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THE Committee of the Society for the Diffusion of Useful Knowledge, and the Publishers, on presenting the Final Part to the Subscribers, offer a few words of explanation and announcement.

The limits proposed for this work have been exceeded by about one-fourth. To have materially abridged the productions of more than two hundred contributors, not copying other works of reference, but each presenting complete articles from original sources, would have been unjust to the writers, and unsatisfactory to the readers. The result has been that, without trespassing largely upon the indulgence of the purchasers, a Cyclopædia has been produced without any important omissions, and differing from other books of the same class in not being hurried to a conclusion by abbreviation of the matter contained under the later letters of the alphabet. The complete book may fairly take rank among works of authority systematically conducted without any improper abridgment of labour or expense; and this, although it is the cheapest original work of the class which any time or any country has produced. That cheapness has been made possible, not by any false economy, not by remodelling old materials, nor by employing inadequate writers, but by the expenditure of no less a sum than forty thousand pounds upon the literature and engravings alone, in the assurance that the excellence of the work would secure a large body of purchasers at a small price, who would eventually remunerate the publishers as certainly as a small body at a large price.

The Committee and the Publishers have to offer their thanks to the numerous body of Contributors by whose exertions they have been enabled to bring the work to a conclusion. They have to offer them especially to the Editor, by whose learning, unwearied diligence, and watchfulness, unity of plan has been maintained during eleven years, error, as far as possible, has been avoided, and regular monthly publication, without a single omission, has been accomplished. It is believed that no similar work has ever been brought to its conclusion with anything like an approximation to the same regularity. A list of the Contributors is subjoined.

In the course of publication care has been taken, in all the great departments, to bring up the information to the most recent period, and also to make the later articles supplementary to, as well as corrective of, the earlier. But omissions, especially of new discoveries, improvements, and recent biographies, cannot have been avoided. These will be supplied by the publication, after a proper lapse of time, which will be at least a year, of a Supplement. A full Index will be published at a future day, which will not only materially increase the value of the Cyclopædia as a work of reference, but will enable the reader to place the later articles in proper connexion with the earlier, in the point of view just mentioned.

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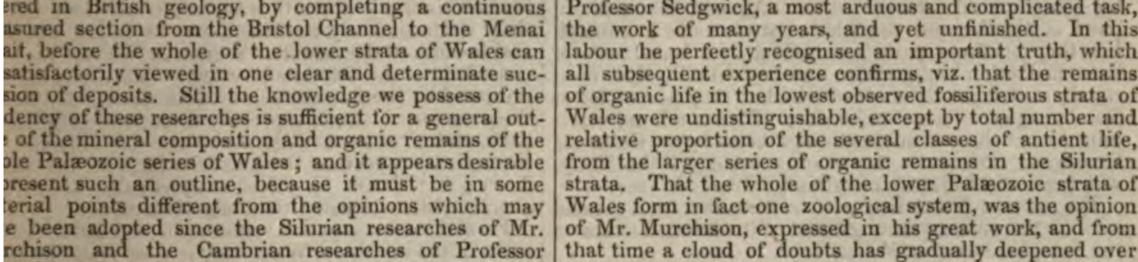
ALES, GEOLOGY OF. Though, since the date 94) of Mr. Aikin's 'Tour through North Wales,' the logical structure of the principality has been actively l extensively examined by Professor Henslow, Mr. rchison, Professor Sedgwick, and other eminent persons, re still remain some points unsettled in the general ssification of the older Palæozoic strata. These difficties are now rapidly disappearing under the continued ertions of Professor Sedgwick, Mr. Sharpe, and the lous members of the Ordnance Geological Survey of eat Britain, directed by Sir H. T. de la Beche. These earches being still in progress, we must wait until the lnance surveyors have executed their important task, l solved the grandest and most inviting problem now ered in British geology, by completing a continuous asured section from the Bristol Channel to the Menai ait, before the whole of the lower strata of Wales can satisfactorily viewed in one clear and determinate sucsion of deposits. Still the knowledge we possess of the dency of these researches is sufficient for a general out- of the mineral composition and organic remains of the ole Palæozoic series of Wales; and it appears desirable present such an outline, because it must be in some terial points different from the opinions which may e been adopted since the Silurian researches of Mr. rchison and the Cambrian researches of Professor gwick were undertaken, though not to such a degree o cause to these eminent persons any but gratifying sations at the progress toward completion of their uous undertaking.

Vhen, in 1831, and many subsequent years, Professor gwick and Mr. Murchison made a friendly partition of our in Wales, each formed for the country he exaed the scheme of classification which seemed most ed to his district. Mr. Murchison, *parting from the er limit* of what we have termed the lower Palæozoic es, and working his way downwards through *sandy*, *careous*, and *argillaceous* strata (almost unknown, ext to Mr. Lewis of Aymestry, and a few intelligent idents in Shropshire, but uncommonly rich in various and cessive groups of organic life), established, on a firm is, the *Silurian System*; Professor Sedgwick, *parting m the lower limit* of the same grand series of strata, and ceeding upwards through many thick *slates*, and *conmerates*, and *a few thin limestones*, in a general sense r in traces of organic life, proposed to constitute for these the Cambrian system. These 'systems' have been adopted into all our geological works with more or less of confident reliance on their being really distinct and recognisable groups of strata, not merely parts of one grand and varied series of antient deposits. But the conterminous boundary of the groups, the exact line, or even the transition zone between them, was never traced. Mr. Murchison was conducted, by his inquiries downward, into the Cambrian system of Sedgwick, perhaps very deeply into it, but without clearly recognising in the slaty and conglomeritic Cambrians the altered shales and grits of the lower Silurians, and without determining the geographical area of these strata. To determine the geographical extent and geological succession of the Cambrian system was left to Professor Sedgwick, a most arduous and complicated task, the work of many years, and yet unfinished. In this labour he perfectly recognised an important truth, which all subsequent experience confirms, viz. that the remains of organic life in the lowest observed fossiliferous strata of Wales were undistinguishable, except by total number and relative proportion of the several classes of antient life, from the larger series of organic remains in the Silurian strata. That the whole of the lower Palæozoic strata of Wales form in fact one zoological system, was the opinion of Mr. Murchison, expressed in his great work, and from that time a cloud of doubts has gradually deepened over the correctness of the classification which divided this one series of antient life into two systems of stratified depositions. Through this cloud, the only one left on the whole horizon of English stratification, light is breaking by the efforts already alluded to; and we are glad to take this opportunity, the last which may occur, by noticing some points in the geology of Wales, to bring up the knowledge of this subject to the actual date. A short summary of facts will suffice for this end, especially as Mr. Murchison's last address from the Chair of the Geological Society (February, 1843) has touched the same questions.

If a line of section be chosen from the shores of the Bristol Channel (as, for example, about Cardiff) across the mountains and valleys to the Menai Strait (a line actually chosen and partly executed by the Ordnance Geological Survey), it may be made to pass through nearly all the principal formations of Wales in a direction favourable for showing the manner of their arrangement. The general features of such a section may be as under:—

No. 1.



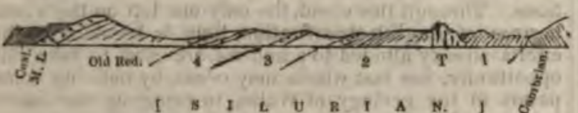
On the shore of the Bristol Channel lias and new red-sandstone lie nearly level against and upon the inclined mountain limestone, which supports in a deep basin the coal strata of South Wales. From beneath these, on the north side of the coal-field, rise the old red-sandstone and the Silurian strata, conformable in position to the coal and mountain limestone.

The Silurian strata are in their lower parts often confused and somewhat altered by frequent occurrences of trap rocks, and in some places are made to assume a slaty structure, and thus even to lose all distinct stratification. When this happens, the lower limit of the Silurian system appears untraceable; but yet, as a mass, the appearance of these rocks is different from the mixed massive and slaty rocks of the central ranges of Wales, which rise to Plynlymmon, the Berwyns, and Snowdonia. In all of these the stratification is greatly disturbed, often contorted near trap rocks (which are bent with the argillaceous and conglomeritic strata), and generally subject to very prominent slaty cleavage. The least confused part of this labyrinth of rocks is in the Snowdonian range, at least this is the part on which Professor Sedgwick's views appear most positive. Here strata rising to a thickness of many thousand feet, including slates, conglomerates, and trap bands, succeed one another with considerable regularity, the lowest beds of the series being near the Menai, and there resting upon chloritic and micaceous schists, and meeting unconformed beds of mountain limestone and other newer strata. These beds Professor Sedgwick conceives to be several thousand feet below the limestone of Bala, whose geological relations have been so much discussed. That limestone appeared to himself and Mr. Murchison to dip (eastward) beneath the rocks of the Berwyn mountains, which consist principally of a mass of clay-slate, in which fossils have not yet been discovered. On this point Mr. Sharpe dissents, and gives as the result of his recent examination the Bala limestone lying in a trough between the Berwyns and Arran Fowddy, and resting on the clay-slates of the Berwyns.

Between the Berwyns and the undoubted Silurian rocks the geographical interval varies. Against the northern parts of the Berwyns the Silurian strata come in contact, but their southern parts are girdled by a broad zone of slates and other rocks, whose age is doubtful; that is to say, it is not yet determined whether they are of lower Silurian age or of some earlier date. This is not yet determined; but there is information gathered by the Ordnance Geological Survey in the country north of the Towy, which goes far to justify a certain positive inference.

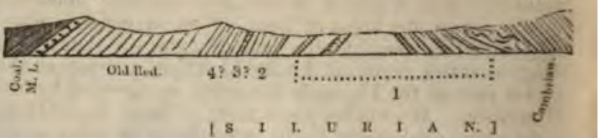
The section No. 2 may now be consulted for a general view of the ordinary arrangement of the Silurian strata on the Salopian border of Wales.

No. 2. North.

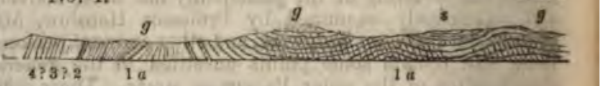


Here, beneath the coal, mountain-limestone, and old red-sandstone, appears the Silurian system, in four parts, resting against the slaty (supposed Cambrian) rocks of the Berwyns. The beds marked 1, Llandeilo flags, are sometimes slaty; 2, the Caradoc sandstones contain conglomerates, and are locally capped by a certain limestone; 3, the Wenlock formation with characteristic limestones; 4, the Ludlow formation, with equally characteristic limestone and peculiar flaggy shales. If this, the normal series of Silurian rocks, retained its characters in all other parts of the border of Wales, nothing could be more easy than to determine the exact geographical range of the system. But this is not the fact. This series exists in perfection only in the eastern and south-eastern parts of the Silurian region, in Shropshire, Woolhope, Malvern, Mayhill, and Usk, and does not exist, with the same parts, in Denbighshire and a great part of South Wales. In the latter district their usual composition may be judged of by section No. 3, where from beneath the old red-sandstone the first Silurian strata which rise to the north are somewhat doubtfully referred to the Ludlow and Wenlock rocks, but are followed by the determinate Caradoc and Llandeilo series. In this series is an anticlinal arch of some considerable length, the effect of it being a reversal of dip to the north, so that the Silurian strata appear to descend beneath what have been called Cambrian, and have been left under the colour appropriated to the Cambrian rocks in Mr. Murchison's splendid map. These so-called Cambrian strata are however, certainly for many miles northward of the Towy, nothing but the Llandeilo shales, less calcareous and less fossiliferous. The seeming great dip to the north, which often occurs in these beds, is sometimes fallacious, and in fact is caused by the cleavage planes, here generally inclined to the northwards at about 70°. The true beds have however been traced by Sir H. de la Beche and the Ordnance surveyors, and they are found to be at first highly, then moderately inclined to the north, afterwards to grow flat, and finally have been proved by Mr. Ramsay to undulate and roll into anticlinals and synclinals such as constitute the region of the interior of Wales. Section No. 4 may be taken to represent this:—Comparing No. 4 and No. 3, the difference on the north side of the section appears great; yet in fact it is merely occasioned by the introduction of the lines of stratification (almost always traceable in almost every rock deposited from water, and under almost every aspect of metamorphism by heat and even fusion), and the separation in the drawing of the arenaceous or conglomeritic beds *g*, from the shales below (and above, as at *s*). Now contortions of the stratification similar to those thus traced, in conglomeritic and shaly strata similarly combined, may be traced through a vast breadth of the mountain regions in Wales, which were conceded to the Cambrian system. Slaty cleavage (represented by the fine cross-lines) goes abundantly through these contorted strata, especially through the argillaceous parts, and gives them a general character different from the ordinary aspect of the Llandeilo flags in the Vale of Towy; but this is an effect of particular causes more characteristic of locality than of geological age.

No. 3. North.



No. 4. North.



From these facts a general presumption arises that the slaty rocks in the interior of Wales may not be really of higher antiquity than the Llandeilo shales and grits. What, upon this supposition, is the Bala limestone? What are the Snowdonian slates and conglomerates? Complete answers to these questions cannot be now given; nor will they be completely answered till the measured work of the Ordnance Geological Survey has been carried across the whole of Wales in the direction already indicated. But answers have been attempted, partly on the evidence of sections, partly on the evidence of organic remains. On the evidence of accurate (but limited) sections, Mr. Sharpe shows that the Bala limestone presents much conformity with the limestone of Coniston in Cumberland, now admitted to be of Lower Silurian age; and that, in common with other associated beds, it contains the fossils of that age, was well known to Professor Sedgwick and Mr. Murchison. But Mr. Sharpe has added the statement, that these Bala beds, 'folding over to the east and south, are surmounted by Upper Silurian beds.' (Murchison, in the *Address* already referred to, p. 14.) If this conclusion have even only a local value, it is, taken in connection with the proved undulations of the Lower Silurian beds north of the Towy, of great importance, and, supposing it established eventually on a greater scale, we shall find that but a small portion of any strata older than the Lower Silurians can be reasonably looked for in the central regions of Wales. Perhaps the lowest clay-slates of the Berwyns may be in this case.

Admitting, with Professor Sedgwick, that the fossiliferous Snowdonian slates and conglomerates are really placed several thousand feet below the Bala limestone, and are parts of a series extending several thousand feet still farther downward, we arrive at the conclusion that beneath the Bala (Caradoc, Woolhope, Coniston) limestone occurs a vast thickness of beds, which in general mineral characters resemble the mixed shales (or slates) and conglomerates north of Llandeilo, which are not in the lowest part of the Llandeilo formation as adopted by Mr. Murchison. We further know that in these Snowdonian rocks occur abundantly fossils referable to no other series of organic remains than to those of the Caradoc and Llandeilo rocks (or, in general terms, to the Lower Silurian rocks), and must therefore believe that the Snowdonian series is coeval with that north of the Towy, or that it is an earlier series of similar mineral constitution enclosing similar groups of organic remains. In either case the progress of classification will require the union into one great group of this whole fossiliferous series. Whether any groups which may occur below (as happens in Cumberland) may require to be distinguished by a distinct general title, remains to be seen. But under what title shall we group this great series of fossiliferous slates, shales, limestone, and conglomerates, and upon what principle rest the definition of it?

It has been already seen that in proposing the Cambrian and Silurian systems, neither Professor Sedgwick nor Mr. Murchison was influenced by any expectation that these systems were or were likely to be distinguished by different fossils or different assemblages of fossils. Mr. Murchison, though aware that the fossils of Bala and Snowdonia were of the (lower) Silurian type, did not for that reason include the rocks in which they lie in his Silurian system. Much importance was then attached to the mineral constitution of the masses, and it is only by the growth of generalization on the sequence of life on the globe that geologists have arrived at a decided preference for general classifications of strata founded on their organic contents. There is danger lest this preference become an unjust partiality. If our classifications of the effects of successive combinations of mechanical, chemical, and vital agencies leave out of view the changes of physical conditions and inorganic agencies which preceded, accompanied, or succeeded the changes of the organic world, it must be very clearly proved that those conditions and agencies are always indicated by the series of organic forms, and that these offer general, consistent, and complete types, and are on this account to be exclusively adopted. If geologists should generally concede this, we must inquire whether the whole Siluro-Cambrian system possesses such a character of harmony in the assemblages of organic remains in its different parts as to demand its union in one system, and forbid the separation of it into two systems, such as the Devonian system and the Carboniferous system, among the higher Palæozoic rocks? This question has not been thoroughly examined. Mr. Murchison, in his general views of the Silurian series, shows that *considerable differences* appear between the groups of fossils in the upper and lower Silurian strata—differences in respect of the trilobites, brachiopoda, and corals. In our judgment the amount of these differences is very nearly proportionate to that which obtains between the liassic and oolitic formations.

Whoever decides to keep these together in one (the oolitic or Jurassic) system, may consistently unite, even with our present amount of knowledge, the whole of the antient fossiliferous rocks of Wales (below the old red-sandstone) into one Siluro-Cambrian system, or one system of upper and lower Silurians. With this he may combine the view of nomenclature proposed in this work, as suited to the present state of geological reasoning, general in its basis, and strictly in harmony with the observed succession of organic life. Such a view would be thus stated:—

Palæozoic Strata.	UPPER PALÆOZOIC STRATA.		
	MIDDLE PALÆOZOIC STRATA.		
	LOWER PALÆOZOIC STRATA. (Silurian System.)	Upper Silurian.	Ludlow formation.
			Wenlock formation.
		Lower Silurian.	Caradoc formation.
			Llandeilo formation.
			Cambrian formation.?

Upon this plan of nomenclature the nonfossiliferous deposits beneath will be called HYPOZOIC STRATA.

The materials for this notice are partly supplied from personal knowledge on many of the points discussed, partly from oral communications from the eminent persons whose opinions are quoted, and from the publications referred to. It is to be regretted that Professor Sedgwick's excellent labours in North Wales are in great measure unknown except by incidental notices and abstracts.

(Sedgwick, in Geological Society's *Proceedings*, 1832 et passim; Sharpe, in the same, 1842, 1843; Murchison, *Silurian System*, 1839; *Address to the Geological Society*, 1843, including information of the progress of the Ordnance Geological Survey.)

WALES, PRINCE OF, is the title usually borne by the eldest son or heir apparent of the British King or Queen. Before the reign of Edward I. the eldest son of the king was called the Lord Prince. The title of Princes of Wales originally distinguished the native princes of that country; and after the entire conquest of Wales and its union with England, the title was transferred to the sons of the kings of England. Henry III., in the 39th year of his reign, gave to his son Edward (afterwards Edward I.) the principality of Wales and earldom of Chester, but rather as an office of trust and government than as a special title for the heir apparent to his crown. When Edward afterwards became king, he conquered, in 1277, Llewellyn and David, the last native princes of Wales, and united the kingdom of Wales with the crown of England. There is a tradition that Edward, to satisfy the national feelings of the Welsh people, promised to give them a prince without blemish on his honour, a Welshman by birth, and one who could not speak a word of English. In order to fulfil his promise literally, he had sent the queen, Eleanor, to be confined at Carnarvon Castle, and he invested with the principality her son, Edward of Carnarvon, then an infant, and caused the barons and great men to do him homage. Edward was not at that time the king's eldest son, but on the death of his brother Alphonso he became heir apparent, and from that time the title of Prince of Wales has ever been borne by the eldest son of the King. The title however is not inherited, but is conferred by special creation and investiture; and was not always given shortly after the birth of the heir apparent. Edward II. did not create his son Prince of Wales till he was ten years old, and Edward the Black Prince was not created until he was about thirteen.

The eldest son of the King is by inheritance Duke of Cornwall. Edward the Black Prince was first created duke of Cornwall on the death of John of Eltham, his uncle, who was the last earl of Cornwall; and by the grant under which the title was then conferred, in the 11th Edward III., the dukedom is inherited by the eldest living son and heir apparent. If the duke succeed to the crown, the duchy vests in his eldest son and heir apparent; but if there be no eldest son the dukedom remains with the king, the heir presumptive being in no case entitled to it. The Black Prince was also created by his father earl of Chester and Flint. By the statute 21 Richard II., c. 9, the earldom of Chester was erected into a principality, and it was at the same time enacted that it should be given only to the king's eldest son. Although that statute, with all the others in that parliament, was repealed by the 1st Henry IV., c. 3, the earldom has ever since been given together with the principality of Wales.

A remarkable instance occurred in the reign of the unfortunate Henry VI., in which all these titles were borne by one, not the eldest son and heir apparent of the king. Richard, duke of York, claiming the crown, procured an act of parliament declaring that after the king's death he and his heirs should inherit the crown; and in order to make this succession the more secure, the act declared his eldest son to be forthwith Prince of Wales, Duke of Cornwall, and Earl of Chester. The antiquity of the title of Prince of Wales and its regular succession are, as it were, a confirmation of the father's present right and of the Prince's own nearness in succession to the crown. Thus on the death of Edward the Black Prince, Edward III. immediately made his grandson Prince of Wales. Richard III., as soon as he came to the throne, created his son Prince of Wales, in order to strengthen his usurpation. Henry VII., again, on the death of his son Arthur, created his next son Henry. Henry VIII., having no son, created his daughter Mary, Princess of Wales; and after her illegitimation, his next daughter, Elizabeth. Each of them in succession had only been heiress presumptive, yet they bore the title, being then next in succession to the crown.

The titles, at length, now borne by the Prince of Wales are, 'Prince of Wales and Earl of Chester, Duke of Saxony, Duke of Cornwall and Rothsay, Earl of Carrick, Baron of Renfrew, Lord of the Isles, Great Steward of Scotland.'

(Selden's *Titles of Honour*, part ii., c. 5; Connack's *Account of the Princes of Wales*, 8vo. 1751.)

WALES, NEW SOUTH, extends over the south-eastern portion of Australia. Its western boundary has been fixed by the grant of the colony of Southern Australia, whose eastern boundary extends from the shores of the Southern Sea along 141° E. long. to 26° S. lat. The northern boundary-line of New South Wales has not yet been determined, but as Moreton Bay (27° S. lat.) has been settled, and in the interior the sheep-stations have nearly reached the banks of the river Karaula, we shall consider that New South Wales also extends to 26° S. lat. On the east, New South Wales is washed by the Pacific, and on the south by Bass's Strait, which separates it from Tasmania, and by the Southern Sea. Within these boundaries it extends from 26° to 39° S. lat. Wilson's Promontory, which constitutes its most southern point, stretches some miles south of 39° S. lat. New South Wales lies between 141° and 154° E. long., the most eastern point being Cape Byron (near 29° S. lat.). Its length from north to south is about 900 miles, and its average width about 630 miles. This gives an area of 560,000 square miles, or somewhat more than the extent of Portugal, Spain, France and Italy taken together. About one-tenth of this immense country is within the limit of location; but the cattle-stations have spread already over a country at least three times more extensive. The remainder is still in the undisturbed possession of the aborigines, and the most north-western portion of it, extending over perhaps one-third of the whole surface, has never been visited by any European. There are also, large tracts lying within the range of the cattle-stations which are still unknown.

Surface, Soil, and Climate.—The physical constitution of this country is very peculiar. The interior consists of wide plains, interrupted only by comparatively short ranges of high hills or low mountains. The waters collected in these plains are all united into one river, the Murray, which disembogues within the territories of South Australia. On the east and south the plains are surrounded by higher land, which constitutes the watershed between the rivers joining the Murray and those which run to the sea. This watershed is in general met with at a distance of about 100 miles from the shores, with the exception of three places, at two of which it retires to a distance of 140 miles, whilst at the third, between the sea and the upper course of the Murrumbidgee, it approaches within about 60 miles. This high land on which the watershed occurs assumes at most places the form of a mountain-chain, but there are extensive tracts where it presents itself only as an extensive swell overtopped by single hills, and at other places it spreads into elevated plains.

I. *The Australian Alps.*—Wilson's Promontory, the most southern headland of Australia, is formed by a mountain, which is visible at the distance of 15 leagues. This rocky mass may be considered as the commencement of the Australian Alps, a range of mountains which, for a distance exceeding 70 miles, runs to the west of north, and, farther on, for about 100 miles, to the east of north, until it approaches 37° S. lat. So far this range seems to be composed of a single chain, from which however several lateral ridges extend to the south-east and west. Its mean elevation does not appear to exceed 2500 feet, and probably it is less at some places. It has been crossed about 45 miles from its southern extremity, and at this place it is 2150 feet above the sea-level. Its acclivities both on the east and west are gentle, and are partially overgrown with forests, containing many timber-trees, mostly blue gum and black butt. Near 37° S. lat. the range rises above the snow-line, and this portion of it is called the Ajuk Mountains. It extends from west to east for about 100 miles, but only the western part of it is always covered with snow; it is however not known to what extent, as these mountains have not yet been explored. South of the Lake Omeo (147° 30′ E. long.) the mountains do not appear to rise much above 4000 feet. From the western portion of this range several offsets branch off towards the north-west, which grow lower as they proceed in that direction, and at a distance of less than 100 miles from the principal chain they terminate on the plains of the Murray River, with ridges of high and low hills, near 36° S. lat. From the eastern extremity of the Ajuk chain (near 37° S. lat. and 148° E. long.), a range extends to the east of north, which always maintains an elevation of from 4000 to 5000 feet above the sea-level, and near 36° 30′ S. lat. rises to 6510 feet in Mount Kosciusko. This elevated pinnacle was found covered with snow in February, by Count Streleski, and it would therefore seem that in Australia the snow-line in 36° S. lat. is found below 6500 feet above the sea-level; whilst in Europe, on the southern declivity of the Alps, in 46° N. lat., it occurs near 9000 feet above the sea. The chain of which Mount Kosciusko constitutes the highest summit continues to run north by east to 35° S. lat., where it terminates on the banks of the Murrumbidgee, where that river suddenly changes its northern into a western course.

The country included between the last-mentioned chain and the north-western offsets of the Ajuk Range is the most extensive mountain-region of Australia, as far as it is known. It extends from south-west to north-east upwards of 200 miles, and its breadth from south-east to north-west probably does not fall short of 120 miles. This gives an area of 24,000 square miles. The base on which the mountains rest seems to vary from 1200 to 1800 feet above the sea-level. The numerous ridges by which it is traversed run north or north-west, and are higher in the eastern district, where they rise from 1000 to 2500 feet above their base. Towards the south-west they are lower. In this region originates the largest of all the perennial rivers of Australia, the Murray, with numerous branches, by which it is supplied with that abundance of water which distinguishes that river in its whole course and all the year round. The drainage of the northern portion runs into the Murrumbidgee, which river in this way is likewise supplied with sufficient water to prevent it from becoming dry during the summer months, as is the case with most of the large rivers in the plains of the interior. That portion of this region which is occupied by mountain-ridges is comparatively small, as the valleys along the numerous watercourses are of very considerable width, and according to all appearance no less fit for cultivation than for pasture.

II. *Australia Felix* is that portion of New South Wales which lies west of the Australian Alps, and extends from the Southern Sea to the banks of the Murray and Murrumbidgee rivers. It has obtained this denomination on account of the great proportion of land fit for cultivation which it apparently contains. Nearly the whole of this country was entirely unknown up to 1836, and it cannot therefore be a matter of surprise that more than one-half of its surface is still almost entirely unknown, though in the last few years much has been done to ascertain its capabilities.

The coast-line of this tract, from Wilson's Promontory on the east to the mouth of the river Nangeela or Glenelg on the west, extends for more than 300 miles. Only three harbours are found on it—Portland Bay, near the western, and Port Phillip and Western Port, near the eastern extremity. Between Portland Bay and Port Phillip, a distance of more than 200 miles, there is no place of safety even for small vessels, with the exception of Port Fairy, a small harbour for coasting vessels, but quite open to the south-eastern winds, which during the summer blow for three months with great force. It is true, that a portion of this coast-line measuring nearly 100 miles, between Cape Otway on the east and Port Fairy on the west, has not been surveyed, but as it is known that no river even of moderate size reaches the sea in this tract, and as the coast seen from afar is a low beach backed by sandhills of moderate height, it is almost impossible that even a small harbour can exist on this coast. The eastern portion of the coast from Wilson's Promontory to Western Port is mostly high, being only low in the innermost corner of the bay formed by the promontories Cape Liptrap and Wallamai, where there are lagoons separated from the sea by narrow strips of sand. The coast from Western Port to the western boundary-line of New South Wales is low, with the exception of some cliffs, which occur at the entrance of Port Phillip, and at Cape Nelson and Cape Bridgewater, west of Portland Bay. The low shores are sandy, except at some places where swamps exist. West of Cape Nelson the coast is bounded by bare sandhills, consisting of a loose sand, which is carried inland by the gales.

Western Port affords good anchorage for vessels of considerable size, and is safe, being protected against the southern and south-eastern winds by Phillip Island, which lies across its entrance. The country surrounding the harbour is hilly, being traversed by ridges connected with the southern portion of the Australian Alps, but it exhibits a considerable degree of fertility, as is proved by several stations, which had existed there for several years before the settlement of Port Phillip was effected. But only the tract immediately contiguous to the harbour is known; the extensive country skirting the western declivity of the Southern Australian Alps, as far north as the Ajuk range, has not yet been explored.

Port Phillip, situated at the western entrance of Bass's Strait, is a harbour of great capacity. It measures 40 miles from north to south, and as much from east to west in the widest part. The country which surrounds it is tolerably elevated, at least sufficiently so to protect shipping against the winds. Against the swell of the sea they are protected by the narrowness and the form of the entrance of the harbour, and the shoals which lie before the entrance. The country surrounding this excellent harbour is in general of superior quality. As far as it has been well examined, or to the distance of from 30 to 40 miles from the northern and western shores of the bay, it contains a large proportion of land fit for agricultural purposes; and the remainder, with the exception of a few tracts of moderate extent, affords good pasture, consisting of open grassy downs. Though the settlement at this place was founded only in 1837, by Sir Richard Bourke, the influx of emigrants has been so great, that several tracts of land were cultivated with wheat, maize, oats, and potatoes in 1840, and numerous herds of cattle and sheep covered the downs. It was then already proposed to divide it into three counties: the northern district, under the name of Bourke, and the western under that of Grant; between these two is the county of Normanby. The country lying to the north-east of the harbour, towards the Australian Alps, appears to offer less advantages, but as no account has been published of it, it would be premature to decide this point.

On the north of Port Phillip the watershed between the rivers falling into the Southern Sea and the Murray occurs about 45 miles from the northern extremity of the harbour, but farther to the west it is between 80 and 100 miles from the sea-shore. On both sides of the watershed the country is hilly and broken, and between 143° and 142° E. long. it rises into mountains. This hilly tract is in general from 30 to 40 miles across. To the south of it is an extensive plain, which descends gently to the sea-shore. Near the sea it is almost level or slightly undulating; but farther north it contains a rather large number of hills, rising from 500 to 700 feet above their bases. These single hills are most numerous in the vicinity of the hilly tract along the watershed, and among them is Mount Boninyon, which rises 1570 feet above its base. This plain exhibits different degrees of fertility. The worst portion is that which lies due west of the colony of Port Phillip, and extends from the River Nurriwillun, or Lea (144° E. long.), to the River Hopkins (142° 45′). It is about 60 miles long, and from 20 to 30 wide, and is covered with small pebbles of ironstone and fragments of porous ferruginous sandstone, and no wood or water is found except on the rivers and lakes. A great number of lakes are scattered over this plain, one of which, called Carangamite, is about 30 miles in circumference. Its waters are salt, as are those of nearly all the others. The isolated hills, which rise on this plain from 500 to 700 feet above their base, appear from their formation to be of volcanic origin, and one of them, Mount Napier, is an extinct volcano. The country lying between this barren waste and the sea is believed to be better, but we have no account of it. West of the Hopkins the land along the sea-shore, as far as Portland Bay, is generally poor and destitute of wood, except on the banks of the rivers and round the bases of the isolated hills; and that lying west of Portland Bay, though better, is only indifferent. But that portion of the plain which lies north of 38° contains a large portion of good land. In some parts it is overgrown with thick forests of eucalyptus trees, Banksiæ, casuarinæ, and other trees peculiar to Australia. At other places it is covered with open forests and abundant grass; between these forests occur some plains of considerable extent, which are destitute of trees, but overgrown with grass and bushes. The numerous hills are thickly wooded, and the best soil is found at their bases. As however the soil in this plain is not of first-rate quality, it has not yet attracted the attention of settlers. That portion of it however which lies north-west of the colony of Port Phillip, and is comparatively very hilly, is known to have a very good soil, and is well-timbered; probably it will in a few years receive the benefit of cultivation. There is however on this plain, south of the Grampians, though at some distance from them, a very large swamp, which, with several other swamps surrounding it on all sides, covers many square miles in extent.

The best portion of Australia Felix is that which lies within the hilly tract on both sides of the watershed. It is remarkable that nearly all the ridges by which this tract is overtopped do not run in the direction of the watershed, but cross it nearly at right angles. The most western of these ridges rises to the elevation of mountains, and has been called the Grampians, which name is appropriate if their elevation only is considered, but the extent cannot be compared with that of the Scottish range of that name. The Grampians of the South extend from south to north about 54 miles, between 37° 40′ and 36° 50′ S. lat., and occupy a width of 20 miles. They are supposed to consist of two ranges: that seen from the east is called the Serra, on account of its numerous summits, and nearly in its centre stands Mount To-ol, or Mount William, which rises to 4500 feet above the sea-level. That chain which is seen from the west is called Victoria Range. The eastern chain terminates on the south abruptly with two high summits—Mount Abrupt, which is 1700 feet, and Mount Sturgeon, which is 1071 feet, above its base. The Grampians are surrounded with extensive forests of fine tall timber-trees of eucalypti.

The country which is drained by the rivers originating in the southern and western portion of the Grampians appears to be the most fertile tract of New South Wales. It is abundantly watered by the Nangeela, or Glenelg, and its tributaries. The soil is black and rich, several feet deep, and rests on a subsoil of clay. In its natural state it has the appearance of a park, the plain being studded with clumps of casuarinæ and other trees, and, as thick forests are not frequently met with, the ground almost everywhere is covered with excellent herbage. But near the banks of the Nangeela are low tracts, which are swampy, and in many places interspersed with numerous small lakes and ponds. The surface of the higher portion of this plain is strongly undulating, and on it are found many small sandhills. This fertile country is supposed to extend 50 miles from south to north, and somewhat more from east to west. Though at a considerable distance from the sea, some cattle-stations have been established in this country since its discovery in 1836.

The hilly tract of the watershed east of the Grampians has its surface diversified by numerous narrow ridges of rocks, several round hills of moderate elevation, and many rather narrow valleys traversed by clear and beautiful streams. In some parts the hills are covered with wood; at other places free from wood, but overgrown with grass to the top. About 30 miles west of the Grampians, some more elevated ridges traverse the watershed. They have been named Pyrenees, but the natives call them Peerick Hills. They consist wholly of granite, but are all grassy to their summits, and thinly wooded. They rise from their base with rather a steep acclivity. East of the Pyrenees the country is more broken and the hills are higher. It is mostly wooded, but good strong grass grows among the trees. The forests are chiefly composed of box and lofty blue gum. A considerable portion of the hilly country, placed nearly in the centre of it, consists of hills of lava, and in these parts the vegetation is less vigorous and abundant than on the Pyrenees and the ranges which lie farther east, and approach the meridian of Port Phillip. A very large portion of this hilly country affords excellent pasture, and it is supposed that many large tracts are fit for cultivation, but no part of it has been occupied by settlers, except along the road which leads from Port Phillip to the Murrumbidgee.

Between the hilly region of the watershed on the south, the mountain-region of the Australian Alps on the south-east, the course of the Murrumbidgee and Murray on the north, and the boundary-line of South Australia on the west, lie the plains of the Murray River. These plains extend on an average 150 miles from south to north, and 300 miles from east to west, but our knowledge of this country is very imperfect. We only know that it is very well watered, all the rivers which drain it rising in the mountain-region of the Australian Alps, the hilly region of the watershed, or the Grampians, and that the larger of these rivers, as the Millewa and its tributary the Bayunga, flow in wide bottoms, sometimes eight or ten miles across, which bottoms are overgrown by high trees, partly swampy or covered with lakes and ponds, but exhibiting an extraordinary degree of fertility in the vigour of their vegetation. The higher grounds between the rivers are either level or slightly undulating, and only hilly where they approach the more mountainous tracts on the south and south-east. In some places are found salt lakes in considerable numbers, but in general these plains are open, grassy, and beautifully diversified with serpentine lines or clumps of wood. Even at a considerable distance from the banks of the rivers water is not scarce, as there are numerous hollows in the plains, which generally contain water; some parts so much so, that they are converted into swamps after heavy rains. As far as the plains of the Murray River have been seen by travellers, they are certainly fit both for cultivation and rearing of cattle. No settlements have been made in the plains, except along the banks of the upper course of the Murrumbidgee, where they have extended to the west of 147° E. long.; but the difficulty and expense of bringing the wool and the produce of the dairies from this distance to Sidney are such, that of late years the advance of the cattle-stations along the Murrumbidgee has been much slower than formerly. But it is hoped that the plains of the Murray River will be settled by emigrants advancing from the southward through the fine country watered by the Nangeela; and to favour the settlement of this immense tract by a more easy access, a town has lately been founded in Portland Bay. This bay extends twenty-six miles from east to west, and ten from north to south, and has good anchorage on its western shores, in four, five, or six fathoms, but it is open to the south-east winds, and during the south-western gales a swell sets into the anchorage, causing a heavy surf on the beach.

As no part of Australia Felix had been settled before 1837, the accounts respecting its climate which we possess must be extremely scanty. From the unconnected observations of hasty travellers who have visited it, we learn that rains are by no means so scarce as in the great plains of the interior or in the countries along the eastern coast; and as the winds to which this country is most exposed in winter (June—August) are those which are usually attended with heavy rains, it is supposed that this country will be less subject to such frequent and long droughts as the old colony. In winter, frost occurs along the watershed, and hoar-frost is experienced even on the low plain along the sea.

III. *Gippsland* is the name which has lately been applied to that portion of New South Wales which from the eastern declivity of the southern portion of the Australian Alps and the Ajuk Range descends to the Pacific. The sea-coast between Wilson's Promontory and Cape Howe bears the name of the Long Beach, as in its whole extent, for 200 miles, it extends in a continuous line without any indentation, curving however a little in the middle. The shores are low and sandy, but at the back of them the country rises into hills. Gippsland extends along this shore from the Southern Australian Alps to 148° E. long. It consists of an inclined plain, which however near the mountains appears to descend with great rapidity, as in the middle of the region the plain is only 210 feet above the sea-level. The northern portion of this country is traversed by several ranges of hills, which detach themselves from the Ajuk Range and run south by east. They are of considerable elevation near the principal range, but grow lower as they proceed southward, until they cease at a distance of several miles from the shore. The valleys are of moderate width, but grow wider towards the termination of the ridges. The hills are rather steep, but in general well wooded. The valleys exhibit a considerable degree of fertility, and some cattle-stations have been established in them. In the centre of Gippsland are plains of considerable extent, which are covered with open forests, and ready to receive and maintain numerous herds of cattle. These plains however do not extend to the shore, for between them and the sea a ridge of moderately high hills stretches parallel to the sea between the mouths of the rivers Barney and La Trobe. These hills are thickly wooded. The most southern portion of Gippsland is traversed by several offsets of the Southern Australian Alps, which are covered with forests of blue, green, and black butt, in which numerous timber-trees are found. The whole of Gippsland is abundantly watered by several streams, running from sixty to seventy miles, but it is not known if their mouths are deep enough to receive small vessels. At the southern extremity and on the eastern side of Wilson's Promontory is Corner Inlet, a small harbour for small vessels, and full of shoals. It is stated that in the summer months the thermometer at nine o'clock in the morning generally rises to 68°.

The country extending north-east of Gippsland to the river Moruya, which forms the southern boundary of the settled part of the colony, has not yet been explored in the interior. At Cape Howe the coast begins to trend due north, and changes its character, being in general rocky and high, and presenting several indentations, among which the most important is that of Twofold Bay, a tolerably good harbour even for large vessels, in which a settlement has lately been made, from which the adjacent country in a short time will probably be explored. Not far south of the river Moruya an isolated high peak lies close to the shore: it is called Mount Dromedary, and rises to 3000 feet above the sea-level.

IV. *The Connecting Table-lands.*—The most northern range of the Australian Alps, called the Warragong Chain, terminates near 35° S. lat., where the Murrumbidgee, encircling the extremity of this range, changes its northern course into a western. The Warragong Range extends nearly south and north, and along its eastern base lie extensive plains. The most southern of these plains, as far as is known, are those which go under the name of Moneroo or Monaroo Plains, and are famous in the colony for the large herds of cattle and numerous flocks of sheep which find there abundant pasture. These plains extend a considerable distance south of 36° S. lat. Less extensive plains, contiguous to one another, lie farther north. East of the northern portion of the Warragong Range are Yass Plains and the hilly tract enclosing Lake George. The elevated plains however do not terminate with the range of the mountains, but extend, under the name of Goulburn and Bredalbane Plains, about forty miles farther north to the southern extremity of Cockbundoon Range, which constitutes the southern part of the Blue Mountains. The last-mentioned plains occupy a width of about fifty miles, extending eastward to the narrow valley in which the Shoalhaven River runs. Along these plains lies the watershed between the rivers running east and west, as some of the sources of the Lachlan and Murrumbidgee, which run to the west, and those of the Shoalhaven and Wollondilly are found in them. They consist of open flats of grassy land, or of open undulating downs encircled by eminences of little height, which separate the plains from one another: they all afford excellent pasture for sheep, and cultivation also is in many parts carried on with success. On these plains are several lakes. The most remarkable of them is Lake George, a sheet of water seventeen miles in length and seven in breadth. There is no outlet for the lake, though it receives no less than four mountain-streams from the eminences north of it. The water is slightly brackish, but quite fit for use. In long droughts it dries up, and then resembles a grassy meadow, not unlike the plains of Bredalbane. There are several other lakes to the east and west of Lake George; they are small and the water is sweet. The plains on which these lakes occur are more than 2000 feet above the sea-level, and in winter a considerable degree of cold is experienced on them. Frost occurs for several weeks nearly every night. As in these parts no mountain-chain separates the countries lying along the eastern coast from the interior, the great thoroughfare leading from Sydney to the banks of the Murrumbidgee, Australia Felix, and Port Phillip, traverses the northern portion of the plains obliquely, and this, united to their fertility, was one of the reasons why they were settled sooner than most other parts of the colony.

Along the eastern edge of these plains runs the Shoalhaven River. In the upper part of its course this river flows nearly on a level with the surface of the plains, and resembles an English stream. The temperature of the adjacent country in these parts is so low even in summer, that potatoes and gooseberries, for both of which the climate of Sydney is too hot, grow luxuriantly. The upper valley of the Shoalhaven River contains a considerable portion of good land. In proceeding northward the river sinks deeper and deeper under the adjacent plains, and where it approaches its north-eastern great bend it flows in a ravine about 1500 feet below their common level. The precipices of this ravine, consisting at one part of granite and at another of limestone, give a peculiar grandeur to the scenery of this part of the Shoalhaven River. The country to the eastward of Shoalhaven River, that is to say, between it and the sea-coast, is very wild and mountainous. It is full of high hills and short ridges, the summits of which generally rise to the elevation of the plains west of the river; their tops present sometimes level plains, but as the hills are composed of sandstone destitute of a layer of soil, they have as little vegetation on them as the steep declivities of their sides. Near the coast, where the hills are lower, the sandstone is covered by a layer of soil, but with the exception of a few tracts of moderate extent, the soil is poor; it is somewhat better towards the south, but even there of indifferent quality. The coast is everywhere high and rocky, except at a few places where inlets occur, which terminate with low and mostly swampy grounds. Indentations are rather numerous, but none of them can be called a harbour, except Jervis Bay, which is about eight miles long from south to north, and six wide; and though not such a magnificent harbour as Port Jackson, it still affords good shelter and safe anchorage, being divided from the sea by high rocky masses, and in general it is from 9 to 12 fathoms deep. It is intended to found here a town, and to make a road through the country between it and the connecting plains, that the increasing settlements on the Murrumbidgee and in Australia Felix may be enabled to bring the produce of their industry with less expense to a place where it can be shipped.

V. *The Blue Mountains* begin on the south with Cockbundoon Range, near 34° 30′ S. lat., and extend northward to the Monundilla Range, which runs from east to west near 32° 40′ S. lat. Their length therefore does not exceed 130 miles. Towards the southern extremity of the range its width is about 40 miles; where it is crossed by the road leading from Sydney to the interior, it is about 60 miles across; and at its termination in the Monundilla Range, probably more than 70 miles. Its eastern edge runs along the ridge which encloses the Nattai River on the east, crosses the Warragamba, and extends along the western bank of the Nepean, Hawkesbury, and Macdonald Rivers, terminating at the source of the last-mentioned river in the Monundilla Range. The western edge of this mountain-system has not yet exactly been made out. It seems to extend from the sources of the Wollondilly River (149° 30′ E. long. and 34° 30′ S. lat.) nearly due north, traversing Fish River some miles above Bathurst, at the place where it joins Campbell River, and from this point to run to the east of north to the western termination of Monundilla Range (150° E. long. and 32° 30′ S. lat.). The southern portion of the range, or that contiguous to the Nattai River, does not seem to rise to a great elevation above the general level of the country (2000 feet), but it consists of sandstone, nearly destitute of vegetation, and is consequently uninhabitable. Seen from a higher elevation it presents the appearance of a flat country whose surface is hollowed and cracked out into the wildest ravines, deep and inaccessible. No road traverses this part of the range. The only road by which the mountains are passed is that leading from Sydney to Bathurst. It runs along the line of high land which separates the ravines of the valley of the river Cox on one side, from those which belong to the valley of the Grosse on the other. The mountains, composed of sandstone, rise with an exceedingly steep acclivity to an elevation of about 1000 feet above the flat country on the banks of the Nepean River. Farther on, the rise is more gradual, till the highest part of the road, near King's Table-land, 3400 feet above the sea-level, is attained. The sides of the mass of sandstone over which the road runs are intersected by ravines, very steep in proportion to their height: near the highest part of the road, the profound depth of the valleys, enclosed by rocky precipices, imparts a wild grandeur to the scenery, hardly to be conceived. The rocks are in most parts overgrown with stunted trees. There is scarcely a patch of land along this part of the road fit for cultivation, except near an inn, which is 2800 feet above the sea, and where gooseberries and potatoes of excellent quality grow. Only two summits, Mount Hay and Mount Tomah, standing about 12 miles north of the road, rise considerably above its level. The descent from the more elevated part of the mountains at Mount York is not less precipitous than the ascent from the east. West of Mount York the road passes through some deep valleys, where the mountains are composed of granite, and their surface is thinly wooded and grassy. On Stony Range, the most western ridge of the Blue Mountains, the soil is of a red colour, rather rich, and bears trees of uncommon magnitude.

VI. *The Liverpool Range and the Connecting Ridge.*—At the distance of from 60 to 70 miles north of the Monundilla Range is the Liverpool Range, running east and west. This range is of great extent, as the lofty mountains which enclose on both sides the river-basin of the Manning, which forms the boundary-line of the settled country on the north (32° S. lat.), are to be considered as its eastern prolongation. On the west it appears to be connected with the Warrabungle or Arbuthnot Range, which near 149° E. long. runs nearly south and north. It appears from this that the Liverpool Range extends upwards of 180 miles. This range is imperfectly known, except where it constitutes the southern border of Liverpool Plains, between 150° and 151° E. long. In these parts its southern slope rises with a precipitous acclivity, and in some places nearly perpendicularly above the plains which lie south of it. Its elevation is apparently very considerable, probably 1500 or 2000 feet above the base. It appears like a huge wall with numerous notches in it, formed by the short, but deep ravines, by which it is indented, and from which numerous torrents descend, which feed several perpetual streams. Where the slope is not too rapid, it is thinly wooded. On account of the steepness of the ascent only two places have been found at which it can be traversed with ease: the western, known by the name of Pandora Pass, is near 150° E. long.; and the eastern, called by the natives Hecknadüey, occurs west of 151° E. long. When the summit of the passes is attained, a short descent brings the traveller to the Liverpool Plains. This evidently shows that this range is only the marginal range of an elevated table-land, and this is also proved by its inconsiderable width, the eminences which overtop Liverpool Plains occupying only a narrow space, perhaps nowhere more than 8 or 10 miles in breadth.

The Liverpool Range is connected with the Monundilla Mountains by what may be called the Connecting Ridge. This ridge lies between 33° 10′ and 34° 20′ S. lat. It begins on the Monundilla Chain, near 150° 20′ E. long., and runs north-west until it attains 149° 20′ E. long., when it turns north-north-east, and in that direction meets the Liverpool Range some miles east of Pandora Pass. It divides the affluents of Goulburn River, a tributary of Hunter River, which falls into the Pacific, from those of the Cudgegong and Talbragar, which fall into the Macquarie. As far as this range is known, it does not appear to rise to any considerable elevation. In some parts it is overtopped by rocky hills including short valleys; whilst at others it extends as a broad-backed swell with very gentle acclivities, and again it sinks down nearly to the level of the adjacent country. In some of the last-mentioned tracts the surface is so level, that the watershed is covered with extensive swamps. A considerable portion of this ridge is without trees, overgrown with bushes and grassy; but on the rising grounds are forests, composed mostly of apple-trees, iron-bark, stringy-bark, and box. There are some tracts where water is scarce, but in general this ridge is sufficiently watered, and settlements have of late years spread over its bases and acclivities. It is across this ridge that the most easy communication could be effected between the interior of New South Wales and the coast, as it is the highest ground over which the traveller has to pass when he goes from the coast along the Hunter and Goulburn Rivers into the plains drained by the Macquarie; and it is probable that the commercial capital of this part of the colony will be transplanted to the mouth of the Hunter River, though the harbour of Newcastle cannot be compared to that of Sydney.

VII. *The country between the Blue Mountains and the Pacific.*—The line of coast between the mouths of Shoalhaven River (north of 33° S. lat.) and Hunter River (north of 35°) presents a range of bold perpendicular cliffs of sandstone, lying in horizontal strata. These cliffs however are in many places interrupted by sandy beaches, behind which the country is low and flat, the high land retiring to a considerable distance. The spaces now occupied by sandy beaches appear at no very remote period to have formed the entrances of bays and arms of the sea. In many places they are even now so partially filled up, that there still exist extensive salt-water lagoons, separated from the ocean only by a bank of sand, through which the sea yet occasionally forces a passage.

An elevated country lies north of the banks of Shoalhaven River, where it runs from west to east. It is formed by a remarkable range of high land, which traverses the whole country between the Blue Mountains and the sea, being connected with the former at the source of the Nattai River, where the summit of Mount Jellore rises. From this summit it extends south-east to the very shores of the sea, between Kiama Head and the mouth of the Shoalhaven River. The highest part is known as the Mittagong Range. The more elevated portion of this tract, which consists of ferruginous sandstone, is almost entirely barren, and only covered with shrubs. Its southern slope is furrowed by deep ravines, which are hardly accessible except from the Shoalhaven River, into which they open, and on their declivities are only small tracts fit for cultivation, but the soil is poor. North of this unprofitable waste and along the sea-shore is a lofty range of trap-rocks, called Illawarra, possessing a very rich soil, which in its natural state is buried under matted creepers, fern-trees, cedar, cabbage-trees, and a luxuriant tropical vegetation, nourished both by streams from the lofty range and the moist breezes of the sea. The extent of cultivable ground is small, but it yields most abundantly all kinds of grain and other vegetables. The forests constitute the riches of the settlers in this tract, as the trees are high and make excellent timber, especially a kind of cedar, of which a great number of boards go to Sydney, though the transport is very expensive, as the country at the back of the Illawarra Range is covered with offsets from the Mittagong Range, which, by their deep ravines, cause great obstacles to the transport of any heavy article.

From the ravines of the Mittagong Range the country as we proceed northward opens gradually into a kind of plain, the best portion of which is known by the name of the Cow Pastures, which name is derived from a herd of wild cattle which were found pasturing on them when they were discovered. The surface of this plain, which contains upwards of 100,000 acres, consists chiefly of undulating thinly-wooded hills, covered with a sward of fine dry native pasture, with alluvial tracts along the margin of the rivers of the most fertile description, producing wheat equalling in quality and quantity the best in England. Some tracts adjoining the river Nepean, which drains this plain, were originally clear of timber; and as they are intersected with ponds having no ready outlet for their waters, they are always considerably flooded after a heavy fall of rain, and consequently make excellent meadows. Cattle abound on this plain, and also sheep: the wool is considered the best in the colony. In the middle of the Cow Pastures is the Razor-back Range, an isolated mass, which extends about 8 miles in a general direction between west-north-west and east-south-east: it is very level on some parts of its summit, and so very narrow in others, while the sides also are steep, that the name it has obtained is very appropriate and descriptive.

The Cow Pastures extend over the northern districts of the county of Camden, and the countries contiguous to them on the east and north contain the best portion of Cumberland. In the last-mentioned county the sandstone ridge along the sea extends only a few miles inland south of Botany Bay; but between Botany Bay and Port Jackson it reaches the vicinity of Paramatta and Liverpool. The land immediately bordering upon the coast is of a light, barren, sandy nature, and, in its natural state, thinly besprinkled with stunted bushes. The crops it yields are so scanty, that it would not be cultivated were it not for the vicinity of the capital of the colony. At a distance of from 10 to 15 miles inland the country is somewhat better, and thickly covered with evergreen forest-timber and underwood; but the clayey soil is of indifferent quality, and the labour required for clearing it has been an obstacle to settlements. Beyond this commences the fertile portion of the country, a plain extending from south to north about 40 miles, from Appin on the south to Windsor on the north, with an average width of about 20 miles, so that it is nearly equal in extent to Surrey. The surface of this extensive tract is gently undulating, and rises only in a few places to moderate and isolated hills with a gentle acclivity. The soil in general is very good, consisting of decomposed trap. A large portion of it is under cultivation, which even extends over the declivities of the hills. Prospect Hill, which is the most conspicuous eminence in the country, is cultivated to the summit. Nearly the whole tract could be cultivated, but it remains for the most part occupied by the original wood. It is however very generally enclosed by substantial fencing, and affords good pasture for cattle. The rich red soil, derived from the subjacent trap rock, produces crops as abundantly now as when it was first tilled, upwards of thirty years ago. The southern districts are stated to have the richest soil, but water is scarce, and where it is found the surface-water possesses a saltness, which renders it at some seasons unfit for use. This tract and those adjacent to it are in general deficient in water, as only a few springs are found; but there are a number of gullies, worn out by the rains, in which deep holes have been excavated, at irregular intervals, by the occasional torrents which pour through them, where water is generally found for a considerable portion and sometimes the whole of the year. This water is often brackish, and has a nauseous sweet taste; but in the fresh-water holes it is good, and much relished by the cattle. There seems to be a considerable portion of saline matter in most of the lands of this tract, as it is often seen in dry weather lying like hoar-frost upon the ground in the vicinity of ponds.

Along the banks of the Hawkesbury are alluvial lands, which exhibit an extraordinary degree of fertility, having yielded one crop of wheat and one crop of maize in each year for more than 30 years. These lands however are exposed to occasional terrible floods, which take place not at certain periods, but irregularly, often after a lapse of many years, and sometimes when the crops are still on the ground. These excessive floods originate in the peculiar nature of the rivers and of the climate. The rivers of this portion of Australia do not run, as in most other countries, in bottoms, but wind in a tortuous course between high grassy banks covered with heavy timber and brushwood. These banks are very precipitous, rising in most places perpendicularly to 100 and even 200 feet above the common level of the river. There are only a few places at which it is possible to get from the top of these banks to the bed in which the river flows. When by heavy rains of long continuance a volume of water larger than usual falls on the hilly surface of the country in which the upper branches of the Hawkesbury have their origin, the waters are not quickly imbibed by the soil, which consists of indurated clay. They therefore sweep down the deep ravines, with which the country is furrowed, with resistless force, and accumulating in the bed of the river, they make it swell with inconceivable rapidity. Its tortuous course, and the fallen trees which are in some parts very numerous, especially where it forces its way through narrow chasms, check the flow of the waters towards the sea, while the narrow channels and high banks keep them from spreading out, until, overtopping these banks, the waters sweep over the adjacent country. Thus it may be conceived, how it happens that the Hawkesbury sometimes in a few hours rises above its elevated banks. In 1806 it rose 90 feet perpendicular above its ordinary level, and caused great desolation on the alluvial grounds contiguous to its banks. In 1817 it rose nearly as high.

The country lying between Port Jackson and Broken Bay, and extending from the sea to a line drawn from Paramatta to Windsor, is one of the most desolate of those districts which lie contiguous to the Pacific. Its surface is an undulating ground, broken by a succession of deep ravines, and its soil is exclusively composed of barren sandstone rocks, over which only stunted trees are thinly spread. These forests are composed of *Banksiæ* and grass trees (*xanthorhœa*), which are usually found in sandy soil where nothing else can vegetate, and these trees always suggest the idea of hopeless sterility. This tract is quite uninhabited, and uninhabitable, even for the aborigines. It is about 25 miles long and 15 wide. It is surrounded on the north-west and north by the Hawkesbury, which flows here in a very deep valley between rocks, which rise to 600 feet, and are nearly perpendicular; at some places they overhang the river. In this deep chasm the river flows slowly, is smooth as a mirror, and affords access by boats and small vessels to the little sheltered farms which are found on its banks; for there are some small patches of alluvial soil, which occur alternately on each bank, and comprise farms of from thirty to a hundred acres.

The country north of the Hawkesbury, as far as it is drained by torrents which join that river, is as barren as that south of it, but rather more mountainous, and some of the hills rise to a considerable elevation. It is composed of sandstone, and is only partially covered with vegetation, except a few isolated heights, which generally consist of trap-rock, and are covered with a tolerably good soil and very heavy timber.

VIII. *Basin of the Hunter River.*—This basin is the largest which has up to this period been discovered in the countries of Australia bordering on the Pacific. It extends from the sea westward to the Connecting Ridge, a distance of about 140 miles in a straight line. Its average width certainly does not fall short of 60 miles. This gives an area of 8400 square miles, or an extent of country equal to Wales with the addition of Monmouthshire. This large tract seems to contain a greater proportion of available land than any other portion of New South Wales of equal extent, some portions of Australia Felix perhaps excepted. The whole basin may be divided into two portions. The eastern or lower basin, or that which lies east of 150° 40′ E. long., is drained by the Hunter River and several large affluents; and the western or higher basin, west of 150° 40′ E. long., by the Goulburn, a tributary of the Hunter and its numerous feeders.

The lower basin of the river consists of two inclined plains, sloping towards the banks of the river, of which that on the northern side is the more extensive, measuring about 40 miles from the banks of the river to the Liverpool Range, whilst the southern is hardly half as wide. The Hunter resembles the rivers of Europe more than the other rivers in the eastern districts of New South Wales, as it flows partly through a bottom which contains extensive tracts of alluvial land. The largest of these alluvial tracts however do not, as in Europe, occur towards the mouth of the river, but at places where the river is joined by some of its larger tributaries. Thus Wallis Plains are found where the river receives the William and Paterson Rivers; the Patrick Plains, where it is joined from the south by the Wollombi, and from the north by the Fall River; and Twickenham Meadows or Plains at its confluence with the Goulburn. The two last-mentioned alluvial plains are of considerable extent, Twickenham Meadows measuring 12 miles and upwards along the banks of the river, with a width varying from half a mile to a mile and a half. Some of the alluvial plains in their natural state were heavily timbered, and required much labour to bring them into cultivation; whilst others, as Twickenham Meadows, were scattered over with trees, singly or in irregular clumps, and required very little preparatory labour. All these alluviums however are of amazing fertility, producing heavy crops of wheat, maize, and whatever else is sown upon them.

The higher grounds rise into high hills only where they approach the outer edges of the basin. The surface at all other places is only undulating, and at some nearly level, to a distance of about 12 miles on the south, and on the north more than 20 miles from the river. In the vicinity of the sea-coast the soil of these higher grounds is barren, and only covered with stunted trees, but in this tract extensive coal-measures are found, from which the whole colony is supplied with coal, and which have greatly increased in value since steam-navigation has been introduced. At a distance of about 12 or 15 miles from the sea the soil improves. The more elevated parts have a soil of inferior quality, but the depressions between them are overgrown with thick underwood, and tolerably fertile, in some places of considerable fertility. Proceeding still farther, the rising grounds are what is called open forest-land, thinly sprinkled with large trees, among which fine herbage grows, which generally affords excellent pasture for sheep. As the alluvial tracts do not constitute a great proportion of the available land, they are only cultivated to maintain the large sheep-farms which have spread over nearly the whole of this lower basin of the river. In many parts of this undulating country the soil presents what is called a 'ploughing-ground,' where the surface appears to have undergone ploughing, it being furrowed with a regularity which astonishes the observer. Such tracts, which are numerous in many districts of the colony, have a good soil, either of a red or very dark colour, and it is thought that they could be cultivated with great advantage. Along the rivers which join the Hunter from the north and south are also bottoms, but of less extent, though not of less fertility, and the adjacent rising grounds afford pastures for sheep, which are rather better than those in the vicinity of the principal river. The rivers flowing from the Liverpool Range have water all the year round, but those coming from the south dry partly up in the dry season, so that only pools are found in the beds of the rivers. The alluvial tracts along the northern affluents extend to the very base of the Liverpool Range.

The upper basin of the Hunter, or that which is drained by the Goulburn, one of the greatest branches of the Hunter, extends westward to the Connecting Ridge. From the lower basin it is separated by a ridge of high hills, or rather mountains, which separate the upper course of the Hunter, where it runs from north-east to south-west, from that of the Blaxland, an affluent of the Goulburn. This range appears to be higher than any other of those traversing this basin. The Goulburn, running from west to east, divides the upper basin into two unequal sections, its course being much nearer to the Monundilla Range than to the Liverpool Range, which two chains of mountains enclose the basin on the south and north. That portion of the basin which lies south of the Goulburn is mountainous, being filled up with numerous offsets from the Monundilla Range, which are of moderate elevation, but steep, and exhibit that character of sterility which belongs to the sandstone rocks of the Blue Mountains. Even the hilly tract which skirts the banks of the river on the northern side is to be considered as a portion of the Blue Mountains, as it is mostly covered with hills composed of sandstone, and nearly destitute of vegetation, except some stunted trees. This tract however occupies only a narrow space, extending hardly more than four or five miles from the banks of the Goulburn. Between this hilly and sterile tract on the south and the Liverpool Range on the north lies a plain, which extends nearly 30 miles from south to north, and about 40 miles from east to west. It is far from being level, as it is traversed from north to south by numerous swelling grounds, which rise from 200 to 400 feet above the level of the rivers which run between them. The more elevated parts of these swelling grounds are thinly clothed with timber-trees without underwood, whilst their gentle declivities present low grassy hills, and at their base are open levels of moderate extent, quite free from trees or bushes, but producing fine herbage. The soil of the levels is alluvial, fertile, and retentive of moisture, whilst that of the grassy downs, especially towards the south, is a rich loam, well adapted for the formation of artificial meadows for sheep, or for cultivating wheat and other grain. The broad backs of the swelling grounds afford excellent pasture for sheep. Towards the Liverpool Range the country assumes a more uneven surface, but is equally fertile. In the interior of the plain are some rocky tracts, but they are of small extent. In the last ten or twelve years numerous sheep-farms have been established in this plain, and they are rapidly increasing in number.

The country extending along the shores of the Pacific, from the mouth of the Hunter River to Farquhar Inlet, the æstuary of the Manning River, may be considered as belonging to the basin of the Hunter. The shore of this tract is low and sandy from the mouth of the Hunter to Port Stephens, but on the peninsula separating this port from the sea is a series of sandhills of moderate elevation. A similar row of sandhills occupies the narrow strip of land which runs from Port Stephens to Sugarloaf Point, and separates some lagoons from the sea. Sugarloaf Point is formed by a sandy hill of a conic form, rising to a considerable elevation. The sandhills continue north from this cape to some distance beyond Cape Hawke, and here too are large lagoons at the back of the sandhills. A few miles north of Cape Hawke the shores begin to be high and rocky, and continue thus to Farquhar Inlet. Some of the lagoons are connected with the sea, but they are too shallow to admit even small vessels, and that is the reason why the country at the back of them was neglected for some time, and considered a sterile unprofitable waste. But since the Australian Agricultural Company has acquired the property of this country, it has been ascertained that a considerable portion of it is not much inferior to the country situated in the northern portion of Hunter Basin, the bottoms of the rivers being alluvial, and the higher grounds, which rise only to the elevation of moderate hills, being clothed with thin forests and affording tolerable pasture for sheep. The most southern portion however between Port Stephens and the Hunter is a low tract, covered with sand, and a useless waste. Port Stephens is a bar-harbour, so that small vessels only can enter it: those of larger description are compelled to anchor outside.

IX. *Countries contiguous to the western base of the Blue Mountains.*—Though all the countries lying on the west of the mountain-range are included within the bounds of location, we are very imperfectly acquainted with the features and productive powers of a considerable part of them. The most southern districts, or those which constitute the counties of King and Georgiana, are almost entirely unknown, as no satisfactory account has been published respecting them. Mr. Bennet, who traversed a portion of them in his 'Wanderings,' limits his narrative to a few observations, from which we learn that those districts which lie between the road leading from Sydney to Bathurst and the banks of the river Abercromby consist mostly of swampy tracts, which are very little available for the purposes of agriculture or as pasture-grounds. But south of the river he found the country mostly traversed by low ridges, thinly wooded, and at some places more level tracts, affording good pasture for sheep, being what is called open forests.

The country north of 34° 15′ S. lat. is much better known. A very hilly and broken tract, connected on the east with the Blue Mountains, stretches westward on both sides of Belubula River. It contains several summits, which rise to the elevation of mountains, among which the most elevated is Mount Lachlan, which probably attains 3000 ft. above the sea-level. This tract at its western extremity (near 149° E. long.) is connected with a lofty range of mountains, which runs nearly south and north from 34° 30′ to 33° 30′ S. lat., and separates the affluents of the Macquarie River from those which run westward into the Lachlan or Calare. Though comparatively narrow, it rises in some places to a great elevation. The highest of its summits, Conabolas, which is not far from its southern extremity, attains 4461 feet above the sea-level, and is higher than the most elevated pinnacle of the Blue Mountains. The Coutombals, which are not far from the northern extremity of the range, are also very elevated, and visible to a great distance. Their elevation has not yet been determined. Between the southern portion of this western range and the Blue Mountains are the Plains of Bathurst, which are twelve miles in length and about five in width. They are, more properly speaking, downs, not unlike the South Downs near Brighton, presenting on their surface considerable undulations. The highest parts of these elevations or knolls are generally covered with deep quagmires or bogs, but otherwise these downs have a dry soil, and being entirely destitute of wood, and producing different kinds of nutritive grass, they afford excellent sheep-walks, but there are also tracts fit for cattle; the cheese and butter made here are in great request at Sydney. The Plains of Bathurst are more than 2000 feet above the sea-level.

The remainder of this region, extending northward on both sides of the Macquarie River, and north-eastward over the countries lying on the banks of the Cudgegong to the base of the Connecting Ridge, exhibits great varieties in its surface, soil, and productive powers. In general it may be said that the surface is undulating, though the tracts which are farthest from the banks of the rivers generally rise into hills, which in some places are rather high. There occur also levels, but they are usually of small extent; and some of them are swampy, at least during the greatest part of the year. The hills in many places are rocky, and only overgrown with stunted trees, whilst in others they are covered with grass, and well though not thickly timbered. Between them are some narrow valleys, producing abundant pasture for cattle. At a few places the undulating country is destitute of water, but these tracts are not of great extent. Many of the small streams which drain this country are dry in summer, but well filled after rains. The larger ones have always water, though it is much reduced after long droughts, which are frequent in this region. A great portion of this tract appears to be well adapted for sheep, and this is proved by the increasing number of sheep-farms which are spreading over it in all directions. It does not seem that there is much land fit for cultivating wheat or other grains: very little at least has till now been grown, except in Wellington Valley, an extremely fertile tract of alluvial land, watered by the River Bell, one of the principal tributaries of the Macquarie. It lies east of the high summits of the Coutombals, and is six miles in length, and more than a mile across where it is widest. In this valley are some very remarkable caves, in which fossil remains of animals have been found.

At the distance of about 25 miles from the range on which the summits of Canobolas and Coutombals stand, is another range of heights, which runs nearly parallel to it, along 148° 25′ E. long. Its southern portion is called Croker Range, and its northern Hervey Range. This range has only been traversed at two or three points by travellers, and is very imperfectly known. On its western declivity are the sources of Bogan River, one of the affluents of the Darling. The country lying east of this range appears, as far as is known, to have an irregular hilly surface, drained by numerous watercourses running northwards into the Macquarie, or southward into the Lachlan, but many of them are dry in times of drought, or contain only stagnant water in the deepest depressions of their beds. Some sheep-farms have of late years been established in this hilly tract, and the range west of them is at present the farthest point to which the settlements of the whites have extended. On the west of Croker and Hervey Range begin the great desolate steppes which extend between the Darling and Lachlan rivers.

X. *Countries along the Pacific* from 32° to 26° S. lat., or from the mouth of Manning River to Double Island Point. The Coast Range, or the high land separating the rivers falling into the Pacific from those running westward into the great plains of the interior, is probably in most places about 100 miles or somewhat less distant from the sea, but as it has only been minutely examined at two or three places, it remains uncertain if that range always runs parallel to the coast, or in some places retreats farther from it. The coast-line of this tract, extending about 400 miles, is mostly low and sandy, being broken only at intervals by rocky points. But in some parts, especially north of Trial Bay (30° 50′ S. lat.) and south of the mouth of Clarence River, are tracts of coast many miles in length, where it is rocky and rises to a considerable elevation, but even here no indentations occur sufficiently deep to form harbours. The harbours are only found at the mouths of the numerous rivers. The country which lies at the back of this coast is much more mountainous than that portion of the colony which lies south of Manning River along the Pacific. Numerous ranges detach themselves from the coast-range, and traverse the country in several directions. Their sides are mostly steep and overgrown with thick forests, which is one of the reasons that has retarded the exploration of this country, so that the large River Clarence long remained unknown, and was only discovered a few years ago, though some parts of the country have been penal settlements nearly for 30 years. There are still some tracts of considerable extent which are blanks on our maps. The imperfect account we have obtained of these countries would suggest the idea that by far the greater part of them is occupied by elevated mountain-ridges. As far as it is known, the valleys along the rivers are only of moderate extent, and occupy probably less than one-fourth of the area. On the ridges are several summits, which attain a great elevation. The Three Brothers (31° 43′), only from 3 to 5 miles from the shore, are visible at a distance of 50 miles at sea. West by north of them is Mount Sea-View, which is supposed to rise 6000 feet above the sea-level. Farther to the north are two summits, each supposed to attain more than 4000 feet. Mount Warning, about 12 miles from the shore, near 28° 25′ S. lat., is considered by Flinders as the highest summit visible from the Pacific, and its elevation is estimated by him at 3300 feet: to the west of it is Mount Lindesay, rising 5700 feet above the sea. In some parts the high rocky masses seem to cover an extensive tract of country contiguous to the Coast Range, and to be furrowed by narrow clefts, by which the waters collected on the mountains find their passage to the lower level. This is especially the case with the country near 31° S. lat., where the

MacLeay River runs for a great distance in a narrow glen whose sides rise 900 feet above its bed; and above this glen it forms two falls, one 235 and the other 150 feet high.

In the narrow valley of the Manning River, which is said to be navigable 20 miles from its mouth, a few settlements have been formed, but at Port Macquarie and on the banks of the Hastings River the population has within a few years so increased, that this district, with the adjacent valleys of the Manning and MacLeay River have been formed into a county. Port Macquarie is a bar harbour, admitting only vessels of 100 tons burden, and it is dangerous to enter, except at full tide, on account of the rapid current which sets the vessels ashore upon the shoals on the northern side of its entrance. Outside the bar is good anchorage for ships of the largest class, except when the wind blows strong upon the shore. Within the bar is secure anchorage for a great number of vessels. This harbour is formed by an æstuary, into which two rivers fall, which however are designed by one name, the Hastings. About the æstuary the country is rather low, but dry. The banks of the rivers however are rather high, but nevertheless subject to sudden inundations. The soil on the margin is generally a rich alluvium, thickly timbered with cedar-trees and matted with vine-brushes, which renders the clearing of the ground laborious and expensive. But the large cedar-trees yield good timber, which is shipped to Sydney. The hills surrounding the lower tract are thinly wooded and serve as sheep-walks. This is the most southern district in New South Wales where the sugar cane has been cultivated with advantage, and where this cultivation is carried on regularly. Tobacco is also grown to some extent. Both rivers falling into Port Macquarie are navigable for several miles from their embouchures.

North of Port Macquarie is the valley which is drained by the MacLeay River, which divides about 12 miles from the sea into two branches, enclosing a large island. The main branch forms a harbour, which has a bar across, having from twelve to seventeen feet water upon it. This river is stated to be navigable to a distance of more than 50 miles from the sea, when farther progress is impeded by a fall, which occurs where the river issues from a narrow glen, whose sides rise 900 feet above its bed, as already observed. Below this place the river runs through a wide valley, in which there are some plains destitute of timber, and gently rising hills covered with open forests and grassy pastures. Several settlements have been made in this tract, and the fertility of the soil is such, that it will probably become a populous district.

Farther north is the valley of the Clarence River, of the existence of which government was unacquainted up to 1838, though it had for some time before been visited by woodcutters, who obtained excellent cedar-timber there. The mouth of the river is at Shoal Bay, 29° 20′ S. lat. The bar across its entrance has twelve feet of water on it at high tides; and to a distance of fifteen miles from it the soundings vary between three and five fathoms, the average breadth being nearly a quarter of a mile, so that it forms a spacious harbour. The country surrounding the lower part of the river is low and covered with a mass of luxuriant vegetation, among which are many trees of gigantic size. At the distance of twenty miles from the sea the country begins to rise higher, and the river, being divided into two arms, encloses an island of about 120 square miles in area, which is moderately elevated above the level of the river. Both arms are navigable. The river continues to be navigable for sailing vessels as high up as Susan Island, about sixty miles from Shoal Bay by the course of the river, and the depth is seldom less than five fathoms. The country contiguous to this portion of the river is slightly undulating; the banks are about 15 miles above the ordinary level of the river, but at a short distance from them are swamps and alluvial plains many miles in extent, and their soil is of the best description. Above Susan Island the river is still deep, but has some shoals; its banks are bold and rocky, and occasionally varied by gentle slopes, and the adjacent country has the character of an open grazing country of sandstone formation. The lower country seems to be adapted for numerous settlements, and it is supposed that wheat, maize, the vine, tobacco, sugar, indigo, and many other articles may here be raised with complete success.

The most northern settlements on the eastern coasts of New South Wales are at Moreton Bay. This bay extends over a whole degree of latitude, from 28° to 27° S. lat., and is formed by a projecting headland, Skirmish Point, and two large islands, extending nearly parallel to the coast of the mainland. The northern island, called Moreton, is about 20 miles, and the southern, Stradbroke, 36 miles long: the greatest width does not exceed four miles. They are moderately elevated above the sea. There are three entrances into the bay, two for large vessels and one for boats. The North Passage, between Skirmish Point and Moreton Island, is more than 12 miles wide, and across it lies a bar, on which there are only three fathoms at low-water. The South Passage, between Moreton and Stradbroke Islands, is hardly a mile wide, and of moderate depth. Between the southern extremity of Stradbroke Island and the mainland is the Boat Passage, which is hardly a quarter of a mile wide. The interior of the harbour is full of mud shoals, but between them are channels which may be safely navigated by vessels not drawing more than 18 feet. The shores of the mainland along the bay are, with few exceptions, low, swampy, and covered with mangrove trees. Into this bay falls Brisbane River. This river is navigable 20 miles up by ships drawing 16 feet water, at which point a ridge of rocks crosses the bed, but to a distance of more than 60 miles from the sea it may be navigated by boats. Several of its tributaries are also navigable for some miles from their mouths. The country on both banks of the river presents an alternation of hills and level tracts. The level tracts are not subject to inundation, and the soil, which is very good, is overgrown with high trees, among which are cedars and cypress-trees of great magnitude. The hills rise with a gentle acclivity, and are covered with open forests; they are equally adapted for cultivation and grazing. The highest hills lie on the north side of the river, where some rise from 700 to 800 feet. At a distance of about 12 miles from the river however the country rises considerably, and there are several summits of great elevation. The farthest sources of the Brisbane are in the Coast Range, which here offers an easy passage to the interior by a gap which occurs south of 28° S. lat., north of Mount Mitchell, which rises to 4120 feet above the sea. A few settlements have been established on the banks of the river, and it is supposed that the population of this tract will rapidly increase, as the sheep-stations have begun to spread in the interior so far to the north that they have reached the latitude of Moreton Bay.

XI. *Countries north of the Liverpool Range and west of the Coast Range.*—That portion of this region which lies at the back of Port Macquarie, between 32° and 31° S. lat., is tolerably well known. The district contiguous to the Coast Range consists of several fine and extensive valleys, separated from each other by narrow rocky ridges, which rise only a few hundred feet above the common level of the country. The rivers have water all the year round, being supplied with it from the Coast Range and Liverpool Range. The country is well wooded, but generally free of underwood, so as to afford good sheep-walks. Along the banks of the rivers there are tracts of rich alluvial land, subject to inundations, which will certainly yield good crops of grain when cultivated. But the whole tract is at present only used as sheep-stations. A woody ridge, rising from 700 to 800 feet above the common level, separates this hilly tract from the Liverpool Plains. These extensive plains lie along the northern declivity of the Liverpool Range, and extend along their base about 70 or 80 miles (between 149° 20′ and 150° 40′ E. long.). From south to north they occupy a space exceeding 25 miles; and towards the north-west their extent is said to exceed 50 miles. They present a vast level overgrown with grass several feet high, here and there interspersed with insulated wooded spots, which cover gentle eminences, the elevation of some of which is several hundred feet, but others are very slightly elevated. Some of these eminences have a sandy soil, and are overgrown with pines. After long-continued rains the plains are covered with water and the eminences appear like islands, but after long droughts there is a want of water, except near the Liverpool Range; for a few miles from the range most of the streams originating in that range are then dried up, or constitute only a series of pools; a few of them are lost in swamps. A great number of cattle and sheep stations have been established on these plains.

At the distance of about 30 miles north of the Liverpool

Plains begins a range of mountains which runs about a hundred miles from south to north, between 31° and 29° 30′ S. lat.: it is called Nundawar, or Hardwicke Range. Its southern portion is low; but north of 30° 30′ it attains a great elevation, some of the summits rising to 3500 and perhaps 4000 feet above the sea-level. The mountainous portion of this chain occupies only from 10 to 12 miles in width, but it is surrounded by hills and offsets, which extend on each side to a distance of several miles from the ranges. A great number of watercourses originate in this range, and water the country surrounding it on all sides. Thus the tract of country between the river Gwydir on the east and Nammoy or Peel River on the west, according to our scanty information, contains a considerable portion of land fit for cultivation, though it varies much in its soil. Some parts are barren, and their surface is covered with thick bushes and stunted trees, which prevents the springing up of grass; others are overgrown with forests of small timber, and being more open to the action of the atmosphere, produce a considerable growth of grass. Where the country is more hilly the ridges are covered with open forests, and the valleys between them, with occasionally a patch of plain, have a good soil. The best soil however is met with in the vicinity of the larger watercourses. But many of the watercourses dry up in summer, or only a few pools are found in their beds, which is especially the case after long droughts. The larger rivers always preserve a considerable volume of water, and even after droughts they are many feet deep. The country between the course of the Gwydir and the Coast Range has not been explored; but it is supposed that it must contain also a considerable proportion of land either fit for cultivation or useful as pasture-ground, as several rivers, known to originate on the western declivity of the Coast Range, run through this country, and probably contain water all the year round.

North of 29° S. lat. the country appears to contain very little land fit for colonization. Allan Cunningham, who traversed it obliquely from the northern skirts of Nundawar Range to the mountains at the back of Moreton Bay, describes it as a barren waste, over which a loose sand is spread, which gives it a desert-like aspect. It is a plain densely wooded or covered with brushwood, the monotonous aspect of which is here and there relieved by a brown patch free from trees. A brown kind of iron-bark tree (apparently Eucalyptus resinifera), scarcely 25 feet high, clothes its surface, on which are scattered dense patches of underwood. In travelling more than 100 miles he met with several watercourses, but only with two rivers which contained water. But in approaching the Coast Range, and when distant from it about 25 miles, he entered some extensive tracts of pastoral country, in which were numerous small rivers and deep pools supplied by streams from the highlands lying to the east. Some of these tracts had an undulating surface, and others were level, but they were mostly destitute of trees and underwood, and their rich black and dry soil was covered with grass and herbage exhibiting an extraordinary luxuriance of growth. The hills separating these tracts from each other were clothed with an underwood of the densest description.

XII. *The Steppes of the Interior* occupy, south of 32° S. lat., all the countries north of the Murrumbidgee and west of 148° E. long., but north of 32° they spread farther eastward, until they appear to approach the Coast Range north of 28° S. lat. The surface of this immense tract is chiefly level, at some places interspersed with low rising ground, and at others, but much more rarely, with undulating tracts. There are indeed a considerable number of isolated hills and short ridges dispersed over the plains, but they are at great distances from one another, and generally occupy a very small space. Nearly all of them are composed of ferruginous sandstone, and the highest do not rise more than 500 or 600 feet above the level of the plain. These hills and short ridges are most numerous on the banks of the Upper Lachlan, east of 146° E. long. The soil consists chiefly of sand, which in many parts is fine and soft, but in other places firm. There are also large tracts whose soil is composed of hard clay. The firmer kinds of soil are after long droughts furrowed by numerous wide and deep cracks. Generally the ground is quite naked, but in a few places it is overgrown with isolated tufts of coarse matted weeds which bind the sand. The more clayey tracts are overgrown with *atriplex*, *mesembryanthemum æquilaterale*, and *salsola*. Along the margin of large rivers are *yarra*, or blue gum-trees, and those tracts which are subject to frequent inundations are overgrown with a dwarf kind of box. The higher country is clothed with forests of stunted trees, among which some kinds of acacia and eucalyptus are the most abundant. Grass is only found at isolated places, and frequently it covers only a small surface. Those tracts which are frequently under water produce a kind of monocotyledonous plant or bulrush, which contains a great portion of gluten, which is not inferior to wheat-flour, and constitutes the principal food of the natives inhabiting the banks of the lower course of the Lachlan. Mitchell states that the cakes which are made of this gluten are lighter and sweeter than those prepared from common flour. These plains are badly provided with water, as the sandstone of the hills and the quality of the soil are such as not to favour the collecting of water in springs, which indeed are nowhere met with, and are scarce all over New South Wales, especially in those tracts where the hills are composed of sandstone. After long-continued rains it appears that a considerable portion of the plains is entirely covered with water and constitutes temporary lakes, but when a drought has continued for some time large rivers dry up, and in their bed are only found pools, generally at considerable distances from one another. In such a state the Lachlan was found by Mitchell in 1836, whilst Oxley, in 1817, was obliged to return by the immense swamps which he found spreading on both sides of the Lachlan. He travelled in this region for five weeks, through a country over which the waters of the Lachlan were so abundantly dispersed, that on no one occasion during that period did his party meet with a dry spot on which to encamp at the close of the day. But when Mitchell traversed it, his party was frequently in danger of perishing from thirst, the river being dried up, and the pools in its bed occurring only at great distances from each other. It is however probable that along the banks of this river pasture-ground must exist, at least at certain seasons of the year, as a herd of wild cattle was found as far west as 146° E. long., and they must have wandered to this place from the settled parts of the colony.

In reviewing this rapid survey of the soil of New South Wales, we find that between 36° and 29° S. lat. the country which may be considered as available for cultivation or the rearing of cattle and sheep extends to a distance of about 200 miles from the Pacific in a straight line. When we still add the narrower tract which lies between 29° and 26° S. lat., this country covers a surface of more than 100,000 square miles. There are certainly large tracts which must be considered as useless wastes, as the Blue Mountains, the tract between Port Jackson and Broken Bay, and some more of smaller extent; but all these tracts taken together certainly do not constitute one-fourth of its area. Of the remainder probably it will be found that only one-fourth is fit for cultivation, and that half of the country can only be used as pasture-ground for cattle and sheep. If compared with most countries of Europe, it cannot be said that New South Wales is favoured by nature in the fertility of its soil, though the Scandinavian Peninsula and the northern and southern portions of Russia certainly present a less advantageous proportion. But Europe must be considered as the most fertile portion of the globe, with the exception of the southern and south-eastern portion of Asia. If we compare New South Wales with South America, it will hardly be possible to point out in the last-mentioned country a contiguous tract of equal extent which is superior in fertility. That portion of New South Wales which lies south of 36° S. lat., and farther to the west occupies the whole space between the sea and the course of the river Murrumbidgee, is to all appearance much superior to the old colony in productive powers; but as a very large portion of it has not yet been explored, it would be premature to form a decided opinion respecting its value as an agricultural country. It covers an area of more than 130,000 square miles.

Rivers.—The larger rivers which drain the country between the Pacific and the watershed have water all the year round. They generally flow in beds which are deeply depressed below the common level of the country, and between banks which rise perpendicularly, or nearly so, from 100 to 200 feet, and frequently higher, so that the streams are inaccessible, except at a few places. This peculiar construction of the channels in which the rivers run renders it impossible to use their water for irrigating the adjacent fields, without very complicated and expensive machinery, though certainly great advantages would result from such a practice in a country subject to such long droughts as New South Wales. These rivers are also of little avail as channels for the transport of the produce of the country, as they are only navigable to a short distance from their mouth, above which their current is frequently broken by rapids and cataracts, which indeed are neither long nor high, but their frequency renders it impossible to navigate these rivers even by small boats.

The Shoalhaven River, the most southern of the considerable rivers of this region, rises on the table-lands east of the Warragong Mountains, and runs about 90 miles northward, measured in a straight line, and then about 40 miles eastward. Near its source its bed is slightly depressed below the general level of the table-lands, but in proceeding northward it continually sinks deeper, so that where it forms the boundary between the counties of St. Vincent and Argyle it runs in a cleft 1500 feet deep and between steep rocks furrowed by numerous ravines. Below its great bend the rocks enclosing its bed are less elevated and their acclivities more gentle, but still so close to the water as not to leave a bottom. It emerges from these hills about 20 miles from its mouth, and at this point occurs the last rapid, where the river flows for about 300 yards over a ledge of small, rounded, water-worn stones, which are hardly covered with water. The tide flows thus far, and below this rapid the river may be navigated by boats, but its mouth is so obstructed by shoals and sand-banks as to prevent even boats from entering it.

The Hawkesbury falls into Broken Bay. It rises, under the name of Wollondilly, on the Connecting Table-lands, and receives nearly all the waters which are collected on them. It flows in a deep bed, which however is accessible until it begins to form the boundary between Argyle and Camden, where it sinks into a deep ravine, and is no longer accessible. In this ravine it traverses a country exceedingly wild and broken, belonging to the Blue Mountains, and separates Westmoreland from Camden under the name of Wollondilly, and the county of Cook from that of Camden under the name of Warragamba. It issues from the ravine where it begins to form the boundary between Cook and Cumberland, but its current is still too rapid to be navigated. The last rapids occur near Windsor, from which place it is navigable for moderate vessels. Windsor is only 40 miles from the sea in a straight line, but 100 at least following the windings of the river, whose waters are fresh for 30 miles below the town. Its æstuary, Broken Bay, is surrounded by rocks, and has several good anchorages even for large vessels, the best of which is called Pittwater. The whole course of the river exceeds 250 miles. Sometimes the floods of this river rise to 90 feet above its usual level, and the inundations then lay waste the fertile tracts on its banks.

George's River falls into Botany Bay. It runs hardly 60 miles, but is navigable for boats from Liverpool downwards, a distance of about 12 miles in a direct line, but 24 miles following the windings of its course. The water is occasionally brackish at Liverpool in the long summer droughts.

Hunter River disembogues into Port Hunter. It has two great branches, one called Hunter and the other Goulburn. Hunter River originates on the southern declivity of the Liverpool Range, not far from the place where that chain is connected with the Coast Range, and flows for about 80 miles south-west in a rather wide valley, which contains a bottom half a mile wide and upwards. Where the Hunter meets the Goulburn, it forms an acute angle, taking the direction of the last-mentioned river, which flows nearly due east. In this direction it reaches the sea with a very tortuous course of more than 200 miles, though the distance between its confluence with the Goulburn and Port Hunter is less than 80 miles in a straight line. The Goulburn rises in the Connecting Ridge, and the greater part of its course is directed to the south of east; but it makes so many windings that its course exceeds 200 miles, though it flows only about 90 miles in a straight line. It runs mostly between high hills, without having alluvial tracts along its banks. Several rivers, running from 80 to 100 miles and upwards, joins the Goulburn and Hunter from the north, originating in Liverpool Range. The course of the Hunter is very rapid, which renders it unfit for navigation in nearly the whole of its course. The navigation begins at Maitland, about 20 miles from Port Hunter by land, but nearly 40 miles by water, and a steam-boat is now regularly plying between that town and Sydney. This river often rises rapidly after heavy rains, and in some places to the height of 50 feet.

The navigable rivers which drain the countries north of the Hunter are the Manning, Hastings, Clarence, and Brisbane, and have been noticed before.

Of the rivers which fall into the southern sea only the Glenelg, or Nangeela, requires to be mentioned. It rises on the western declivities of the Grampians, flows for more than a hundred miles westward, when by degrees it turns to the south-west, and then suddenly to the south, in which direction it runs about 80 miles. In approaching the sea it turns suddenly westward, and enters Southern Australia; but by another sudden turn to the south-east it returns to New South Wales, where it forms a small basin before it disembogues into the sea. The mouth of this river can never be made available as a harbour. It has a bar, on which there are only from one to two feet of water, and on which the sea breaks with great violence; besides, the accumulation of sand is sometimes so great between the east and west shores of the entrance, as completely to separate the river from the sea. The basin through which it flows, immediately above its embouchure, has also a depth of not more than two or three feet water: above the basin the river is of considerable depth, and probably navigable to some extent,

All the rivers draining the interior of New South Wales, as far as it is known, appear to belong to one river system, whose basin probably contains an area of not less than 500,000 square miles. It is called the river-basin of the Murray, not from the river which has the longest course, but from that which contains the greatest volume of water. The rivers composing this extensive system may, according to their origin and nature, be divided into three classes. The first class comprehends those which originate in the elevated Coast Range, and receive from it immense supplies of water, the greater part of which, however, they lose by evaporation and absorption in their long course through the arid plains of the interior; so that towards the end of their long course they dwindle down to the size of small rivers, and become fordable. The extensive beds in which they flow, however, prove that, after long rains, they must bring down an amazing volume of water. The second class are those rivers which originate on the western declivity of the sandstone rocks of the Blue Mountains, from which they derive in ordinary seasons a moderate quantity of water, which after a long-continued drought is so reduced, that it is soon evaporated and absorbed: the beds of the rivers then get dry, and water occurs only in pools or small lakes at great distances from one another. The third class of rivers are those which originate within the extensive mountain-region of the Australian Alps, and in the elevated tract of country which from this region extends westward to the Grampians. As they are abundantly supplied with water from these high lands, and their course does not lie through desert and arid steppes, at least not to any great extent, they always preserve a considerable volume of water; and many of them will certainly be found fit for navigation in a great part of their course.

The Darling is supposed to receive all the waters which collect on the northern slope of the Liverpool Range and on the western declivity of the Coast Range, so that its upper branches drain the country extending from 32° to 28° S. lat. The most northern of these branches, as far as is known, is the Condamine River, which originates west of some of the branches of the Brisbane, south of 28° S. lat.; but only a small portion of its course near the mountains is known. It is supposed that it is the same river which, about 200 miles farther to the south-west, was seen by Major Mitchell, where it was called by the natives Karaula. It ran to the west of south, had a considerable body of water, was about 5 feet deep, and was joined by another large river, the Gwydir, which receives the drainage of the countries lying between the Nundawar Range and the Coast Range. Though the sources of the Gwydir are not known, a part of its course, along the northern side of the Nundawar Range, is known. Farther to the west the course of the Karaula has not been explored, but it is thought to be the same river which was seen by Capt. Sturt between 148° and 147° E. long., and was called by him Darling. He found the water of the river salt at the place where it is joined by the river Castlereagh, which rises in the Liverpool Range, near its western extremity. Nearly all the watercourses originating on the northern declivity of this range join one another to the south-west of Nundawar Range, where they constitute a considerable river, the Peel, or Nammoy, whose upper course has been surveyed; but it is uncertain if this river joins the Karaula, or Darling, or if it is lost in an immense swamp, as the aborigines of this tract assert. After being joined by the Castlereagh, the Darling runs westward through an unknown region, but westward of 146° 20′ its course is known. West of 146° it is joined from the south by the Bogan, a river originating in Harvey Range, whose bed in seasons of drought is quite dry, though its course exceeds 300 miles in length. Where the Darling is joined by the Bogan its water was found salt by Sturt, and so also lower down; but Mitchell found that this was only the case at some places where there are numerous salt-springs on the banks of the river; at all other places its water is quite sweet. At its confluence with the Bogan the Darling runs south-west, and continues in that direction for more than 300 miles, when it turns south, and after a course of 200 miles in that direction, falls into the Murray. In these 500 miles of its course it traverses the great steppe, and is not joined even by a rivulet. It has very little water in dry seasons, and is fordable at most places. Not far from its mouth a portion of its course, about 50 miles in length, has not been explored; but there cannot be any doubt respecting the identity of the rivers, as it is supported by the unvaried statement of the aborigines.

The waters descending from the western declivity of the Blue Mountains are collected into two rivers, the Macquarie and the Lachlan. The waters forming the Macquarie originate north of 34° S. lat. Two considerable mountain-streams, the Fish River and the Campbell, unite in the Plains of Bathurst, and form the Macquarie, whose course lies to the north-west; and after a run of about 240 miles it is lost in marshes, which cover a considerable tract of land. In the Plains of Bathurst its surface is more than 1900 feet above the sea-level. After it has passed the northern extremity of Hervey Range it is still 40 yards wide. North of 32° S. lat. it forms a cataract 5 feet high, and at this place it is 680 feet above the sea. It continues to be a considerable river even in the vicinity of the marshes, where it is from 7 to 10 feet deep. That it preserves such a volume of water is mainly to be attributed to the circumstance that it is joined by two considerable rivers, which draw their supply of water from the Connecting Ridge and from Liverpool Range. The southern is called Cudgegong, and the northern Erskine River. They fall into the Macquarie before it arrives at Hervey Range. It is supposed that in times of great floods the Macquarie discharges its surplus water either into the Castlereagh by the Morrisett Ponds, or into the Bogan by Duck Creek, channels which at other seasons are entirely dry, or contain only water in a few pools.

The Lachlan, or, as it is called by the aborigines, the Calare, receives nearly all the waters originating on the western declivity of the Blue Mountains, and of the Connecting Table-lands between 33° 40′ and 35° S. lat. By their union west of 149° E. long. the Lachlan is formed. It runs north-west, and is still joined by a few other small rivers, when it turns to the west by north, and after running about 100 miles in that direction, it flows south-west about 250 miles more, falling into the Murrumbidgee near 144° E. long. Though the whole course of the river exceeds 600 miles, its bed was found dry by Major Mitchell, in March, 1836: even in the vicinity of the Blue Mountains, where the river is joined by Byrnes Creek (34° 30′ S. lat. and 148° 20′ E. long.), and farther down, there were only a few small ponds in the deepest part of the bed; but Oxley found in the same season, in 1817, such a volume of water in this river, that he was able to navigate it in a boat. Oxley thought that the Lachlan terminated, like the Macquarie, in extensive marshes; but Mitchell found these marshes quite dry, and ascertained that when the river is swollen it discharges its waters into the Murrumbidgee.

The numerous rivers which derive their waters from the Australian Alps and the elevated country west of them form the Murray River. This river has two principal branches, the Murrumbidgee and the Millewá. The Murrumbidgee, or Morumbidgee, rises to the east of the Warragong Range, on the elevated table-land contiguous to that chain, and runs for about 100 miles on these table-lands northward, and at the distance of only a few miles from the base of the mountains. In approaching 35° S. lat. it declines to the north-west, and in turning round the northern extremity of the Warragong Range it takes a westerly course. This upper part of its course is more than 2000 feet above the sea-level. It runs to the west for about 100 miles between high lands and mountain-ridges, until it enters a more level and lower country near 147° 20′ E. long. Before it reaches this point the river is joined by three or four tributaries, which drain the northern portion of the mountain-region of the Australian Alps. But below that point it is in its western course joined by no river of any importance until it arrives at the mouth of the Lachlan; but as the last-mentioned river is frequently dry, it can hardly be considered as bringing any supply to the Murrumbidgee. Its course in the lower country, up to this point, probably exceeds 350 miles. After having been joined by the Lachlan it continues to run to the west and south-west for about 100 miles more, when it is joined by the Millewá. The Murrumbidgee is a considerable river, and will probably be found navigable as far as 148° E. long., and perhaps higher. Its whole course exceeds 650 miles.

The Millewá, which is also called Murray River, receives all the rivers originating in the higher portion of the Australian Alps. They are very numerous, but imperfectly known, except one which rises at the base of Mount Kosciusko, and to which the name of Murray also has been applied. It is also not known where these rivers form their junctions, as by far the greater part of their courses lies through countries which have not been explored. The lower course only of the Millewá, for about 80 miles upwards from its confluence with the Murrumbidgee, has been seen by Mitchell. In these parts it is a wide and deep river, flowing through a bottom which is from 6 to 10 miles wide, and running to the north-west. At its confluence with the Murrumbidgee it is 350 feet wide, and from 12 to 20 feet deep.

The Murray, formed by the confluence of the Murrumbidgee and the Millewá, runs for more than 100 miles in a western and north-western direction, when it is joined from the north by the Darling, and considerably increases in size. Continuing to run westward, it passes 141° E. long. and enters South Australia, where, after a course of about 100 miles more in a western and south-western direction, it turns southward, and runs more than 100 miles, until it flows into Lake Alexandrina. This lake is about 50 miles long from east to west, and at some places 40 miles wide; but it is so shallow that it has only 6 feet of water in the deepest parts. The water of this lake is salt near its outlet, brackish in the middle, and sweet at its north-eastern extremity, where it receives the waters of the Murray. The narrow channel by which the lake discharges its waters into Encounter Bay is very shallow and impracticable even for the smallest boats.

There are several other rivers of considerable size, which descend from the high land extending from the Australian Alps to the Grampians, as the Wimmera, the Loddon, and the Yarrayne. They were crossed by Mitchell in 1836, but it is not known if they join the Murray. A large river, the Bayunga, joins the Millewá about 80 miles above its confluence with the Murrumbidgee.

Islands.—There are no islands of any extent along the coast of the Pacific, except the two which form Moreton Bay, and which have been noticed before. In Bass's Strait is King's Island, nearly equally distant from Cape Otway in New South Wales and Cape Grim in Tasmania. It is nearly 60 miles long and 30 wide, and moderately elevated. Its surface is thinly timbered, and seems well adapted to cultivation. It is well watered by several rivulets, and has some ponds. There is also stated to be a place affording safe anchorage.

Climate.—It is evident that in a country which extends over twelve degrees of latitude, and borders on boundless steppes, the climate must vary considerably. The information we possess of it is very scanty, as even in those parts which have been settled for a considerable time, continuous meteorological observations have not been made, so far as we know. But the few observations that we possess are sufficient to convey a more exact idea of the climate in the vicinity of Port Jackson than the vague observations of travellers. These travellers however appear not to have been mistaken when they compare the climate of Sydney with that of the southern parts of Italy, as the following table shows, in which the climates of Naples, Sydney, and Paramatta are placed side by side:—

Mean Temperature.

	Naples.		Sydney.	Paramatta.
January . . .	47·5°	July . . .	54°	51·5°
February . .	51·1	August . .	56	56·5
March . . .	59·5	September .	62	62
April . . .	58·6	October . .	64·5	68
May . . .	65·8	November .	67	72
June . . .	75·9	December .	74	74
July . . .	81·5	January .	72	73
August . . .	79·7	February .	75·5	68·5
September . .	75·7	March . .	71·5	60
October . . .	68·9	April . .	68·4	59
November . .	57·9	May . .	61	60
December . .	55·9	June . .	58·5	53·5
Mean Annual Temperature.	64·8		65·4	63·2

From this table it appears that the annual temperature of Sydney is only three-fifths of a degree higher than that of Naples, whilst that of Paramatta is lower by one degree and six-tenths. When we consider more closely the details, we find that the heat is more equally divided through the year in the country round Port Jackson than at Naples, as appears from the following table:—

	Naples.		Sydney.	Paramatta.
Winter (Dec.—Feb.)	51·5°	(June—Aug.)	56·3°	53·5°
Spring (March—May)	61·3	(Sept.—Nov.)	64·5	67·4
Summer (June—Aug.)	79·0	(Dec.—Feb.)	73·8	71·8
Autumn (Sept.—Nov.)	67·5	(March—May)	66·8	59·7

The cold at Naples in winter is therefore greater than at Sydney by nearly five degrees, but exceeds that of Paramatta only by two degrees. But, on the other hand, the heat in summer at Naples is more than five degrees greater than at Sydney, and more than seven that at Paramatta. This agrees perfectly with the statement of travellers that frost is unknown in the vicinity of Sydney, whilst at Naples it is experienced nearly every winter, and sometimes ice is formed of the thickness of a crown. We find however that at Paramatta the thermometer descends sometimes as low as 27°, and even 26°, whilst in summer it rises to above 100°, and even to 106°. At the same time it is observed that the changes of the weather are more frequent and sudden at Port Jackson than at Naples, and that the daily and monthly range of the thermometer is much greater, especially in the latter part of the spring and in summer, at which season the monthly range amounts to more than fifty degrees. It is even stated that in a very short time the thermometer rises or falls 25 and even 30 degrees. This great and sudden change is produced by the wind turning from north-west to south-east, or *vice versâ*. The north-western winds passing over the heated steppes of the interior, and over the no less heated sandstone rocks of the Blue Mountains, acquire such a degree of heat that they are nearly scorching, and when they immediately set in after a south-eastern wind, which has brought to Sydney the cold air from the ocean surrounding the southern pole, the change is sudden and great. It is stated that in such a case the thermometer has been observed to rise almost instantly from 80° to 110° in the shade.

The annual quantity of rain which falls at Port Jackson has not been determined. From the incomplete observations which have been published, it would seem that it amounts to from 36 to 40 inches. The rains are not, as between the tropics, limited to certain seasons, but fall all the year round; they are however most frequent in winter (June to August). These rains do not resemble the rains of England, as they fall in much larger drops, and are consequently heavier. Thus it happens that though the annual quantity of rain is much larger at Sydney than at London, the number of rainy days is less, hardly a hundred. Sometimes not a drop of rain falls during five months, but that cannot surprise those who know that this happens also at Naples. The most characteristic peculiarities of the climate of New South Wales are the long droughts which occasionally prevail, when for a period of two or three years not a cloud passes over the sky, and the surface of the earth becomes so parched that the minor vegetation ceases to exist. It was supposed that these droughts were periodical, occurring every ten or twelve years. But the long drought which desolated the country between 1826 and 1829 was followed by another in 1835 and 1836, and a still more recent one in 1839. These droughts are generally succeeded by excessively long and heavy rains, which, as is supposed, lay the plains in the interior under water, and change them into temporary lakes. These heavy rains after some continuation abate gradually, and decrease from year to year until they again cease for a time.

The winds are as variable as in England. Westerly winds, especially from the north-west, prevail in winter, and easterly winds are more frequent in summer (December to February). In the last-mentioned season, however, there seems to exist a regular change of the wind, corresponding to land and sea breezes, for in the morning the winds blow, almost every day, from west and south-west, but towards noon they pass to north-east and north.

Dews are frequent and heavy. Hailstones are common in December and January, and are of much larger size than in England. Thunder-storms prevail from December to February, and occur also in November and March. The lightning flashes particularly vivid from the west, and sometimes continues uninterruptedly for a succession of days, without being attended by thunder or a drop of rain falling.

This account of the climate refers only to the country surrounding Port Jackson. On the Connecting Table-lands and in the Plains of Bathurst, which are more than 2000 feet above the sea-level, the winters are much more severe. Frost is there experienced every night for six weeks or two months, and snow often lies for days on the tops of the adjacent mountains. It is even found in the valleys and depressions which are not much exposed to the effects of the sun. As in summer the heat is several degrees less on these elevated countries than at Port Jackson, the grass is not so quickly burned up, and thus the flocks of sheep find here nearly all the year round sufficient for their sustenance.

We know very little of the climate of the unsettled portions of the colony. Major Mitchell, when traversing the interior on his travels of discovery, kept a meteorological journal, by which it appears that while passing through the northern districts, or those which lie at the back of the Coast Range, he experienced in summer, during more than two months, a degree of heat which kept the thermometer between 90° and 108°, descending a few times 20° lower, but this only happened when the sky was for some time overcast or some rain fell. This degree of heat was the effect of the continuance of the north-westerly winds, which probably pass over an immense steppe, and are not broken by any ridge of mountains. The climate of this part of New South Wales seems to resemble that of Senegambia. [Vol. xxi., p. 236.] In winter however the temperature appears to be much lower; for in this season the thermometer on the banks of the Darling was found to range commonly between 55° and 65°, though it rose occasionally to 70° and more, and descended to 48°. In Australia Felix, on the banks of the Millewá River, the thermometer varied in winter between 43° and 60°, but in the higher grounds it ranged in spring between 50° and 60°, and descended at that season frequently below the freezing-point in the night. Whilst Mitchell was travelling in this region rains were falling nearly every day, though they were generally not heavy.

The southern coast of New South Wales seems to be subject to a considerable degree of cold. Tyers, when surveying the plain between Port Phillip and Portland Bay, experienced a hoar-frost as late in the spring as the 30th of October. This may however have been the effect of the large swamps by which he was surrounded.

Winds and Currents of the adjacent Sea.—Break-sea

Spit, which may be considered as the most southern point of the coral reefs which extend along the eastern coast of Australia from 26° S. lat. to Torres Strait, is an important point for navigators, as at that cape a change takes place in the direction of the winds and currents. No strong current appears to prevail north of that point, but south of it a strong current, running about two miles and a half in an hour, is met with at a distance of 15 or 20 miles from the shore. In summer, between October and February, it sets southward, and in winter to the north. In the space between it and the coast there is a weak current, which sets to the north. North of Break-sea Spit the prevailing wind in winter is the north-east trade-wind, which occasionally varies to the south-east, and blows at this season with great strength. To the south of Break-sea Spit the winds are more variable, because this part of the coast is without the reach of the trade-winds, and therefore they are much influenced by the direction of the coast, which to that point is nearly north and south. Vessels sailing northward in summer accordingly keep close to the shore, where there are no hidden dangers, and where they have in their favour the weak northern current, and may take advantage of the land-winds which usually blow off it during the night. In this season vessels cannot sail through Torres Strait. [Torres Strait, vol. xxv. p. 52.] But in the opposite season, from March to September, they generally take that route, as at that period of the year the current is in their favour, and the south-eastern winds prevail north of Break-sea Spit. Ships prefer this route, as the navigation through Bass's Strait and round Van Diemen's Land is then very difficult and tedious. For when the sun is in the northern hemisphere the winds, which along the southern coast of Australia blow generally from the south-west, acquire great strength in Bass's Strait as if they went through a funnel, and even round the southern part of Tasmania they are so powerful that vessels returning from New South Wales to Europe find it difficult to contend with them, and on this account alone the return passage through this strait is on an average three times as long as the outward passage. Vessels therefore bound from Sydney to Europe, the Cape, or Hindustan, prefer in this season the dangerous passages through Torres Strait or round Papua. [Pacific, vol. xvii., p. 118.]

Agriculture and Agricultural Productions.—When the British settled in New South Wales they introduced all the kinds of grain and plants cultivated in England, and in the course of time they added maize and millet, and also tobacco. When they penetrated somewhat farther into the country, where the soil is better than in the immediate vicinity of Port Jackson, the crops, though not very abundant, repaid the labour bestowed on the land, and it seemed probable that the country would turn out an agricultural colony, like Canada. But no sooner had it been ascertained that the soil of the greater portion of the country was much better adapted for pasture, especially for sheep, than the attention of the colonists was almost exclusively directed to that object. This had an immediate effect on landed property: the grants of land which were made in the first 15 or 20 years generally did not exceed 200 acres; but all those which were made at a later period comprehended tracts extending over from 5000 to 10,000 acres. Landed property of small extent is only found in the first-settled counties, especially in Cumberland, and in Camden, Northumberland, and Durham. In the other counties small proprietors are hardly met with. This circumstance has greatly affected the extension of cultivation; the large proprietors find it most advantageous to convert their large estates into sheep-walks, which, on account of the peculiar nature of the country, can be done without expense; and as they expect to obtain ample returns for their outlay by the produce of their flocks, they do not encourage cultivation, at least not farther than is required for the consumption of their scantily peopled estates. The produce of these cultivated spots is only sufficient for home consumption in good seasons; and in times of drought, the shepherds and other persons attached to the management of the estates must be supplied with grain or bread from other parts of the country and from Sydney. It would even appear that the growth of wheat is on the decrease: we must at least infer it from the data contained in the following table.

Acres of Land under Crops, 1837-1838.

	Wheat.	Maize.	Barley.	Oats.	Rye.	Millet.	Potatoes.	Hops.	To-bacco.
1837	59,512	18,250	2501	3830	493	61	1125	1	532
1838	48,060	25,043	2922	3767	429	39¼	1788	..	925¼

This decrease of land under cultivation for grow wheat is partly owing to the increase of artificial gra Though a great portion of the country has good ture for sheep, there is a want of meadows for fatter cattle; and as the increase of the population increases demand for butcher's meat, the landed proprietors in vicinity of Sydney, and in the more populous parts of country, have directed their attention to the growth of tificial grasses, and have converted their corn-fields meadows. They have been enabled to do it without posing the colony to famine in times of drought, as can now expect to be regularly supplied with wheat other grain from Tasmania, the Cape, and the East Ind All these countries find a ready market for their agri tural produce at Sydney, as the importation of gr &c. is considerable, which is proved by the subjoi table:—

Grain, &c. imported, 1828-1838.

Year.	Wheat. bushels.	Barley, Oats, and Peas. bushels.	Flour and Bread. lbs.	Rice. lbs.	Pota ton
1828	85,716	8,689	320,640	401,578	3
1829	107,929	2,575	42,076	183,703	5
1830	70,904	183	2,226	29,898	1
1831	71,892	758	358,154	54,161	1
1832	44,908	977	30,072	88,052	
1833	19,507	7,081	14,272	39,200	4
1834	15,568	6,816	345.896	407,680	4
1835	122,908	12,031	1,377,018	1,139,551	5
1836	263,956	27,567	4,335,550	474,358	1,3
1837	114,416	6,222	1,086,587	169,746	5
1838	79,166	55,075	875,878	702,346	1,1

Though the number of acres under cultivation is sm the produce is considerable, in spite of the careless m ner in which the cultivation is carried on; as two c of maize or potatoes, or one crop of wheat and ano of maize and potatoes, may be taken annually from same field, if the soil is good and the season favoura that is, if there does not occur a long drought in summ Wheat produces on an average 15 bushels—in be lands even 30 and 40 bushels—per acre; and maize va from 40 to 90 bushels per acre according to the qua of the soil. Oats are not much grown, except on high grounds of the Connecting Table-lands and Plains of Bathurst, where they are cultivated in lieu maize, which does not succeed so well in these co tracts. The growth of barley and potatoes is on the crease. Tobacco is only cultivated to some extent on banks of Hunter River.

The colonists have been at some pains to introd many kinds of fruit-trees and vegetables, and they hav most cases done it with tolerable success. There oranges, lemons, citrons, nectarines, apricots, peac plums, cherries, figs, quinces, pears, apples, mulberr pomegranates, grapes, raspberries, strawberries, bana guavas, pine-apples, gooseberries, and currants; and monds, walnuts, chesnuts, and filberts. Bananas guavas come only to perfection in low sheltered pla near the sea, and pine-apples require the aid of a fra for filling out and ripening. Gooseberries, on the contr succeed only in the colder and more elevated countries near Bathurst. Grapes have lately been greatly perfec both as to size and flavour; and as they begin to be gr to a great extent, it is hoped that at no remote period will constitute an article of export from New South Wa as the soil seems exceedingly well calculated for growth of vines.

In the kitchen-gardens are raised melons, water-mel pumpkins, capsicums, cabbages, turnips, rapes, and s other vegetables.

Pastures and Domestic Animals.—New South W has become a pastoral country not on account of the ri ness of its pastures, but because that portion of the co try which is fit for that purpose is very extensive. I asserted, and we think with reason, that the richest swa there are full two-thirds inferior in point of closeness the old pastures in England. The grass grows only in tached tufts, and between them is so much waste sp ven in the richest pastures, that one may walk along over he pasture on tiptoe without touching the grass-tufts round. This however seems to be the effect of the dry limate, and the same is found in other countries distinuished by dryness of the air. The grasses themselves, hough mostly different from those found on English pasures, are very nutritious, especially on what is called pen forest-land. The forests in Australia are not so losely wooded as in Europe, the single trees being several eet and even paces distant from one another. They are esides mostly free of underwood, so that a horseman may allop in perfect safety through these woods. This state f the woods, added to the general dryness of the soil, enders these tracts excellent pastures for sheep, and the olonists have known how to take advantage of it. The umber of sheep which are kept must be astonishing, to udge from the quantity of wool which is exported, and which of late years has increased so much, that the English manufacturers at present are probably supplied with a larger quantity of wool from New South Wales han from any other country, although hardly 20 years have passed since wool began to constitute an article of export.

Quantity and Value of Wool exported from New South Wales in each Year from 1822 *to* 1840.

Years.	Quantities. lbs.	Value. £.	Years.	Quantities. lbs.	Value. £.
1822	172,880	not known.	1832	1,515,156	73,559
1823	198,240		1833	1,734,203	103,692
1824	275,560		1834	2,246,933	213,628
1825	411,600		1835	3,893,927	299,587
1826	552,960	48,384	1836	3,693,241	369,324
1827	407,116	24,306	1837	4,448,796	332,166
1828	834,343	40,851	1838	5,749,376	405,977
1829	1,005,333	63,555	1839	7,213,584	442,504
1830	899,750	34,907	1840	8,610,775	566,112
1831	1,401,284	75,979			

The first sheep introduced were from England, and he wool was of indifferent quality; but as soon as it became evident that wool might become a source of wealth, and yield an important article of export which would find a ready market in the mother country, several landed proprietors were at considerable expense to get merino sheep. These sheep have not degenerated, as some persons thought they would, and the former quality of the wool has been much improved. In fact large quantities are exported hardly inferior to the wool obtained from Spain or Saxony.

Great numbers of cattle are kept, the consumption of meat being very considerable owing to its cheapness in comparison with bread. After bad crops it constitutes he principal food of the people in parts remote from Sydney, as the transport of grain to great distances enhances its price. There are also large tracts of land which are too wet for sheep, but afford good pasture for cattle. The breed of cattle is a mixture of the Bengal buffalo variety with humpy shoulders, and various English breeds which have been introduced. They are fine large animals. In some parts, especially on the Plains of Bathurst, the dairies are well attended to, butter being made to a great extent, and also cheese not inferior to the common cheeses of England. Bullocks are mostly used for draught.

Few horses are kept, compared with other domestic animals. They are remarkably hardy and can undergo great fatigue. For a long time they were neglected, but since the establishment of races the attention of breeders has been directed to improve the breed. It is rather a pity that asses have not been introduced, as these animals, as well as mules, would thrive very well. Pigs are numerous: they find abundant food in the uncultivated tracts, and are easily fattened with maize. Goats have been introduced, and thrive amazingly in those parts which have a barren soil, and are overgrown with shrubs. Deer were many years ago imported from India, and now run wild in the woods of Cumberland, but they do not multiply much, owing to their being shot and hunted down. Rabbits are bred about the houses, but there are no wild ones.

Poultry is in great abundance, geese, ducks, turkeys, guinea-fowls, and fowls, and they thrive amazingly, almost without any care being taken of them.

Forests.—The peculiarities by which the botany of New South Wales is distinguished may be seen under AUSTRALIA [Vol. iii., p. 123]. Many of its trees are useful for domestic purposes, and some of them are exported as timber. The most valuable is the cedar (*Melia azedarach*), which is found especially at Illawarra, and on the banks of the Hunter, Hastings, and Clarence Rivers. Several of the gum-trees, as they are called (*Eucalyptus*), are very valuable, especially the blue gum (*Euc. piperita*), the iron-bark tree (*Euc. resinifera*), and the stringy-bark tree (*Euc. robusta*), and from some of them an excellent bark is obtained for tanning, of which small quantities are sent to England. Timber is farther obtained from a kind of pine belonging to the genus *Callitris*. Most of the eucalypti yield a kind of gum, and therefore they have obtained the name of gum-trees. No use has yet been made of this gum, but many think that it may at some future period constitute an article of export.

A summary account of the *zoology* of South Wales is found under AUSTRALIA [Vol. iii., p. 126]. Several new species of mammals, birds, and fishes have been discovered since that article was written, as a Jerboa dipus, a Chœropus ecaudatus, &c.; but as these animals are in small numbers, they are not likely to affect the domestic economy of the inhabitants, and are for that reason here omitted. In Bass's Strait and along the eastern coast whales and other cetaceous mammals, and also seals, are very abundant, and a number of vessels belonging to the colony are employed in the fishery.

Minerals.—New South Wales is not rich in metals. There are in some places slight indications of the existence of gold and silver. Iron-ore is known to exist in several places, especially on the west of the Blue Mountains. There are several extensive coal-measures, two of which are worked. Those found near the mouth of the Hunter River, near Newcastle, are extensively worked, and their produce is shipped to Sydney. The coal-beds near Western Port are also very large, and have been worked for the last few years to a small extent. Limestone is very abundant in some places, and some kinds of marble are worked on the banks of the Wollondilly. There are numerous salt-springs near the banks of the Darling, and a great number of salt lakes in the plains west of Port Phillip, on some of which salt of excellent quality is abundantly deposited. As salt is rare and dear in the colony, it is probable that this circumstance will soon be turned to account.

Aborigines.—Their number of natives is small. Mitchell, having seen a very large portion of New South Wales, estimates it at not more than 6000, and he even thinks that it may be considerably less. In the vicinity of those parts where the whites are settled in considerable numbers they are on the decrease, because the settlers keep kangaroo-dogs, and destroy these animals, which form one of the principal articles of their food, merely for the sake of the skin, and thus deprive them of the means of their livelihood. In the interior however they seem to preserve their numbers, and in some parts to increase. Mitchell thinks that they may increase rapidly, if wild cattle become numerous, as he found the most populous and best-fed tribe on the banks of the Lachlan at a place where a large herd of wild cattle was seen.

An account of their characteristic features is given under AUSTRALIA [Vol. iii., p. 122]. It is however stated that their colour is not universally black, but that in the interior, and also at some places on the coast, there are tribes which have a light copper colour, which seems to indicate that there must have been a mixture of different races. Their hair is also not woolly, but only frizzled, and never grows long.

Though dispersed over such a large extent of country, it does not appear that the different dialects spoken by the numerous tribes differ so far as to render the aid of an interpreter necessary for the purpose of communicating with one another. Mitchell, having collected vocabularies from different parts of Australia, finds that in the languages of those tribes which inhabit the south-eastern and the south-western parts of that continent several words are found, mostly applying to different parts of the human body, which are either the same or resemble one another greatly, whilst no such resemblance can be traced between these words and any in the language spoken by the natives on the northern coast of Australia.

The aborigines certainly live in a very low state of civilization. This is proved by their going almost naked. The men wear girdles, usually made of the wool of the opossum; and a sort of tail of the same material is appended to this girdle, both before and behind, and seems to be the only part of their costume suggested by any idea of decency. Round the head they wear a neatly-wrought bandage or fillet, which they whiten with pipe-clay, as a soldier cleans his belts. They also wear one of a red colour under it. The women generally wrap themselves up in a species of cloak made of opossum-skin, or in a blanket. As some of these tribes live in parts which are subject to a considerable degree of cold in winter, it is rather a matter of surprise that they have not adopted a warmer clothing. But they generally pass the nights before a large fire.

As most of the tribes are continually moving about in search of food, they have no fixed abodes. In the night-time they protect their fires by the bark or the boughs of a tree placed to the windward. A few tribes however living along the coast of the Pacific have fixed habitations. In 1839, when the newly discovered Clarence River was explored, a number of huts, forming a temporary village, was found at the head of a deep æstuary which appeared to give a considerable command of fishing-ground.

They evince some industry and ingenuity in the manufacture of their utensils and arms. Mitchell found that the nets used by the aborigines on the large rivers of the interior approached nearer to those made in Europe than any other thing made by them. The fishing tribe on the Clarence River was in possession of nets, baskets, water-vessels, and cooking utensils, which were made with peculiar care and neatness. The same observation is made respecting their arms, of which that peculiar kind of missile called *bommering* has attracted the attention of all travellers, as it is used in a very unusual way. A description of it and its uses is found in Mitchell's 'Three Expeditions,' &c., vol. ii., p. 348.

The opossums constitute the ordinary food of the natives, and they show great industry and ingenuity in finding them out in the hollow trees to which these animals retreat. Next to the opossum is the kangaroo, but they find it more difficult to get this animal. They also eat, when pressed by hunger, snakes, grubs, and other vermin, and they use as food several indigenous roots and plants.

The natives are accused of cannibalism. Mitchell, who certainly knows them well, denies the fact. But Bennet heard of a weak and sickly child having been destroyed, and even eaten. This appears however to have been an extraordinary case, as the parents alleged that they were very hungry, and the child was of no use and much trouble. Infanticide however is not rare, and the alleged reason is that the children are too much trouble to carry about. It is however almost their invariable custom to destroy the infants produced by the intercourse with Europeans, unless the father resides constantly with the female, or may be near her at the time of the birth to prevent it. The most remarkable of their customs is the practice of striking out one of the front teeth of the males at the age of puberty, and that of the females of cutting off the last joint of the little finger.

The aborigines have frequently attacked remote stations, and killed the settlers. This is partly attributed to the harsh and unjust treatment they have experienced from the hands of convict-settlers, or convict-servants, and partly to the desire of appropriating to themselves some portion of their property which they think useful. Besides, it is observed that when a white man has been killed by them, they do not return to peaceful intercourse with the whites, until one of their tribe has been killed by the whites. This appears to originate in the principle that bloodshed can only be atoned for by the shedding of blood. From time to time they have in different parts of the country carried their outrages so far, that government has been obliged to send the police force against them, and to attack them regularly, until they are impressed with the superiority of the whites; when that has been done, they no longer molest the settlers.

They are certainly more capable of civilization than most of the native tribes of America. Mitchell speaks highly of their mental powers and judgment in everything they are acquainted with. He thinks them in manners and general intelligence superior to any class of white rustics. A number of them were sentenced for some offence to be confined with a chain-gang on Goat Island in Sydney Harbour, where a missionary in five months taught them to read tolerably well, and to explain in English the Lord's Prayer and the Ten Commandments. During that time they had been initiated in the craft of stone-cutting and building, so as to erect a small house. There are numerous instances on record where they have industriously assisted farmers in bringing in their crops, and have even cleared tracts of land overgrown with bushes. They have also proved very good shepherds, when any of them have been induced by encouragement and protection to take charge of a flock. Several of them are actually engaged by the colonial government as assistants to the police, as they are extremely skilful in tracing the retreats of runaway convicts, who frequently infest the abodes of the stockmen in remote parts.

Settlements and Division of the Country.—The surface which Australia presents to the settler is very different from that of any other country into which European colonization has been introduced. In consequence of the absence of dense forests or extensive swamps, it is pervious to the settler in almost every direction, whilst the traffic over it is farther facilitated by the general dryness of the soil. In their natural state, too, the lands, though far from being rich, offer very extensive pasturage, and therefore afford the means of profit to the settler almost without the outlay of any capital. These peculiarities have, since the first occupation of the colony, led to a wide dispersion of the inhabitants, so that their flocks and herds already stray over a country 900 miles long by 300 wide.

The more closely settled portion of the colony is divided into twenty-three counties, of which twenty lie contiguous, comprehending the countries along the Pacific and on both sides of the Blue Mountains, between 36° and 31° S. lat. and between the sea and 148° 30′ E. long. The other three counties, or those of Bourke, Grant, and Normanby, which have been lately erected, comprehend the countries surrounding Port Phillip and Bass's Strait, on both sides of 38° S. lat. and between 144° and 145° E. long. This division of counties however serves no other purpose than that of indicating certain tracts of country, as the counties are not co-extensive with any jurisdiction either civil or ecclesiastical. It is however a regulation of government that no land can be sold beyond their limits. The extreme boundaries of county lands have come therefore to be called the boundaries of location, and according as lands lie within or beyond these boundaries, a different system is followed in the management and civil government of them.

Within the boundaries the whole country is divided into police districts, each having a bench of petty sessions and a magistrate; and of these districts, which are of unequal size, there are at present thirty-five or thirty-six. Beyond the boundaries the country is also roughly divided into districts, in each of which there is a commissioner of crown lands, who is the chief magistrate of it, and has under his command a small force of mounted constables, which are called the Border Police. Within the limits of location, land is either sold or let on lease; beyond the limits, it is neither sold nor let, but licences are granted, at the discretion of the crown commissioner, for the occupation of such portions of land as may be desired by proprietors of stock, on each of which licences a fee of 10*l*. is payable annually, and an assessment is levied on the stock depastured there. Each allotment of land, for which a licence is thus given, is called a station, and the stations may vary in extent from 5000 to 30,000 acres.

These stations are pushed into the interior with great rapidity. Wherever the persons forming these stations, who may be compared to the backwoodsmen of America, find good pasturage, they fix themselves, and remain frequently unknown to the commissioner for several years. Wherever a river presents itself running to the westward, the course of it is marked by stations. This is particularly the case on the Nammoy, or Peel River, the Macquarie, the Lachlan, and the Murrumbidgee, on the borders of each of which they extend perhaps to a distance of from 200 to 300 miles beyond the limits of location. Towards the north stations are already found in the country

of the Coast Range lying at the back of Moreton
; and this part of the interior is now known by the
e of New England. In Australia Felix the stations
nd to the vicinity of the Nangeela River, not far from
boundary-line of South Australia, and along the coast
nd Port Phillip.

e number of licensed stations amounted, in 1839, to
The number of stock for which assessment was
was 7088 horses, 371,699 horned cattle, and 1,334,593
. The real amount of stock however in all pro-
ity considerably exceeds the amount returned.

t it is thought that these stations have now attained
xtreme limits to which they can extend. Their dis-
from Sydney is now so great, that the feeding of
must soon cease to be a profitable employment, the
not bearing the expense of transport to such a great
nce. Government has therefore lately resolved to
roads to some other harbours which are much nearer,
n which there have hitherto been no settlements, or
st only small ones. Roads are to be opened from the
tries west of the Coast Range to the ports of Moreton
Shoal Bay, or the mouth of Clarence River, and to
Macquarie. South of the boundary of location, roads
be made to Twofold Bay and Portland Bay. As the
port of goods will be much shortened by these roads,
he expenses consequently diminished, it is hoped that
tations will continue to extend farther to the west and
.

ree years ago a road was opened from the Con-
ng Table-lands and the banks of the Murrumbidgee to
Phillip, which runs through a country which only
years ago (1836) was traversed for the first time by
peans, and along which there are now a consider-
number of stations, and also inns at convenient
ces.

ere is no want of roads within the boundary of location.
lines of roads, which have been made at consider-
expense, traverse these countries. One leads from
ey over the Blue Mountains to Bathurst westward;
er to Hunter River, and a third to the fine pastoral
ries on the Connecting Table-lands. These roads are
nferior to any on the continent of Europe, and
y equal to those of England: but as they all ter-
te at Sydney, the expense of transporting the pro-
of the land from the southern districts is consider-
and operates as a check on the industry of the
itants. But a new line of roads is to be opened
the Connecting Table-lands to Jervis Bay, nearly 100
south of Sydney, by which the distance from a
et will be shortened by more than one-half for these
cts.

abitants.—The white population of New South
s consists of two classes, freemen and bondmen. The
men are the convicts who are transported from
Britain to that country as a punishment for their
s. As New South Wales in the beginning was
y a penal settlement, its population was for more
twenty years after the foundation of the colony
t exclusively composed of convicts, and such as had
pardoned by government, or, after the expiration of
ime of punishment, had resolved to remain in the
y. The number of the last-mentioned class was not
; and thus we find that in 1810, or twenty-two years
the foundation of the colony, its population did not
ed 10,000 individuals. Even after the colony had
opened to free immigration, the circumstance that its
bitants were only convicts deterred many persons from
g to settle there; and up to 1832 the number of free
grants was very small in comparison with those who
to Canada and other colonies. The census of 1831
46,276 inhabitants, and that of 1841 amounts to
56; so that in the last ten years the population has
y doubled twice. This change has been effected by
character of the colony having gradually changed
a penal settlement to an agricultural settlement,
h offers great advantages to an industrious man, and in
h he can now enjoy the fruits of his industry without
of being robbed of them by his neighbours, and of
g obliged to associate with the worst characters.

t New South Wales still continues to be a penal settle-
. The number of convicts annually sent to that
ny is still considerable, and exceeded, up to 1836, that of the free immigrants, as is evident from the annexed table:

	Number of Convicts arrived in 1829-1838.			Free Immigrants arrived in 1829-1838.			
Years.	Males.	Females.	Total.	Men.	Women.	Children.	Total.
1829	3,171	493	3,664	306	113	145	564
1830	2,781	444	3,225	116	70	73	309
1831	2,129	504	2,633	185	98	174	457
1832	2,738	381	3,119	819	706	481	2,006
1833	3,513	638	4,151	838	1146	701	2,685
1834	2,704	457	3,161	571	596	397	1,564
1835	3,423	179	3,602	551	644	233	1,428
1836	3,155	668	3,823	524	807	290	1,621
1837	2,892	533	3,425	1796	1138	1368	4,275
1838	2,740	333	3,073	3631	2132	3077	8,840
Total	29,246	4630	33,876	9054	7337	6794	23,185

The convicts are divided into three classes. The worst characters remain under the immediate surveillance and in the employment of government, which occupies them in erecting public buildings, making roads, building bridges, &c. A considerable number is assigned to private persons, who either send them to their estates to serve as agricultural labourers, shepherds, &c., or employ them as menial servants. When a convict in the state of assignment has escaped punishment for four years he receives a ticket-of-leave, if he has been transported for seven years; but if he has been transported for fourteen, he must not have undergone punishment for six years; and if for life, not for eight years, in order to obtain a ticket-of-leave. Those who have tickets-of-leave constitute the third class of convicts, and they are free to a certain degree, as they may employ their time as they think it most advantageous to themselves; but they cannot leave the colony nor the district which has been assigned for their residence. Those who have passed in the colony the whole time awarded by the sentence of the criminal court, may return to England or any other country, or remain in the colony, which the larger number do. These, together with those who have been pardoned by government, are comprehended under the denomination of emancipists.

That the annual introduction of such a number of convicts must lower, or rather keep down, the moral condition of the inhabitants, is obvious, and the expediency of discontinuing to use this colony as a penal settlement has repeatedly been suggested. This change has been insisted on still more in a political view. In present circumstances it is not advisable to grant to the colony a legislature. The free settlers and the emancipists form two parties, each desirous of gaining the ascendency in colonial affairs; both have their interests, and the emancipists constitute a wealthy and powerful body. This jarring of interests would lead to great outrages in the event of an election. Another consideration is perhaps of greater importance. The great number of convicts retards the progress of the colony. They are considered by the free inhabitants nearly in the same light as the negro slave population in the southern parts of the United States. The free immigrants evince a great aversion to undertaking such kinds of labours and services as are commonly performed by convicts, and thus the most necessary labour in the cultivation of the ground is done in the most negligent way, a very small number of the convicts having been brought up as agricultural labourers. The discontinuance of sending convicts to the colony would probably also lead by degrees to the civilization of the aborigines. They show, as we have observed, no aversion to taking care of flocks, if they are entrusted with them, and they perform the duties of shepherds with a good deal of care and attention. If the proprietors of the sheep-stations, which are so numerous, could not be assisted by the convicts, they would be obliged to engage young native blacks for that purpose, and that would soon induce the native population to give up their wandering life and to fix themselves in the midst of the white inhabitants. This of course would soon lead to other more important steps, and their conversion to Christianity could easily be effected.

Population.—The last census was taken on the 2nd of March, 1841, and its results are laid down in the following tables. The districts to the proper names of which an asterisk (*) is prefixed, are Commissionary Districts beyond the boundaries of location.

I. *Table representing the Population of the Old Colony of New South Wales in* 1841.

Counties or Districts.	Males.	Females.	General Totals.
Argyle.	2434	963	3397
Bathurst	1793	672	2465
Bligh	473	73	546
Brisbane	1210	350	1560
Camden	4114	2172	6286
Cook	1854	1038	2892
Cumberland . . .	33,763	24,345	58,108
Durham	4287	1951	6238
Georgiana . . .	563	186	749
Gloucester . . .	1051	373	1424
Hunter	655	344	999
King	433	165	598
Macquarie. . . .	1919	490	2409
Murray	1562	549	2111
Northumberland . .	6567	3408	9975
Phillip.	363	90	453
Roxburgh	1074	446	1520
St. Vincent	1308	454	1762
Wellington	390	120	510
Westmoreland . .	435	184	619
*Wellington	837	98	935
*Bligh.	577	95	672
*Lachlan	994	251	1245
*Moneroo	1509	374	1883
*Murrumbidgee . .	1258	281	1539
*Peel's River . . .	1424	167	1591
*New England . .	1003	112	1115
*Clarence River . .	343	73	416
*MacLeay River . .	443	141	584
*Morton Bay . . .	176	24	200
Norfolk Island . .	2082	105	2187
	76,894	40,094	116,988

II. *Table representing the Population of Port Phillip in* 1841.

Counties or Districts.	Males.	Females.	General Totals.
Bourke	4882	2838	7720
Grant	598	192	790
Normanby . . .	502	95	597
*Western Port . .	1190	181	1371
Portland Bay . . .	1102	158	1260
	8274	3464	11,738

Both portions of the colony, inclusive of Norfolk Island, contain, according to this census, 128,726 inhabitants: but it was ascertained that at the time of the census 2130 persons were absent from the country in vessels belonging to the colony, most of them engaged in the whale and seal fishery. Thus the whole population of the colony amounted to 130,856 individuals.

This population is very unequally distributed over the surface of the colony. Nearly one-half of it is settled in the county of Cumberland, or rather in two-thirds of that county, as the most northern districts are a barren waste, and contain only a small number of cultivable acres along the banks of the Hawkesbury River. Northumberland stands next to Cumberland in population, containing nearly 10,000 inhabitants, who are almost exclusively settled on the fertile tract along the Hunter River and the alluvial valleys of its tributaries. The two counties contain more than half the population; but they contain also more than half the land which is under cultivation in the colony, for in 1837 the land cultivated for grain in the colony consisted of 86,344 acres, and of this number 26,726 acres were within Cumberland and 22,952 within Northumberland. This is not to be attributed exclusively to the superior fertility of these counties, though indeed the soil of most of the surrounding counties is of inferior quality, but more especially to the state of landed property. With a few exceptions, all the small proprietors are found in these two counties, and in those of Camden and Durham. The number of landed proprietors, merchants, bankers, and professional persons amounted, in 1841, in the whole country, to 4477, inclusive of the towns. Of this number 1695 resided in Cumberland, 442 in Northumberland, 430 in Camden, and 225 in Durham. Thus we find that nearly two-thirds of the above-named classes of persons were found in these four counties, and if those who reside in the towns are subtracted, it is very probable that one-half of the landed proprietors are found in these four counties. In all the other counties and districts the population is composed almost entirely of shepherds and other persons employed in the care of sheep, a small number of people employed in agriculture, and a few mechanics and retail dealers.

The increase of the population can only be effected by immigration. The disparity of the sexes is so great, that were the country left to its own resources, many years would certainly pass until such an equality would be established between them as to influence perceptibly the increase of its inhabitants. The females stand to the males at present as one to two. This misproportion is chiefly produced by the number of male convicts and male emancipists, which exceeds about seven times that of the females of the same description. Among the free immigrants the difference in the number of the sexes does not amount to much more than one-sixth part of the whole. The immigration however in what may be called the Old Colony, that is, that portion which lies between 36° and 32° S. lat., will, we apprehend, be much checked by the state of landed property. Few tracts of land, except such as are quite barren and hardly worth possessing, and a considerable number of town allotments, are at the disposal of government. The large landed proprietors expect the return of their outlay from the produce of their flocks, and are not much inclined to sacrifice a part of their present income to the prospect of an increase at a distant period, by converting a portion of the pasturage into cultivated fields. They are still less inclined to sell such tracts as are fit for cultivation to the immigrants, and the latter generally leave England with the expectation of acquiring landed property and are disinclined to take lands on lease. It appears also that in the countries lying at a moderate distance from the sea little good land is to be found, except what has long ago been brought under cultivation. Nearly twenty years have now passed since the establishment of the Australian Agricultural Company, which then acquired a tract of 437,000 acres in the country between the Hunter and Manning Rivers, and sent to it a considerable number of emigrants, agriculturists, shepherds, mechanics, &c., and now we find, after a lapse of 20 years, that the whole population of the county of Gloucester, in which these grants are situated, amounts only to 1424 individuals, though it has the advantage of being situated near the sea, and in the vicinity of a harbour which offers safety to coasting vessels.

The emigration will probably, for a considerable time to come, be directed to those countries which are north of 32°, but more especially to Australia Felix, or that part which lies south of 36° and extends from the Pacific to the boundary-line of South Australia, and which appears to contain a much larger portion of arable land than the Old Colony.

The rapid rise of the colony of Port Phillip is almost unprecedented. It was regularly founded by Sir Richard Bourke in 1837. Before that time only a few stations existed at Western Port and Port Phillip, and they were small and contained only a few inhabitants. The census of 1841, taken only four years after the establishment of the colony, gives it a population of 11,738 individuals. When it is considered that the colony at Port Jackson twenty-two years after its foundation contained only 10,000 inhabitants, this rapid increase of the population in the new colony augurs very much in favour of its superior soil and situation. It would however appear that in this new colony government takes great care not to grant away those tracts which are fit for cultivation, together with such lands as are for the present only to be used as pasture-grounds, but it reserves lands of the first description for the emigrants, who are reasonably expected to flock in preference to this country, which is so much more favoured by nature in almost every respect.

Education.—There are three colleges, or grammar-schools: two at Sydney, called Sydney College and Australian College, of which the former was attended by 125 students in 1838, but the number which attends Australian College is not stated. King's School, at Paramatta, was attended by 105 students in 1838. These high schools are supported by the payments of the students. The elementary schools are mostly maintained by government. In 1838 there were thirty-five schools, belonging to the church of

England, attended by 2468 children, 1396 boys and 1072 girls. The number of schools for the children of the Roman Catholics amounted to twelve, and were attended by 855 children, 473 boys and 382 girls. These schools were entirely supported by grants from government, which amounted to more than 10,000*l*. Besides there were in the same year seventeen schools belonging to the Presbyterians; and six others belonging to other denominations of Christians. Government contributed to their support the sum of 2047*l*., and equal sums were raised by private contributions. The number of children attending these schools is stated in an unsatisfactory way. The number of private schools was sixty-seven. They were attended by 1806 children, of whom 832 were boys and 974 girls. Six of them were Roman Catholic schools.

Towns.—It is obvious that, in a country so lately settled and so thinly inhabited, large towns are not to be found. The largest is the capital, SYDNEY, of which an account is given under that head. The others would hardly be called villages in England. They are most numerous in the most populous portion of the colony, in Cumberland. Paramatta, or Parramatta, is built on the innermost recess of Port Jackson, in a hollow surrounded by rising grounds. The streets are regularly laid out about east and west, and north and south, but are neither paved nor lighted. The houses are unconnected, being generally detached cottages partly surrounded by gardens. A considerable number of them are of two stories, and many are built with taste and elegance. They are mostly built of brick or white freestone, and all roofed with iron-bark shingles. In this town is an observatory, erected by Sir Thomas Brisbane. The population probably exceeds 4000 individuals. It derives its importance from the retail trade, being situated on the most frequented road of the colony, and where the barren tract along the coast borders on the fertile country of the interior. The place next in importance is Windsor, which is situated on the banks of the Hawkesbury, where the river begins to be navigable for coasting vessels. This circumstance and the fertile country which extends along both sides of the river above the town have raised it to a commercial place, as considerable quantities of grain are shipped in this town. There are at Windsor five mills for grinding grain, two breweries, and four tanneries. The population probably amounts to 2000 individuals. Liverpool, south of Paramatta, is built on the left bank of George's River, and at the place where it begins to be navigable for small vessels; and though the population does not exceed 600 individuals, it has a considerable retail trade, as the country south of it is the most fertile and best cultivated tract in Cumberland, the banks of the Hawkesbury excepted. South of Liverpool is Campbell-town, with about 400 inhabitants, some trade, and two tanneries.

Newcastle is built at the mouth of the Hunter River, which forms a harbour deep enough for merchant vessels, but the entrance is so narrow and crooked that it is dangerous for any vessels except schooners or cutters to work in and out. The town is built on the declivity of a hill of moderate elevation, which is united to the mainland by a low swampy neck of ground. About fifteen years ago it was a thriving place, but since the foundation of Maitland, and the establishment of a regular communication by steam-boats between this place and Sydney, it has lost its commercial importance, which now rests entirely on the coal-mines in its vicinity, which however are worked to some extent. Maitland is built on the southern banks of the Hunter, 40 miles from the mouth of the river, and at the place where the sloop navigation ceases. This town has rapidly risen into importance, as all the commerce of the fertile countries extending along the river and its tributaries now concentrates in this place. It may already contain 2000 inhabitants.

No other place deserves to be called a town in the Old Colony, except Bathurst, which lies on the west of the Blue Mountains, in the county of the same name and on the banks of the Macquarie River. It is however a small place, consisting of huts, and is irregularly built. It derives its importance from the extensive plains in which it lies and the excellent pasturage which these plains afford.

In the lately established colony of Port Phillip is Melbourne, built on the most northern recess of the extensive bay called Port Phillip, and at the confluence of two rivers, the Marriburnong and Yarra Yarra, each of which is navigable for small sea-faring vessels for several miles from its mouth. The town is only in its very infancy, but as the county of Bourke, in which it is situated, only four years after having been settled had risen in population to be the third of the whole colony, being only inferior to Cumberland and Northumberland, it bids fair to outstrip in importance and size, in a comparatively short time, even Sydney, and may eventually become the capital of our settlements in that part of the world. Its greatest advantage does not seem to be derived from its being built in a very fertile tract of land, but from its situation to the west of the western entrance of Bass's Strait. This may be considered as being a month's sail nearer to the countries lying on the Atlantic and Indian Ocean than Sydney, at least as long as the sun is in the northern hemisphere, when the winds blow through Bass's Strait and round Tasmania with such force that it is almost impossible to stem them. Vessels departing from Melbourne may sail to the East Indies, the Cape, and Europe, all the year round, without being obliged to attempt the dangerous passage through Torres Strait. This circumstance will probably in a short time secure to this new town a superiority over Sydney. But the same advantage is also possessed by the town of Geelong in the county of Grant, which is built at the innermost recess of Geelong Bay, the most western portion of Port Phillip. A new town has lately been founded in Portland Bay.

Industry.—The manufacturing industry of the colony is still in its infancy. The most numerous manufacturing establishments are the mills for grinding and dressing corn, turned by wind, water, horses, or steam. In 1838 there were 85 of them in different parts of the country; 17 were at Sydney. In Sydney much cabinet-ware is made, and there are five brass and iron foundries. In a few places are tanneries and manufactures of coarse woollens, and at Sydney eight manufactories of rope and twine. There are also a few of soap and candles, and a few distilleries and breweries; but all on a small scale. Common earthenware is made to a considerable extent not far from Sydney.

Two branches of industry however are carried on to some extent, the fisheries and the building of vessels. As a large number of spermaceti-whales and black whales frequent the sea adjacent to the eastern entrance of Bass's Strait and the Strait itself, and a great number of seals are found on the islands in the same part of the sea, the whale and seal fishery has become a source of gain to the colonists, and is carried on to some extent.

Vessels engaged in the Fishery, and their Produce.

Years.	No.	Tonnage.	Men.	Spermaceti Oil. tons.	Black Whl. Oil. tons.	Whalebone. tons.	Whalebone. cwt.	Seal-skins. No.	Value in £.
1836	40	7544	828	1700	1178	96	6	386	126,085
1837	47	9264	811	1179	2006	77	10	200	116,744
1838	53	9313	894	1184	2178	136	14	180	117,474

As several of the forest-trees of New South Wales afford timber, and some of large dimensions, shipbuilding has lately been set on foot. The vessels however are only of moderate size, the largest not exceeding 80 tons burthen. In 1837 the number built was 17, and their burthen 760 tons, and in 1838 there were built 20 vessels, with 808 tons burthen.

Commerce.—New South Wales, considered as a commercial country, holds a very high rank among our colonies, if its scanty population is taken into account. It is true that the value both of its exports and imports falls considerably short of that of our colonies by which we are supplied with colonial articles of consumption. It cannot be compared with that of Guyana, or of Jamaica, Trinidad, and the other islands of the West Indies. But in these countries cultivation is limited to a small number of articles, calculated for a foreign market, and the population is in a great measure supplied with food and clothing by importation from foreign countries. As this is not the case in New South Wales, this colony, as far as regards commerce, is rather to be compared with those colonies which are in a similar condition, and in this point of view it makes a very conspicuous figure. The Canadas, with nearly a million of inhabitants, exported in 1837 only to the value of 908,702*l*.; whilst New South Wales, with less than 120,000 inhabitants, yielded articles of export to the amount of 768,940*l*. In the same year the Cape, with a population of nearly 250,000 individuals, exported only to the value of 281,388*l.* Tasmania is to be ranged with New South Wales, having, in 1837, exported to the value of 366,705*l.*, or upwards of 80,000*l.* more than the Cape, though its population in that year hardly exceeded 45,000, amounting to only one-fifth of that of the last-mentioned colony. These two colonies, New South Wales and Tasmania, are to be considered, in a commercial point of view, as intermediate between the tropical colonies in the West Indies and our other colonies which in cultivation and productions more resemble England. They owe this advantage to the peculiar dryness of their climate and soil, by which they are rendered more fit for the rearing of sheep than any other part of the globe. As the principal article of export in both the colonies is wool, and as by far the largest manufactures in which wool is consumed are in England, the commerce of both colonies is almost entirely limited to England and to those of its colonies by which they are supplied with such articles as are required for their consumption.

Statement of the Quantities and Value of various Articles of Merchandise exported from New South Wales in 1837.

I. Articles, the produce of the country.		Quantities.	Value.
Bark	tons	2	£15
Beef and pork	barrels	4,572	14,655
Casks	value	. .	30,095
Coals	tons	636	632
Corn—wheat	bushels	2,025	305
other grain	do.	745	217
wheat-flour	do.	10,033	21,038
Dye and hard woods	pieces	293	8,092
Cedar	feet	978,880	
Hides and skins—			
Hides of all sorts	number	11,861	6,474
Seal-skins	do.	40	30
Skins, unenumerated	value	. .	1,229
Live stock—horses	number	25	1,248
Horned cattle	do.	100	780
Sheep and swine	do.	463	354
Oil—train	gallons	417,942	43,449
Spermaceti	do.	626,913	132,579
Whalebone	cwts.	1,701	7,215
Whaleing gear	value	. .	10,293
Wood—boards and planks	number	389	449
	feet	10,228	
Other wood	value	. .	1,607
Wool—sheep's	lbs.	4,128,916	420,325
Miscellaneous articles	value	. .	17,338
Total value of exports produced in the country			£718,416

II. Articles, imported from other countries and re exported.		Quantities.	Value.
Apparel and slops	value	. .	£7,413
Beer and ale	gallons	7,063	613
Bread and biscuit	barrels	2,293	4,386
Cordage	cwts.	130	257
Flax (from New Zealand)	do.	600	450
Guns	number	635	789
Gunpowder	lbs.	34,205	1,078
Hardware	value	. .	2,329
Iron, wrought	do.	. .	3,501
Spirits—brandy, geneva, &c.	gallons	15,814	3,981
Rum	do.	28,427	4,569
Sugar, raw	lbs.	476,436	5,136
Tea	do.	32,871	2,198
Tobacco, unmanufactured	do.	91,878	7,488
Manufactured, and snuff	value	. .	598
Wine of all sorts	gallons	5,483	1,757
Woollen manufactures	value	. .	2,421
Specie	do.	. .	1,560
Total value of the articles imported from other countries and re-exported			£50,504

The total value of exports amounted to 768,940*l.*, that of the imports exceeded it nearly by 100,000*l.*, as it amounted to 864,255*l.* The difference between the imports and exports appears chiefly to have arisen from the immigration, as in that year the immigrants were 4275 in number. The most important articles of importation were manufactured goods, as cotton manufactures, 68,740*l.*; silk manufactures, 33,246*l.*; woollen manufactures, 49,453*l.*; linen manufactures, 28,919*l.*; and apparel and slops, 68,899*l.* Other large articles were tea, 62,113*l.*; sugar, 49,818*l.*; wines of all sorts, 28,246*l.*; spirits, 21,000*l.*; beer and ale, 24,914*l.*; glass, 25,164*l.*; haberdashery, 34,893*l.*; hardware and cutlery, 22,210*l.*; iron in bars or pigs, 11,350*l.*; wrought-iron, 22,112*l.*; leather manufactures, 28,919*l.*; books, 12,536*l.*; corn and flour, 13,378*l.*; saddlery and harness, 9786*l.*; soap, 7037*l.*; musical instruments, 8621*l.*; stationery, 10,967*l.*; tobacco, 17,293*l.*; and machinery, 5549*l.*

Number of Vessels which arrived at and departed from Sydney in 1837 *and* 1838.

	1837.				1838.			
	Inwards.		Outwards.		Inwards.		Outwards.	
Countries.	No. of Vessels.	Tonnage.	No. of Vessels.	Tonnage.	No. of Vessels.	Tonnage.	No of Vessels.	Tonnage.
Great Britain	56	21,816	43	13,398	102	41,848	35	12,267
British Colonies	94	21,085	91	20,959	106	22,928	83	17,943
United States	5	1,220	..	..	1	274	1	229
Foreign Countries	105	23,239	128	30,239	9	2,351	73	35,749
Islands of the Pacific	..	..	..	..	6	616	5	362
Fisheries	..	..	..	..	31	7,928	40	10,386
New Zealand	..	..	..	..	36	4,115	36	5,139
Total	260	67,360	262	64,596	291	80,060	273	81,332

In 1838 the colony possessed 41 vessels, of 6229 tons, which were partly employed in the coasting trade, and partly in the fisheries. A steam-boat plied alternately between Sydney and Paramatta, and between Sydney and Maitland on Hunter River.

Government.—The colony is administered by a governor with the assistance of two councils. The councils are called the Executive and the Legislative. The Executive is composed of official members, and the governor is obliged to consult it on occasions of any moment; but he is still authorized to act on his own responsibility, provided he states in writing his reasons for so doing, and forwards them to the government at home. Thus the governor is enabled to set at nought any combination among the members of the executive, and to defeat opposition when carried so far as to endanger the safety of the colony; but it is also a check on his proceedings, that he incurs a serious responsibility when he frees himself from the control of the council. The members of the legislative council are not chosen by the inhabitants, but appointed by government, and consist partly of officers of government, and partly of landholders and merchants, with the chief-justice as president. It is authorized to impose taxes or to pass laws for the benefit of the colony, provided those laws are certified by the chief-justice to be conformable in spirit to those of England. The governor has the initiative of these laws. If two-thirds of the legislative council are opposed to any act proposed by him, it cannot pass; and in that case the reasons of dissent are entered. The chief-justice, being authorized to declare whether the proposed law is or is not conformable to the law of England, is considered as being invested with a veto. Laws passed by the legislative council must within seven days be enrolled in the Supreme Court, and fourteen days after such enrolment they come into operation. The animosity existing between the immigrants and their descendants on one side, and between the emancipists and their offspring on the other, seems to be a sufficient reason for withholding from the colony the boon of a free legislative body.

The judicature consists of a Supreme Court, composed of a chief-justice and two assistant judges, of courts of quarter-sessions, and courts of requests, which last have jurisdiction in matters to the extent of ten pounds.

Civil cases are tried by one of the judges, assisted by two magisterial assessors, if both parties do not agree to a jury trial. If these assessors do not agree, the judge has a casting vote. Criminal offences are tried in the Supreme Court by seven military officers as a jury. The magistrates of the thirty districts into which the colony is divided sit daily for the trial of petty offences; their decision is subject to the approval of the governor, who is advised by the chief police magistrate. These magistrates have at their disposal a large constabulary force, composed mostly of convicts, and a few of the native blacks.

History.—Though the western and northern coasts of Australia had been discovered by several Dutch navigators during the seventeenth century, that portion which at present constitutes the colony of New South Wales was unknown up to 1770, when it was discovered by James Cook in his first voyage, and received from him its present name. The southern parts of the coast however remained unknown up to the end of the last century, and up to that period it was thought that Tasmania, which had been discovered by Tasman in the seventeenth century, formed a portion of it, until, in 1798, Bass's Strait was discovered by Bass. The country lying between Wilson's Promontory on the east and Cape Otway on the west, was partly surveyed by Grant in 1800, and partly in 1802 by Murray, who discovered Port Phillip. The most western part of the coast, or that which lies on both sides of Portland Bay, was first seen in 1802 by the Frenchman Baudin, who had been sent, after the peace of Amiens, with some vessels to make discoveries in the Pacific, and it was soon afterwards surveyed by Flinders.

The reasons which induced the British government to settle a colony on this coast, and the reasons which determined Governor Phillip to give a preference to Port Jackson above Botany Bay, have been mentioned in the article SYDNEY [Vol. xxiii., p. 436]. His choice may certainly be called a happy one, as it is now known that at no other place along the coast is such a large tract of fertile land found, at no great distance from the sea, as west of Port Jackson, with the exception of Port Phillip. But even with this fertile tract in its vicinity, the progress of the colony was slow in the beginning, which was owing to the circumstance that the first settlers were only convicts. It was not until some persons connected with the government had acquired landed property, and some convicts had cultivated several tracts of land with success, that the colony began slowly to rise in the esteem of the public. How slow the progress of the colony then was, may be inferred from the circumstance that its population in 1810 did not exceed 10,000 individuals. It was about this time that one of the landed proprietors ascertained that the climate and soil of the colony were very favourable to the rearing of sheep, and as soon as that became known, many persons went to the colony to settle there. But they soon found themselves embarrassed: for the fertile country between Port Jackson and the Blue Mountains was settled, or at least had been granted away, and it appeared impossible to extend the settlements farther westward, as several attempts to pass over the Blue Mountains had been frustrated by the nature of the range, which consists of sandstone masses, furrowed by numerous ravines, whose sides are so steep that it is impossible to ascend them. In 1813, when the colonists were visited by a most distressing season of drought, three enterprising individuals, Blaxland, Wentworth, and Lawson, succeeded in passing over the mountains. They effected it by never descending into any of the ravines after having attained the upper part of the range, but by keeping on the high ground forming the separation of the innermost recesses of the ravines, which open into two different river-systems. Thus the western country was opened to the colonists, and in the same year followed the discovery of that fine pastoral country the Downs of Bathurst. In the following year a practicable line of road was constructed over the mountain-ranges by convict labour. As it was soon afterwards ascertained that two of the rivers draining the Downs of Bathurst ran off in different directions, the government of the colony thought it incumbent on them to set on foot an expedition to explore the course of these two rivers. Mr. Oxley, the surveyor-general of the colony, undertook the task in 1817. He first descended the southern river, the Lachlan, and after having traversed a great extent of arid plains, not unlike the steppes of Central Asia, he found that the river spread its waters over the adjacent level grounds, and terminated in extensive morasses, which were west of 144° 30′ E. long. In following the course of the Macquarie, after traversing arid plains, he also arrived at extensive marshes, in which the river terminated. As the two largest rivers then known in Australia traversed arid plains of great extent, and terminated in swamps covering large tracts of land, it began to be the prevalent opinion in the colony and in Europe, that the interior was covered with an immense shallow lake not unlike the Caspian, in which all the rivers terminated which did not reach the sea. From the marshes of the Macquarie, Oxley went eastward, passed over the Liverpool Plains, which are still more extensive than Bathurst Downs, and reached the sea at Port Macquarie. Since this period, nearly every year some portion of the country has been discovered and explored. In 1819 the woody country separating the Cow Pastures from the Connecting Table-land was penetrated, and Goulburn Plains, and soon afterwards Moneroo Plains, were discovered, and here the Murrumbidgee River was found, which, it was soon ascertained, flowed westward into the interior of Australia. In 1823 Hovell and Hume, two enterprising agriculturists, penetrated from Goulburn Plains in a south-westerly direction into that portion of the continent which now is called Australia Felix, and arrived at Port Phillip. In 1827 Allan Cunningham was sent by government to explore the country lying to the west of the Coast Range, north of Liverpool Plains and Port Macquarie, and he succeeded in traversing a tract extending over four degrees of latitude, which had never been seen by Europeans. He terminated his journey at the foot of the Coast Range, where this range lies west of the southern extremity of Moreton Bay. During the long drought which desolated the country from 1826 to 1830, government thought that the country at the termination of the Macquarie, which Oxley had found covered with swamps, would have changed its aspect; and, to ascertain this point, Capt. Sturt undertook an expedition in these parts in 1828, when he found that the river towards its termination in the marshes ceased to exist as a running stream, its bed only presenting a few isolated pools or ponds, and the marshes themselves being quite dry, but in their whole extent overgrown with reeds. Sturt continued his journey to the north-west, and discovered a large river, which he named the Darling, but he found that the waters were salt. In 1830 Sturt was sent to trace the course of the river Murrumbidgee, whose upper course had been known for twelve years, as it drains the Plains of the Connecting Table-lands, whence it descends to the west. He traced the river down its right bank until he had passed every rapid or fall that might impede the navigation, and he then launched a boat which he had conveyed overland from Sydney, and descended the river to its confluence with the Millewá, where he entered the Murray. He pursued his course on the Murray, passed the mouth of the Darling, and continued his voyage until the river turned from a western to a southern course, and at last was lost in Lake Alexandrina.

By these expeditions the general character of the countries surrounding the colony had so far been explored, as to give some idea of their natural powers and fitness for settlements. In 1831 a runaway-convict, who for some years had lived among the aborigines, gave some information of a very large river, which according to his account was called Kindur, and drained an immense tract of fertile country about 300 miles north of Liverpool Plains. The surveyer-general Mitchell was sent to ascertain the truth of this report. In this journey he traversed the hilly country east of Liverpool Plains, and farther north the fertile tract lying west of the Hardwicke or Nundawar Range, and arrived at last in 29° S. lat., at a considerable river, the Karaula. In 1835 Mitchell traced the course of the Darling, in its south-western direction, as far south as 32° 30′, when he convinced himself, by the direction of the river and the information obtained from the natives, that this river actually joined the Murray, a fact which had been doubted before he undertook this journey. He found the river everywhere surrounded by steppes. In his third expedition (1836) Mitchell descended along the course of the Lachlan, and found its bed everywhere dried up, and this was also the case with the extensive morasses which had prevented Oxley (in 1817) from extending his expedition farther westward. He traced the bed of the Lachlan to the place where it discharges in rainy seasons the surplus of its waters into the Murrumbidgee. After having explored the lower part of the course of the Darling, he passed to the country south of the Murray River, traced the lower course of its great branch, the Millewá, to its confluence with the Bayanga, and a part of the last-mentioned river, and then, directing his route to the south-west, he passed round the northern extremity of the Grampians, and descended from the higher grounds to the sea along the course of the Nangeela. From Portland Bay he returned to the colony by travelling across the highlands in which the rivers originate which run southward to the sea and northward to the Murray River. He called this country Australia Felix, on account of its superior fertility and abundance of permanent streams.

The discovery of this part of the country and the information obtained respecting the fertile tracts of land which surround the excellent bay called Port Phillip, determined the governor, Sir Thomas Bourke, to plant, in 1837, the New Colony at that place, and to found the town of Melbourne. The rapid rise of this colony has led to a closer examination of the surrounding country. Mr. Tyers surveyed, in 1839, the plain which from Port Phillip extends westward to the boundary-line of South Australia; and Count Streleski, a Polish refugee living at Sydney, traversed, in 1839, the interior of the mountain-region of the Australian Alps, ascended the high summit of Mount Kosciusko, determined its elevation above the sea-level, and descended in a south-south-eastern direction towards the sea-shore, which he attained at the middle of the Long Beach, at a place nearly equally distant from Cape Howe and Wilson's Promontory. Hence he travelled through the interior of Gippsland to Western Port, and from that place to Melbourne. But only a small portion of the country surrounding Port Phillip has been explored by these expeditions. It can however hardly be doubted, that in a few years this region will be known as well as the countries lying to the south, west, and north of Port Jackson.

(Cook's *First Voyage*; Hunter's *Historical Journal of the Transactions at Port Jackson and Norfolk Island*; Flinders' *Voyage to Terra Australis*; Oxley's *Journals of Two Expeditions in the Interior of New South Wales*; Barron Field's *Geographical Memoirs on New South Wales*; P. Cunningham's *Two Years in New South Wales*; Sturt's *Narrative of Two Expeditions into the Interior of New South Wales*; Breton's *Excursions in New South Wales, Western Australia, &c.*; Bennet's *Wanderings in New South Wales, Batavia, &c.*; Mitchell's *Three Expeditions into the Interior of Eastern Australia, &c.*; Allan Cunningham's *Brief View of the Progress of the Interior Discovery in New South Wales*, in *London Geographical Journal*, vol. ii.; Wedge, *On the Country round Port Phillip*, in *London Geographical Journal*, vol. vi.; *Parliamentary Papers respecting New South Wales*, 1841; *Tables of the Revenue of Population, &c. of the United Kingdom*, 1840 *and* 1842.)

WALES, WILLIAM, an English mathematician and astronomer, was born about the year 1734, of parents in humble circumstances. It is not known in what manner he received the rudiments of education, and it is probable that he was one of the many persons who, for their attainments in science, owe more to nature and intense application than to the precepts of a teacher.

He first distinguished himself as a contributor to the 'Ladies' Diary,' a work containing an extensive collection of mathematical propositions with their solutions. It was begun in the year 1704; and under the able direction of Beighton, Thomas Simpson, and Dr. Charles Hutton, it had no small influence in promoting the advance of science in this country during the eighteenth century: it may be added that it still numbers among its contributors several eminent mathematicians. Many of the solutions which were given by Mr. Wales are signed with his own name, but occasionally they appear under fictitious signatures.

The merit shown in these solutions appears to have procured for him a recommendation to the government; and in 1768 he was appointed, together with Mr. Dymond, to go to Hudson's Bay, for the purpose of observing in that region the transit of Venus over the sun's disk, which was to take place in the following year (June, 1769). The observations were made at Fort Prince of Wales, and each of the observers was so fortunate as to witness the exterior and interior contact at both the commencement and end of the transit. Mr. Wales made at the same place a great number of astronomical observations, an account of which was published in the 'Philosophical Transactions' for 1769; and again, in 1772, in a separate work, entitled 'General Observations made at Hudson's Bay, &c.,' London, 4to. He also, principally, as he observes, for amusement during the many dreary hours which he passed on the shores of Hudson's Bay, computed tables of the equations to equal altitudes, for facilitating the solution of the problem relating to the determination of time: these tables were first published in the 'Nautical Almanac' for 1773; and again, in the year 1794, in his tract entitled 'The Method of Finding the Longitude by Timekeepers,' 8vo.

Mr. Wales returned to England in 1770, and in 1772 he published 'The two books of Apollonius concerning Determinate Sections,' London, 4to. In the same year he was appointed, together with Mr. Bayly, and with the title of astronomer, to accompany Captain Cook in his second voyage for the circumnavigation of the earth; and on the return of the expedition he was (in 1776) elected a fellow of the Royal Society. The series of astronomical observations which had been made during the voyage, with an introduction by Wales, was published in 1777, at the expense of the Board of Longitude, in a quarto volume, with charts and plates. In the same year was published by Wales a tract entitled 'Observations on a Voyage with Captain Cook;' and, in 1778, his strictures on an account of the same voyage, which had been published by John George Forster, who, with his father, had sailed with the expedition as naturalist. [FORSTER, J. R.; FORSTER, J. G.] In this work the accusations made by the elder Forster against the captain and his officers are shown to be entirely without foundation.

In 1776 Mr. Wales again embarked with Captain Cook in the Resolution, on the third voyage of that navigator to the Pacific Ocean: he returned with the expedition in 1780; and soon afterwards, on the death of Mr. Harris, he was appointed mathematical master of Christ's Hospital. He was subsequently made secretary to the Board of Longitude; and both these posts he filled with credit till his death, which happened in the year 1798, when he was about sixty-four years of age.

He published, in 1781, 'An Enquiry concerning the Population of England and Wales;' and, in 1788, 'Astronomical Observations made in the Voyages of Byron, Wallis, Carteret, and Cook,' London, 4to.

In 1739 the French captain De Bouvet had discovered, to the south of the Cape of Good Hope, an island, to which he gave the name of Ile Bouvet, or Cap Circoncision; but its geographical position being erroneously stated, Captain Cook, in his voyages to the south, had been unable to find it, and he was led to suspect that the French seaman had mistaken some bank of ice for an island. On this occasion Lemonnier ungenerously stated, in a paper which was read at a sitting of the Académie des Sciences, that Cook from jealousy had sought for the island under a meridian different from that which had been assigned to it; and Mr. Wales published a pamphlet in which the statement is disproved. The island, or cape, is now supposed to have been that which was, in 1808, discovered by the Swan and the Otter in 54° 20′ S. lat. and about 2° E. long. from Greenwich.

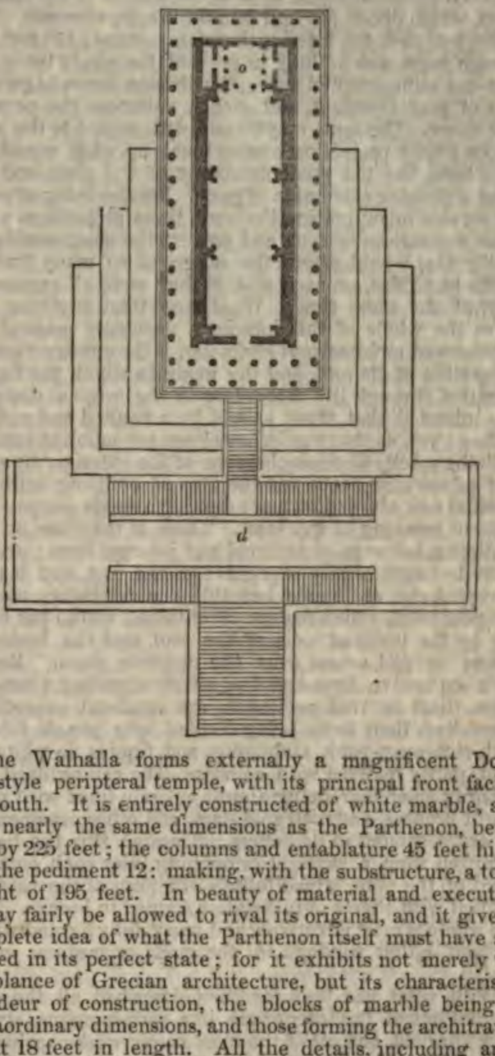
Mr. Wales is said to have been the author of the dissertation on the achronychal rising of the Pleiades, which is annexed to Dr. Vincent's 'Voyage of Nearchus.'

WALHALLA, one of the most remarkable architectural monuments of the present age, stands on the brow of a hill on the north bank of the Danube, and about 250 feet above the level of the river, not far from Regensburg (Ratisbon). The idea of erecting a national edifice consecrated to the worthies of Germany—to all who have established for themselves permanent historical celebrity as warriors, statesmen, philosophers, poets, or in science or in art, had long been a favourite one with Ludwig, the present king of Bavaria, who first conceived it in 1806. The first programme of the scheme, inviting architects to send in designs, was issued in February 1814, but none of them being approved by the royal founder, he, two years afterwards, directed Leo von Klenze, who was then engaged on the Glyptothek [MUNICH], to prepare others, which, though subsequently greatly modified, were ultimately adopted. Many years however elapsed before the structure was commenced; for though the preparation of materials had been going on from 1821, the ceremony of laying the first stone did not take place till Oct. 18th, 1830, and exactly twelve years afterwards, October 18th, 1842, the building was solemnly inaugurated.

Though the title of the edifice is sufficiently appropriate and expressive, being that of the paradise of the Scandinavian mythology, consequently suitable enough for what is a Teutonic Pantheon, commemorating Teutonic intellect and genius, it seems quite at variance with the architectural character, which is strictly Grecian. Comparatively unimportant as it is in itself, this circumstance has given rise to much captious objection, it being contended that a structure so eminently national in its purpose and in name ought to have been no less strictly national in style, and that it should have presented nothing to call up any ideas of Greece, or any classical associations. Even had the present discrepancy been avoided by selecting a name less in direct opposition to its architectural physiognomy, the propriety of adopting such style at all, or any other than the Gothic or antient German, would have been very questionable; still there are considerations, which, if they do not surmount all objections, may reconcile us tolerably well to what has been done. Unless it had been upon a much more extensive scale, an edifice in the Gothic style would have looked diminutive, especially in comparison with some of those colossal fabrics of the kind which are the architectural boast of Germany. There is reason too for apprehending that it would have partaken too much of a religious character—have looked very much more like a church than a national pantheon and shrine of monumental sculpture. The experiment would have been rather a hazardous one at the best, since, with all their study of their national antiquities, the Germans have not yet been very successful in imitating the architectural style of their ancestors; whereas, by copying the Parthenon, though originality has been disowned, all the danger attending experiment has been avoided, and what is in itself a most noble monument of art has been ensured.

But the Walhalla is not a mere copy of the Athenian edifice, for it exhibits the Parthenon reared aloft upon a widely-spreading enormous substructure of Cyclopian masonry, forming successive terraces and flights of steps leading up to the platform on which stands the Doric temple itself, displayed with a pomp of architecture that may be said to be without precedent, as no instance of any similar arrangement in antient temples has been preserved to us, for of that at Præneste [TEMPLE, p. 183, col. 2] no more remains than to show that such was originally its disposition. In the case of the Walhalla therefore, the Doric peripteros becomes only a portion of the general design—the superstructure crowning a colossal architectural mass, to which it is in a manner what the dome of St. Paul's is to that edifice. Consequently, though the temple portion itself may look somewhat smaller than it would do apart from the substructure, the whole becomes infinitely more imposing, more picturesque, and more varied in aspect, as viewed from different points, and more or less foreshortened as seen from below. In geometrical elevation the whole is of nearly pyramidal outline, and the temple seems to stand immediately over the ascent up to it, but in the real building the appearance is very different, owing to the manner in which the terraces and first flight of steps are brought out in advance of it.

Hence it is only from a considerable distance that the general outline and mass display themselves, for on approaching and beginning to ascend the visitor loses for a while sight of the temple itself, until he reaches the last flight of steps leading immediately up to it, when it comes all at once into view, with its magnificent pediment. This is well contrived, the effect being far more impressive, and conveying an idea of greater magnitude than were the building seen during the whole course of the approach to it. Owing also to the ascents returning parallel to each other and to the building, views are obtained in different directions and at different heights; while the terraces and their colossal masonry, which show scarcely at all in a more general prospect or drawing, when seen close at hand appear a truly gigantic and indestructible work. This enormous substructure or basement rises altogether 138 feet to the level of the upper platform. Instead of being enclosed on its sides by pedestal walls, carried up horizontally, the first or lowermost flight of steps has merely low parapets following the slope of the steps themselves, so that at the bottom it is of no height at all,—which gives a poor and sprawling expression to that part. It is true the same is the case with regard to the other flights, but then they are seen sideways, and their sloping profiles mark the different ascents, and contrast significantly with the horizontal lines of the terraces; besides which, if they had not sloped, no prospect could have been obtained from the steps while ascending. On the lower terrace there is a bronze door (marked *d* in the plan), which forms the entrance to a spacious crypt or vaulted hall beneath the Walhalla, called the 'Hall of Expectation,' and intended both to give more immediate access to the interior, and to serve as a repository for busts of eminent persons who are still living, and are afterwards to be removed into the Walhalla itself.



The Walhalla forms externally a magnificent Doric octastyle peripteral temple, with its principal front facing the south. It is entirely constructed of white marble, and is of nearly the same dimensions as the Parthenon, being 104 by 225 feet; the columns and entablature 45 feet high, and the pediment 12: making, with the substructure, a total height of 195 feet. In beauty of material and execution it may fairly be allowed to rival its original, and it gives a complete idea of what the Parthenon itself must have appeared in its perfect state; for it exhibits not merely the semblance of Grecian architecture, but its characteristic grandeur of construction, the blocks of marble being of extraordinary dimensions, and those forming the architraves about 18 feet in length. All the details, including antifixæ and acroteria, are most carefully studied, and beautifully finished; and yet there is one species of decoration peculiar to the order which has been omitted, there being no sculpture in the metopes of the frieze. The reason for such omission however is sufficiently apparent, because, owing to the situation of the building, sculpture would have been entirely lost, except as giving a general expression of richness; for seen from below it would not have been distinguishable, and viewed near would have been seen so very near and so immediately from beneath, and would have been so greatly foreshortened, as to be unintelligible. Still there is a most magnificent display of sculpture, and in a truly classical taste in the two pediments, after designs by Rauch, remodelled and executed by Schwanthaler. That of the south pediment consists of fifteen figures in full relief, the one in the centre (of colossal size and seated) representing Germania, and the others symbolical of the different Germanic states. The sculpture of the other pediment, which is entirely the work of Schwanthaler, consists of the same number of figures, representing the victory obtained by the Cherusci over the Romans.

Of Grecian temples the beauty was confined almost entirely to the exterior, there being no architectural display of any kind within, or very little; but the interior of the Walhalla is of most striking splendour—most sumptuous in point of decoration, and highly original in its design, which exhibits great happiness of invention. Here Klenze shows himself not an imitator of the antients, but their rival—their pupil, but also a master in his art. The arrangement will be sufficiently understood from the plan, which shows that it consists chiefly of a single hall (150 by 57 feet), with a space (*o*) answering to the opisthodom of an antient temple, at its north end, but separated from it only by a screen of Ionic columns, which order is continued throughout in the antæ at the angles of the massive piers, which divide the hall into three compartments. The entire length of the interior therefore becomes 175 feet, and though there was nothing to prevent the whole being laid into one uninterrupted space, the division serves to give the idea of greater extent, and greatly enhances the perspective effect. The same may be said with regard to the piers, whose boldly projecting masses break up what would else have been the too great monotony of the plan, and produce a pleasing succession of parts. Besides being of essential service in supporting the roof, these projections act in some measure as screens, and prevent the disagreeable formality that would attend the ranges of so many busts all of the same size, on each side, if they were all exposed to view at the same time. What more than anything else gives the whole of this interior a decidedly original and unborrowed architectural character, is the construction and decoration of its roof, and the mode in which the light is admitted through it. According to the original design, it was intended that there should be a vaulted and coffered ceiling; yet, as that would have been too much at variance with the strictly Grecian character of the exterior, the architect afterwards conceived the idea of omitting ceiling or internal roof altogether, and adopting a single or open roof, without masking of any kind. There is therefore no contradiction between its external and internal form; and the latter becomes highly expressive of the first, and is made to repeat one of its most beautiful characteristics, namely, the pediment, which feature is obtained within the building by the inclined sides of the roof, and the horizontal beams carried across from the opposite piers. Besides their expressive form and the effect attending a series of them, these internal pediments are rendered exceedingly decorative, their faces being divided into panels filled in with rich open-work arabesques and figures, in white and gold, partly relieved with colours. The ceiling itself is of dazzling splendour, being almost entirely lined with plates of gilt bronzes, and with gold stars, and other ornaments on an azure ground in its coffers. Through this the light is admitted from a skylight or opening over each compartment of the plan, which follows the form of the roof, and is filled with sheets of plate-glass framed in bronze. Thus the whole is most effectively and beautifully lighted within, without either windows in the walls or lanterns on the roof.

With what has thus far been described all the other decorations of the interior are in a corresponding style of magnificence, and all of the most costly workmanship and material—white and coloured marbles, bronze, gilding, polychromy, and sculpture. The floor is inlaid with coloured marbles from Tegernsee, distributed into three larger compartments answering to those of the plan. The shafts of the antæ and columns are of a brownish red marble, resembling the antique African, and their bases and capitals of white marble, picked out with colours and gilding; while the walls are lined with the same material, and of nearly the same hue as the columns. In the entablature the architrave and cornice are white, relieved by gold and colours on their mouldings; but the frieze, which is of unusual depth, is entirely of white marble, and forms, except where interrupted by the piers, and where that part is decorated with small pannels of sculpture, a continuous bas-relief, representing the progress of civilization in Germany from the earliest times to the introduction of Christianity by St. Bonifacius. This piece of sculpture, which extends altogether to two hundred and thirty feet, was composed by Wagner and executed by Pettrich and Schopf.

Besides this principal Ionic order, which is 28½ feet high, there is a second one (17¼ high) of colossal Caryatides, representing Valkyriæ, the female genii in Scandinavian mythology, whose office it was to welcome the souls of the blessed into the halls of Odin and the Walhalla. Of these figures there are two over each pier, which is not carried up solid higher than the first order, so that they stand detached from the walls, and thereby give an air of lightness to the upper part of the interior. These statues, of which there are altogether fourteen, six on each side and two over the columns at the farther end, where there is an upper gallery above the *opisthodomos*, were executed by Schwanthaler, and are of marble, but slightly polychromed, after the chryso-elephantine fashion of the antients, in imitation of the natural colours, or, as heralds would say, 'proper.' This order, which may also in some degree be termed Ionic, inasmuch as the figures bear voluted capitals on their heads, is raised upon a podium of greyish marble, and the frieze of its entablature is ornamented with wreaths of gilded bronze upon an azure ground.

Imperfect as it is, this description of the architectural decorations has detained us so long, that we may seem to have overlooked the principal objects of all—the very works for which the structure was erected as a repository, namely, the effigies of the illustrious persons here commemorated. In regard to mere busts being adopted instead of statues, as would seem more befitting so sumptuous a pantheon, it may be observed that, besides the impossibility of having anything like the same number of statues in the same space, one great inconvenience has thereby been got rid of, namely, that which would have attended the strange variety of costume: for while that of the older periods would have been more or less imaginary, that of more recent times would frequently have been found utterly unsuitable for sculpture, and would have formed a most grotesque contrast with the edifice itself; whereas the busts all partake of the same classical character, and are in perfect keeping with the architecture.[*] They are also skilfully arranged, so as to show that they are not mere decorations, and at the same time they do not appear too much crowded, being confined to two rows, the lower one of which is placed upon a continued pedestal of beautiful yellow marble, the others on consoles; and, as presiding over the respective groups of busts, there is within each of the six recesses a smaller winged Valkyria or genius; also antique marble seats and marble candelabra. In short the whole arrangement is eminently tasteful; full of contrast and variety, without the slightest confusion. Equal study has been bestowed on every part and every circumstance: so far too is the Walhalla from being a mere restoration or copy of the Parthenon, or designed merely according to antient precedent, that the interior is a perfectly fresh architectural conception, faithful to the spirit of Grecian art, and giving us not merely its forms, but its essence and its poetry. No other edifice of modern times is so intensely Grecian, or so highly elaborated as a monument of art. A truly monumental fabric it certainly is, being so constructed that it may be pronounced imperishable: as such therefore it will hand down the memory of its royal founder and architect to a distant posterity, which, along with the names of Pericles and Phidias, will place those of Ludwig of Bavaria and Leo von Klenze.

WALKER, OBADIAH, was born at Worsbrough, near Barnesley, in the West Riding of Yorkshire, probably in the year 1616, and was educated at University College, Oxford, where he took his degree of M.A. in July, 1635, and was chosen Fellow of his college in August following. In April, 1638, he took his master's degree, and entered into holy orders. Becoming now very distinguished as a college tutor, he remained at Oxford till he was expelled from his fellowship by the parliamentary visitors in May, 1648; on which he retired to Rome. On the Restoration he was reinstated in his fellowship; but he soon after paid another visit to Rome in the capacity of travelling tutor. Returning home in 1665, he might then have been elected master of his college, but declined the appointment. He accepted it however on the death of Dr. Richard Clayton in 1676.

Walker's tutors at Oxford had been Mr. Anderson and Mr. Abraham Woodhead, both of whom appear to have been then inclined towards popery, which Woodhead afterwards openly professed. Their instruction and his visits to Rome had probably made Walker a convert to the same faith long before his election to the mastership of University College. Indeed it is asserted by Anthony Wood that at the time of his appointment to this office he was actually assisting Woodward in his seminary at Hogsdon, or Hoxton, near London, in which young men were educated in the Romish religion. It was not however till 1678 that attention was drawn to his principles and conduct by the publication of his Latin translation of Sir John Spelman's Life of King Alfred, which appeared at Oxford in a magnificent folio in 1678. In October of this year, in the ferment excited by the death of Sir Edmundbury Godfrey, complaint was made in the House of Commons of the dangerous tendency of some of the notes to this work, and also of Walker's connection with the seminary at Hoxton. But no consequences followed; and, although the matter was mentioned again in April, 1679, the master of University College remained still unmolested. At last, on the accession of James II. in 1685, Walker openly declared himself a papist, and, after having paid a visit to London, during which he is understood to have been consulted by the king on the measures to be taken for restoring the old religion, he not only had mass celebrated in his lodgings, but converted two of the rooms of his college, forming the lower half of the side of the quadrangle next the chapel, into a Romish chapel, which he opened for public use on Sunday the 15th of August, 1686. He at the same time obtained a mandate from the king to sequester the revenue of a fellowship towards the maintenance of his priest, and erected a statue of James over the inside of the college gate; and the next year he set up a press in the back part of his lodgings in the college, under letters-patent from his majesty, for the avowed purpose of printing books against the established religion. Many tracts, principally written by Woodward, issued in the course of the next two years from this press.

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[*] In the number of the 'Civil Engineer and Architect's Journal' for April, 1843, will be found a list of all the busts which had up to that time been deposited in the Walhalla, arranged chronologically, beginning with Heinrich der Finkler, 936, and terminating with Goethe, 1832.

These rash proceedings of course made him a marked man when the Revolution came. He left Oxford on the 9th of November, 1688; and on the 11th of December following, he, Andrew Pulton, a Jesuit, and others, put themselves into a coach at London, in the hope of making their escape to France; but hearing that the populace in Kent were seizing all papists that attempted to leave the kingdom, the party turned back. They were however pursued, seized, and carried first to Feversham, and thence to London, where Walker was committed to the Tower. On the 4th of February following, the vice-chancellor and doctors of the University declared him no longer master of University College; and on the 15th of the same month his place was filled up by the election of Edward Ferrer, the senior fellow.

On the 25th of October Walker was brought up by habeas corpus to Westminster Hall, and sued for bail; but he was immediately sent for, with other prisoners in the same circumstances, to the bar of the House of Commons; and the result of his examination there, in which he denied that he had ever altered his religion, the principles which he now professed being, he said, the same which had been taught him in his youth by his tutor Mr. Anderson, was that he was remanded to the Tower on a charge of treason. But on the 31st of January, 1690, being again brought up to the court of King's Bench, he was allowed to give bail and was set at liberty; nor was he further troubled, although he was excepted out of the Act of Pardon soon after passed (the 2 Will. & Mar., sess. 1, c. 10). He spent the remainder of his days in retirement, and partly abroad: but he died at London, on the 21st of January, 1699, in the house of Dr. Radcliffe, who was one of his old pupils, and by whom he had been for some time principally supported. He was buried, at Radcliffe's expense, in old St. Pancras churchyard, then, as still, the common place of interment of London Roman Catholics of the upper classes.

Walker, who is admitted on all hands to have been a man of learning and talent, is the author of various works, of which the principal are, 'A brief Account of Antient Church Government,' 4to., Lon., 1662; a 12mo. tract, entitled 'Of Education, especially of Young Gentlemen,' first printed at Oxford in 1673, and for the fourth time in 1683; a Latin treatise on logic, entitled 'Artis Rationis, maxima ex parte ad Mentem Nominalium, Libri Tres,' 8vo., Oxford, 1673; 'Some Instructions concerning the Art of Oratory,' 2nd edition, 4to., Oxford, 1682; 'An Historical Narration of the Life and Death of Our Saviour Jesus Christ,' 4to., Oxford, 1685 (the sale of which was prohibited by the vice-chancellor of the University, on the ground of the alleged popish tendency of some things in it); 'Some Instructions in the Art of Grammar,' 8vo., Lon., 1691; and 'The Greek and Roman History illustrated by Coins and Medals,' 8vo., Lon., 1692; a work which formerly had a high reputation.

WALKER, CLEMENT, is known as the author of a work entitled 'The History of Independency,' the first part of which was published, in a small 4to., under the pseudonyme of Theophilus Verax, in 1648, in two editions, one much more extended than the other; the second (a much more considerable volume) in 1649; the third, under the title of 'The High Court of Justice, or Cromwell's New Slaughter House,' in 1651. A fourth part, by a different writer, who calls himself 'T. M., Esq., a Lover of his King and Country,' appeared in 1661, along with a reprint of the other three parts, in which the second has the new title of 'Anarchia Anglicana.' In this edition the work is entitled 'The Compleat History of Independency.' It is now very scarce, but the first part has been reprinted by Baron Maseres, in his 'Select Tracts relating to the Civil Wars,' 2 vols. 8vo., 1815.

The little that is known of the personal history of Clement Walker is chiefly to be found in Wood's 'Athenæ Oxonienses' and in his own work. He was born at Cliffe, in Dorsetshire, towards the close of the sixteenth century, and there he appears to have spent the early part of his life: the register of that parish, according to Hutchins, in his 'History of Dorsetshire,' records the births or baptisms of three sons of Mr. Clement Walker and Frances his wife: Thomas in 1626, Anthony in 1629, Peter in 1631. Wood mentions another son, John, 'sometime a commoner of Lincoln College,' Oxford. This John told Wood that his father had studied at Christ Church in that university, but no record of his matriculation there remained. Before the breaking out of the contest between the king and the parliament, he lived, Wood tells us, on an estate he had at Charterhouse, near Wells, in Somersetshire, and held the appointment of usher of the Exchequer. At this time he was reputed both a sound royalist and a good churchman, holding puritanism as well as dissent in avowed dislike. Nevertheless, when matters came to a crisis he declared himself for the popular party, and was on that profession returned as one of the members for the city of Wells to the memorable second parliament of 1640. But notwithstanding what is thus asserted by the Oxford antiquary, we must not too hastily assume that Walker at this time really changed either his professions or his principles. He appears to have continued to the end of his life attached to the monarchical part of the constitution, and he had probably been from the first opposed to the excesses of prerogative. In parliament he necessarily acted with the Presbyterians, as on the whole coming nearest, in the course they followed, to his own principles, and his ability and reputation for integrity soon acquired him considerable ascendancy with his party. But his book is by no means, as it has been generally represented, an indiscriminating defence and laudation of that section of the house. He is however, it must be admitted, unsparingly acrimonious in his castigation of the dominant Independent faction, and can see nothing but hypocrisy, fraud, violence, and the destruction alike of all order and liberty in the proceedings of Cromwell and his associates. Yet his work has preserved a good many minute facts not elsewhere to be found; and although the author sees no sense, and no good of any kind, either to the right hand or the left of the middle way in which he and his friends attempted to walk, it throws a considerable, though it may be a highly-coloured, light on the events and characters of the time. Walker also published anonymously several other short tracts against the republican government, a list of which, so far as they are known, may be seen in Wood: the most important of them are incorporated in his History. His authorship of that work was discovered soon after the appearance of the second part, upon which he was immediately consigned by Cromwell to the Tower, but he was not debarred the use of his weapon, the pen, and while in confinement he wrote and sent to the press the third part of his History, which, as may be conjectured from the title, is the most violent portion of it. In fact he never recovered his liberty, but died in the Tower, in October, 1651.

Walker was one of the two prosecutors (William Prynne being the other) of Colonel Fiennes before the council of war, at St. Albans, in November, 1643, for the surrender of Bristol. (See the proceedings in *State Trials*, iv. 185.

316.) Lord Clarendon upon this occasion describes Walker as 'a gentleman of Somersetshire, of a good fortune, and by the loss of that the more provoked; who had been in the town when it was lost, and had strictly observed all that was done.'

WALKER, SIR EDWARD, is said to have been the son of a Roman Catholic gentleman, Edward Walker of Roobers, in Netherstowey, Somersetshire. In early life he appears to have held some office in the household of Thomas, twentieth earl of Arundel (the collector of the Arundelian Marbles), and, having accompanied that nobleman as his secretary on the expedition to Scotland in 1639, he then became known to Charles I., who, taking him into his service, made him his secretary-at-war, and to that added, in June, 1644, the appointment of clerk extraordinary of the privy council. In this latter year also, while he was with the king at Oxford, the university conferred on him the degree of M.A.; and, in 1645, he received the honour of knighthood. After the execution of his royal master, Walker fled to Charles II., whom he accompanied to Scotland in 1650, and, after the failure of that enterprise, rejoined on the Continent. Charles, during his exile, made him Garter King at Arms; and, after the Restoration, he was appointed one of the clerks of the privy council. Both these offices he held till his death, at Whitehall, 19th February, 1677.

Walker is several times mentioned by Lord Clarendon, whom he is said to have assisted in the parts of his history which relate to military transactions.

In 1705 there was published in London a folio volume, entitled 'Historical Discourses upon several occasions, by Sir Edward Walker, Knight, &c.' It is dedicated to the queen in an address signed Hugh Clopton, and there is also a dedication of the Discourses by Walker himself, 'to his grandchild, Edward Clopton, Esq. of Clopton,' dated 1664, followed by a postscript, dated 1674, at Clopton, near Stratford-on-Avon, directing them to be made public after his death. It is quite clear that all the Discourses were printed for the first time in 1705. In 1820 was published, in London, in an 8vo. volume of 131 pages, with plates, 'A Circumstantial Account of the Preparations for the Coronation of his Majesty King Charles the Second, and a minute detail of that splendid ceremony, &c., from an original manuscript by Sir Edward Walker, Knight, Garter principal King at Arms at that period.'

The common biographical accounts attribute to Sir Edward Walker a work on tactics, entitled 'Military Discoveries,' published in folio, in 1705; and also the following works, which are stated to have appeared in his lifetime, but the dates of none of which are given:—'Iter Carolimum, being a succinct account of the necessitated marches, retreats, and sufferings of his Majesty King Charles I., from January 10, 1641, to the time of his death, in 1648, collected by a daily attendant upon his sacred Majesty during all that time,' folio; 'Acts of Knights of the Garter in the Civil Wars;' 'Account of the Celebration of St. George's Day at Windsor in 1674.' We have not been able to ascertain the existence of any of these alleged works. The substance of the 'Iter Carolinum,' however, appears to be contained in the 'Historical Discourses,' the first of which is entitled 'The History, Progress, and Success of the Arms of King Charles I., from 30 March to 23 November, 1644, written by his Majesty's special command, and corrected almost in every page with his own hand;' and the second, 'Memorials of his Majesty's unfortunate success in the year following.' The seventh discourse is entitled 'Observations on L'Estrange's Annals of Charles I.;' and the eighth is a Review of the entire reign of that king. The third is a 'Journal of the Expedition of Charles II. to Scotland in 1650-1.' The fourth discourse is entitled 'The Life and Actions of Thomas Howard, Earl of Arundel and Surrey.' The fifth professes to be a full answer to William Lilly's 'Monarchy or No Monarchy;' and the sixth consists of 'Observations' upon the inconveniences of the frequent promotions to titles of honour since the accession of James I.

WALKER, ROBERT, a clever English portrait-painter contemporary with Vandyck, and the principal painter employed by Cromwell. Walker painted several portraits of Cromwell, and those of most of his officers, military and naval. One of these portraits of Cromwell is now in the Pitti Palace at Florence. It was purchased by the reigning grand-duke in Cromwell's lifetime for 500*l.*; he sent a person to England for the express purpose of procuring a portrait of the Protector. The agent had much difficulty in procuring one to his satisfaction; but he at last found this by Walker, in the possession of a lady who was related to Cromwell, and who, being unwilling to part with the picture, in order to get rid of the importunity of the agent, asked him what appeared to her the exorbitant sum of 500*l.* for it. The amount was however immediately paid, and she was obliged to part with her picture. Another was in the possession of Lord Mountford, at Horseth in Cambridgeshire, to whom it was given by Mr. Commissary Greaves, who found it at an inn in that county. There is a gold chain upon Cromwell's neck, to which is appended a gold medal with three crowns, the arms of Sweden, and a pearl: it was sent to him by Christina of Sweden in return for his picture by Cooper, on which Milton wrote a Latin epigram. There was another in the possession of the earl of Essex at Cashiobury; and a fourth in Lord Bradford's collection, with the portrait of Lambert in the same piece. It was upon one of these portraits that Elsum wrote the following epigram:—

> 'By lines o'th' face and language of the eye,
> We find him thoughtful, resolute, and sly.'

'From one of R. Symondes's pocket-books,' says Walpole, 'in which he has set down many directions in painting that had been communicated to him by various artists, he mentions some from Walker, and says the latter received ten pounds for the portrait of Mr. Thomas Knight's wife to the knees; that she sat thrice to him, four or five hours at a time. That for two half-lengths of philosophers, which he drew from poor old men, he had ten pounds each in 1652; that he paid twenty-five pounds for the Venus putting on her Smock (by Titian), which was the king's, and valued it at sixty pounds, as he was told by Mrs. Boardman, who copied it, a paintress of whom I find no other mention; and that Walker copied Titian's famous Venus, which was purchased by the Spanish embassador, and for which the king had been offered 2500*l.* He adds, Walker cries up De Critz for the best painter in London.'

Walker had for some time apartments in Arundel House: he died a little before the Restoration. There is a portrait of him by himself in the picture-gallery at Oxford, and there was another at Leicester House: there is also a good print of Walker, holding a drawing, by Lombart. Walpole speaks of a capital half-length of General Monk at the countess of Montrath's, Twickenham Park, which he supposes to be by Walker: he mentions also by this painter a fine whole-length, sitting in a chair, of Keble, keeper of the great seal in 1650. Buckeridge says that Walker's works, by their life, best speak their own praises. His portrait of Cromwell in the Pitti Palace is painted in a masterly style: in the catalogue of that gallery this picture is attributed to Sir Peter Lely; but it is not certain that Lely ever painted Cromwell, and Lely usually painted half-lengths: this picture is merely a head, and is painted in a bolder style than Lely's pictures generally are.

(*An Essay towards an English School*, 1706; Walpole, *Anecdotes of Painting*, &c.)

WALKER, REVEREND GEORGE, the heroic defender of Londonderry, was born of English parents in the county of Tyrone in Ireland, and, after being educated at the University of Glasgow, took orders in the established church, and became rector of Dunoughmore. When King James landed in Ireland after the Revolution, Walker raised a regiment at his own expense to oppose him. On the approach of James to Londonderry, he went out to meet him at the head of a body of troops at Long Causeway, but after a resolute defence was obliged to retire into the town, which he found Lundie, the governor, preparing in all haste to leave. Destitute as the place was of all apparent means of standing a siege, Walker and Major Baker, who had succeeded Lundie in the command of the garrison, determined to hold out as long as possible, in the hope that King William would, before they were quite exhausted, be able to throw in supplies by sea. This was about the middle of April, 1689. The besieged were soon reduced to the most terrible extremities. Baker died on the 20th of June, and then the sole command devolved on Walker, who however showed himself quite equal to the emergency, directing and assisting in every operation, preserving the strictest discipline under the most difficult circumstances, and dividing himself between the most opposite duties,—now heading a sallying party, now reviving the hearts of soldiers and citizens by a rousing sermon in he cathedral. The end was, that the siege was at last aised, on the 30th of July, by Major-General Kirk making is way with three ships over a boom which James had hrown across the river. Walker soon after came over to England, and, having published a narrative of the scenes n which he had been engaged, under the title of 'A True Account of the Siege of Londonderry,' in a quarto pamphlet, he received in November the thanks of the House f Commons for his heroic exertions. His account provoked some controversy: he defended himself against ome of his assailants in a vindication published the same ear; this was followed by an anonymous 'Apology for the ailures charged on the Rev. G. Walker's printed Account,' also 4to., 1689; and that by a 'Narrative of the iege,' &c., by the Rev. John Mackenzie, 4to., 1690, professing to rectify Walker's mistakes, which was answered he same year by a friend of Walker's, in another quarto amphlet, entitled 'Mr. John Mackenzie's Narrative a alse Libel.' Meanwhile Walker, having been created D.D. by the University of Oxford, had been nominated by King William to the bishopric of Derry; but having resolved to serve another campaign before entering upon his piscopal duties, he was killed at the battle of the Boyne, 1st of July, 1690.

There is in the British Museum a pamphlet of ten pages, ntitled 'The Substance of a Discourse, being an Encouragement for Protestants, or a happy prospect of glorious success, &c., occasionally (*sic*) on the Protestants' victory over he French and Irish Papists before Londonderry, in raising hat desperate Siege. By Mr. Walker, Minister, and Governor of the City. London, printed by A. M. in the year 1689.' This was probably a reporter's publication. Prefixed on the title-page is a rude wood-cut, which seems to be intended to be taken for a portrait of Walker.

WALKER, JOHN, was born at Colneyhatch, in the parish of Friern-Barnet, Middlesex, 18th March, 1732, and was brought up to trade, but adopted the profession of an actor, which he followed with no great success till 1767, when he quitted the stage, and joined Mr. James Usher in establishing a school at Kensington Gravel-pits. This partnership lasted only about two years, after which Walker set up for himself as a teacher of elocution, and soon became greatly distinguished in that capacity. Not confining his instructions to the metropolis, he visited Scotand, Ireland, and various provincial towns, especially Oxford, where early in his career the heads of houses invited im to give a course of private lectures in the University. He soon also began to employ the aid of the press in diseminating what he considered to be correct views on the art which he professed. The settlement of the pronunciaion of the English language upon analogical principles, and according to the best usage, was certainly attempted by Walker more systematically than by any preceding writer; and his various works, characterized as they all are by good sense and careful inquiry, as well as a respectable amount of information, cannot be denied to have done considerable service in that matter. His first publication was a prospectus of his Pronouncing Dictionary, under the title of 'A General Idea of a Pronouncing Dictionary of the English Language,' which he printed in quarto in 1772. This was followed in 1775 by 'A Dictionary of the English Language, answering at once the purposes of rhyming, pelling, and pronouncing;' afterwards reprinted, at least wice, under the title of 'A Rhyming Dictionary......in which the whole Language is arranged according to its Terminations,' &c. In 1781 appeared his 'Elements of Elocution,' which has gone through many editions. In 1783 he published a pamphlet, entitled 'Hints for Improvement in the Art of Reading.' The greater part of this ract he afterwards incorporated in his 'Rhetorical Grammar,' first published in 1785, and since often reprinted, as well as his 'Academic Speaker,' and two or three other imilar compilations. In 1787 he published a small 8vo. ract of 70 pages, entitled 'The Melody of Speaking delineated, or Elocution taught, like Music, by visible Signs;' which is not much known. His 'Critical Pronouncing Dictionary, and Expositor of the English Language,' the work which had occupied most of his attention, and upon which his reputation principally rests, first appeared in 1791. It has been eminently successful, having since gone through between twenty and thirty editions, and having superseded all other previous works of the same nature. Several of the later editions contain also his 'Key to the Classical Pronunciation of Greek, Latin, and Scriptural Proper Names,' which was first published a few years after the Dictionary, and of which there are also many editions in a separate form. His last publication was his 'Outlines of English Grammar,' which appeared in 1805. Mr. Walker, who was brought up a Presbyterian, but became a Roman Catholic, and a very strict one, in his latter days, died 1st August 1807, and was buried among his co-religionists in Old St. Pancras church-yard, London.

WALKER, REVEREND JOHN, is the author of a work entitled 'An Attempt towards recovering an Account of the Numbers and Sufferings of the Clergy of the Church of England, Heads of Colleges, Fellows, Scholars, &c., who were sequestered, harassed, &c. in the late times of the Grand Rebellion; occasioned by the Ninth Chapter (now the Second Volume) of Dr. Calamy's Abridgement of the Life of Mr. Baxter: together with an Examination of that Chapter,' folio, London, 1714. It contains a long list of subscribers, is dedicated to 'The Archbishops, Bishops, and Clergy, now assembled in Convocation,' and commences with a preface of above 50 pages, in which the author gives a very detailed account of his sources of information and the extensive researches he had made both in printed books and in public and private repositories. The body of the work consists of two parts, the first in 204 pp., the second in 436.

On his title-page the author designates himself 'M.A., Rector of St. Mary's the More in Exeter, and sometime Fellow of Exeter College, in Oxford.' In Watt's 'Bibliotheca' he is called 'Vicar of Ledbury, Herefordshire;' and there are attributed to him, besides the above-mentioned work, two single Sermons, both published in 1710, and 'Conscience Displayed, in several Discourses on *Acts* xxiv. 16,' 8vo., 1729. But whether different writers be not confounded in this notice may be doubted. In Gorton's 'Biographical Dictionary' Walker is stated to have been a native of Devonshire, to have been, after the publication of his work on the Sufferings of the Clergy, complimented by the university of Oxford with the honorary degree of D.D., and to have died at Exeter in 1730. This information professes to be given on the authority of the 'Biographia Britannica;' but there is no account of Walker either in that work or in any of the other collections of English biography which we have had an opportunity of consulting.

Walker's 'Account of the Sufferings of the Clergy' has been severely attacked for its misstatements and exaggerations by Puritan and dissenting writers. It was replied to soon after its first appearance by Dr. Calamy, in a tract entitled 'The Church and Dissenters compared as to Persecution;' and also by the Rev. John Withers, a dissenting minister of Exeter. Several of its assertions are disputed by Neal, in various passages of his 'History of the Puritans;' and there is a general notice of the book in the preface to the third volume of that work, published in 1735, in which it is denounced as written 'with notorious partiality, and in language not fit for the lips of a clergyman, a scholar, or a Christian.' It must be admitted that Walker was a man of a coarse and violently prejudiced mind, without any critical judgment, and with little learning or ability of any kind: he boasts indeed of his unusual ignorance of the history of the time to which his work relates when he undertook its compilation, as rather a qualification for the task; and with all his parade of inquiry and preparation, it is evident that, partly from incompetency, partly from haste, he has set down many things upon the most insufficient authority. His style is illiterate to the point of barbarism, and he complains pathetically of the laborious occupation he found writing for the press to be. Yet, after all deductions that may justly be made from the value of his book, it must be allowed to have preserved much curious information that in all probability would otherwise have been lost. Walker makes the entire number of the episcopal clergy who were 'imprisoned, banished, and sent a starving,' to have amounted to seven or eight thousand.

WALKE'RA, a genus of plants named after Richard Walker, D.D., who was founder of the botanic garden at Cambridge. It belongs to the natural order Ochnaceæ.

and is known by possessing five petals, five stamens with ovate anthers; an obovately kidney-shaped fruit, which is a drupe; an inverted embryo with a hooked beak. There are two species of this genus known. *W. serrata* has serrate crenate leaves, racemes of flowers somewhat corymbose, and the lobes of the calyx lanceolate. It is a native of Malabar and Ceylon, and has yellowish flowers and reddish fruit. The roots and leaves are very bitter, and are used in decoction by the inhabitants of Malabar as a tonic and anthelmintic. *W. integrifòlia* is a native of French Guiana, and has entire leaves.

WALL. [Staffordshire.]

WALL, PICTS', ROMAN, &c. [Britannia; Northumberland.]

WALL-CRESS, the common name of the plants belonging to *Arabis*, an extensive genus in the natural order Cruciferæ. Nearly seventy species of this genus have been described; they are most of them small plants, fond of growing in dry stony places and on walls, and hence their English name wall-cress. Their fruit is a linear silique, with flat 1-nerved valves. The seeds are oval or orbicular, compressed in one row in each cell. The cotyledons are flat. The radical leaves are usually stalked, whilst those of the stem are sessile, or embrace the stem; they are entire or toothed, rarely lobed. The whole plant is frequently covered with hairs, of which those on the stem are simple, whilst those on the leaves are bifid or trifid. The flowers are white in most instances, rarely red. Several of the species are natives of Great Britain, and many of them are cultivated in gardens on rock-work and flower-borders, on account of their blooming early in spring.

A. turrita, Tower Wall-Cress, has leaves embracing the stem; the pods all on one side, recurved, flat, and linear; the bracts foliaceous. This plant is a native of Europe, in Spain, France, Switzerland, and Italy. In Great Britain it appears to be almost an entirely academical plant, as the only localities mentioned are the walls of colleges at Oxford and Cambridge.

A. hirsuta, Hairy Wall-Cress, has hairy toothed leaves, numerous straight pods, and the pedicels the length of the calyx. It is a native of middle and northern Europe, and also of North America, from Hudson's Bay to the Rocky Mountains. In Great Britain it is found in Sussex, Norfolk, and Suffolk, and also in Scotland.

A. rosea, Rose-flowered Wall-Cress, has oblong, subcordate, half-stem-clasping leaves, covered with branched hairs; the pedicels longer than the calyx, and the stigma apiculate. It is a native of Calabria, and has rose-purple flowers.

A. albida, White-leaved Wall-Cress, has toothed leaves, hoary or downy, with branched hairs. It is a native of Taurida and the Caucasus. It has large white flowers, and is a tufted plant, often cultivated in English gardens.

The great mass of the species resemble these examples. They are of easy cultivation, and when once sown they will mostly propagate themselves.

WALL-FLOWER. [Cheiranthus.]

WALL-FLOWERS, the common name of the species of *Cheiranthus*, a genus belonging to the natural order Cruciferæ. This genus is known by possessing square or compressed siliques; a 2-lobed or capitate stigma; a calyx bi-saccate at the base; ovate compressed seeds in one series. The species are biennial or perennial herbs, or under-shrubs. The leaves are oblong, lanceolate, entire, or toothed. The flowers are arranged in racemes, and are of various colours—yellow, white, purple, or particoloured. Many of the species exhale a delicious odour, and are great favourites in gardens. The most plentiful is the *Cheiranthus Cheiri*, the common Wall-flower, which has lanceolate entire leaves, which are either smooth or covered with 2-parted appressed hairs; linear pods and recurved lobes of the stigma. It is found wild throughout Europe, on old walls and in stony places, and almost constantly amongst the ruins of old castles. On this account it is a great favourite with poets, and is popularly regarded as an emblem of faithfulness in adversity. The general colour is a brown-yellow, or, as a poet has called it, the 'yellow wall-flower stained with iron-brown.' It is however subject to considerable varieties of colour even in its wild state, and these are much increased by cultivation. On account of its scent, it has been transferred from ruined walls to the flower-borders of gardens, and there, by the doubling of its flowers and the variations of its colours, a number of distinct varieties have been recorded. The following is a list of the most remarkable varieties found in gardens:—

α. *flore simplici.*	Single yellow.
β. *flore pleno.*	Double yellow.
γ. *maximus.*	Large-flowered yellow.
δ. *serratus.*	Large yellow, saw-leaved.
ε. *patulans.*	Double yellow, spreading.
ζ. *ferrugineus.*	Double rosy.
ϑ. *varius.*	Double, variegated with purple and yellow.
ι. *flavescens.*	Large double, pale yellow.
κ. *thyrsoideus.*	Bunch-flowered, yellow.
λ. *gynantherus.*	Flowers with anthers changed into carpels.
μ. *hæmanthus.*	Single and double, bloody-flowered.

The wall-flower is a common wild plant in Great Britain. It possesses the slight acridity of the order to which it belongs, and it has been recommended to sow it in pastures for the purpose of preventing rot in sheep. The wild flower has by some botanists been distinguished from the cultivated plant by the name of *C. fruticulosus*, but they are both the same.

Several other species of this genus have been described, and are occasionally found in collections in gardens in this country. In their cultivation, the hardy shrubby species, such as the common wall-flower, may be propagated by cuttings, which soon strike root when planted under a hand-glass. Other perennial species will permit of growth by dividing the roots. The annual species may be sown in the open border or on rock-work, where they will flourish, and most of them will survive the winter in such a situation. (Don's *Gardener's Dictionary.*)

A number of other plants deserve the name of wall-flowers, as they are found growing on old walls; the most common of these are the Reseda luteola, some of the species of Antirrhinum, the Asplenium ruta muraria, and other ferns, Draba verna, Valeriana rubra, the Parietaria [Wall-Pellitory], the Arabis [Wall-Cress], the Prenanthes, &c.

WALL-PELLITORY, the common name of the *Parietaria officinalis*, a plant belonging to the natural order Urticaceæ. The genus Parietaria is known by possessing a quadrifid inferior perianth; stamens with incurved filaments, and a one-seeded fruit inclosed in the enlarged perianth.

The *P. officinalis*, Wall-Pellitory, or Pellitory of the Wall, has ovato-lanceolate 3-nerved leaves, and the involucre in two portions, each of about 7 segments; in each portion are 3 flowers, with one fertile one between them. This plant is the same as the *P. erecta* and *diffusa* of German botanists. It is common throughout Europe, and is found in Great Britain inhabiting old walls and waste places amongst rubbish. The stems of the plant are often procumbent upon the wall on which it grows, and are of a reddish colour. The flowers are small, hairy, of a purplish green colour, and clustered in the axils of the leaves. The leaves are furnished with minute hairs, which under some circumstances have a stinging power, similar to many plants of the order to which they belong. The filaments of the stamens are jointed, and possess a remarkable physiological property. When the flower first opens, the filaments are found bent over the stigma; but when the time has arrived for the anther to shed its pollen, the filament flies back from the stigma with considerable force, and entirely empties the pollen-case of its pollen by the jerk. Naturally this is effected when the sun first shines on the opened flower; but it may be easily effected artificially by touching the anther with the point of a pin or other instrument. This phenomenon was first observed by Caspar Bauhin, in 1600, and a full account of the structure of the flower of this plant is given in Curtis's 'Flora Londinensis.' The wall-pellitory was at one time admitted into the Materia Medica of the London and Edinburgh Pharmacopœias, but it is now abolished. It was recommended as a diuretic in diseases of the kidneys, and also as a purifier of the blood in cutaneous diseases. Farmers are in the habit of placing a bunch of this plant on corn affected with weevils, which, it is said, it quickly drives away.

WALLACE, SIR WILLIAM. The life and exploits of this most popular national hero of the Scots have been principally preserved in a legendary form by poetry and tradition, and are only to a very small extent matter of contemporary record or illustrated by authentic documents. There is no extant Scottish chronicler of the age of Wallace. Fordun, the earliest of his countrymen from whom we have any account of him, is his junior by nearly a century. Wynton, the next authority, is still half a century later. His chief celebrator is the metrical writer Blind Harry, or Harry the Minstrel [Vol. xii., p. 56], whose work confesses itself by its very form to be quite as much a fiction as a history, and whose æra at any rate is supposed to be nearly two centuries subsequent to that of his hero. Some few facts however may be got out of the English annalists Trivet and Hemingford, who were the contemporaries of Wallace.

There are contradictory statements of the year of his birth, but it is probable that he was born about 1270. His family was one of some distinction, and he is said to have been the younger of the two sons of Sir Malcolm Wallace of Elderslie and Auchinbothie, in the neighbourhood of Paisley. His mother, who, according to one account was Sir Malcolm's second wife, is stated by the genealogists to have been Margaret, daughter of Sir Raynald or Reginald (other authorities say Sir Hugh) Crawford, who held the office of sheriff of Ayr.

The history of Wallace down to the year 1297 is entirely legendary, and only to be found in the rhymes of Harry the Minstrel; though many of the facts which Harry relates also still live as popular traditions in the localities where the scenes of them are laid, whether handed down in that way from the time when they happened, or only derived from his poem, which long continued to be the chief literary favourite of the Scottish peasantry. Harry, who, it may be observed, professes to translate from a Latin account written by Wallace's intimate friend and chaplain, John Blair, makes him to have been carefully educated by his uncle, a wealthy churchman, who resided at Dunipace, in Stirlingshire, and to have been afterwards sent to the grammar-school of Dundee. Here his first memorable act is said to have been performed, his slaughter of the son of Selby, the English governor of the castle of Dundee, in chastisement of an insult offered him by the unwary young man: Wallace struck him dead with his dagger on the spot. This must have happened, if at all, in the year 1291, after Edward I. of England had obtained possession of all the places of strength throughout Scotland on his recognition as Lord Paramount by the various competitors for the crown, which had become vacant by the death of the infant Margaret, the Maiden of Norway, in September, 1290.

This bold deed committed by Wallace, who in making his escape is asserted to have laid several of young Selby's attendants as low as their master, was immediately followed by his outlawry. He now took to the woods, and gifted as he was with eloquence, sagacity, and other high mental powers and accomplishments (to this the testimony of Fordun is as express and explicit as that of his poetical biographer), not less than with strength and height of frame and all other personal advantages, he soon found himself at the head of a band of attached as well as determined followers, who under his guidance often harassed their natural enemies the English soldiery, both on their marches and in their stations, plundering and slaying, as it might chance, with equally little remorse. Particular spots in nearly every part of Scotland are still famous for some deed of Wallace and his fellow-outlaws performed at this period of his life; but for these we must refer to the Blind Minstrel. The woods in the neighbourhood of Ayr would seem to have been his chief haunt; and some of his most remarkable feats of valour were exhibited in that town, in the face and in defiance of the foreign garrison by which it was occupied. Both his father and his elder brother are said to have fallen in rencontres with the English during this interval. It was now also that he fell in love with the orphan daughter of Sir Hew de Bradfute, the heiress of Lamington, having, it is said, first seen her at a church in the neighbourhood of Lanark. The Scotch writers affirm that this lady, whom he appears to have married, and who at any rate bore him a daughter, a year or two after forming her connection with Wallace fell into the hands of his enemies, and was barbarously executed by order of Hazlerig, the English sheriff or governor of Lanark, while her husband, or lover, was doomed to witness the spectacle from a place where he lay in concealment. Such private injuries were well fitted to raise his public hatred to an unextinguishable flame.

How far the guerilla warfare maintained by Wallace and his associates contributed to excite and spread the spirit of resistance to the English government, we have scarcely the means of judging; but it seems probable that it aided materially in producing the general insurrection which broke out in the spring of 1297. The accounts we have of the commencement of that movement represent Wallace at its head, in command of a considerable force, and in association with some of the most distinguished persons in the kingdom, such as the Stewart of Scotland and his brother, Wishart, bishop of Glasgow, Sir William Douglas, &c. Soon after he was joined by the younger Robert Bruce (afterwards King Robert I.), who had hitherto, as well as his father, still alive (the son of the original competitor for the crown), professed to adhere to the English king.

This however appears to have been but an ill-cemented confederacy. When the force dispatched by Edward to quell the revolt presented itself before the Scottish army posted near Irvine, in Ayrshire, the leaders of the latter, throwing off the authority of their nominal chief, could no more agree what to do than whom to obey; and the result was that Bruce, the Stewart, Douglas, and others of them, availing themselves of the diplomatic talents of the Bishop of Glasgow, concluded a treaty on the 9th of July, by which they agreed to acknowledge Edward as their sovereign lord. All the rest ultimately acceded to this arrangement, except only Wallace and his friend Sir Andrew Moray of Bothwell. The treaty of Irvine, which is printed by Rymer, is, we believe, the first of the few public documents in which mention is made of Wallace: to the instrument (which is in French) are subjoined the words, 'Escrit à Sire Willaume;' the meaning of which Lord Hailes conceives to be, 'that the barons had notified to Wallace that they had made terms of accommodation for themselves and their party.' The words moreover, on the supposition that they refer to Wallace, of which there can be little doubt, show that he had before this date obtained the honour of knighthood. It had probably been bestowed upon him (as was then customary) by some other knight, one of his companions in arms, since his elevation from being the captain of a band of outlaws to be the commander-in-chief of the national forces.

Wallace now retired to the north, carrying with him however a considerable body of adherents, to whom additional numbers rapidly gathered, so that he soon found himself in a condition to recommence aggressive operations. Directing his force on the north-eastern coast, he surprised the castle of Dunottar, cleared Aberdeen, Forfar, Brechin, and other towns of their English garrisons, and then laid siege to the castle of Dundee. While he was engaged in this last attempt, news was brought that the English army was approaching Stirling; upon which, leaving the siege to be carried on by the citizens of Dundee, he hastened to meet the enemy in the field. The result was the complete defeat and rout of the English at the battle of Stirling Bridge, fought on the 11th of September, 1297—a battle which once more, for the moment, liberated Scotland. The English were immediately driven or fled from every place of strength in the country, including Berwick itself.

Availing himself of this panic, and of the exhilaration of his countrymen, Wallace even pursued the fugitives across the border; and putting himself at the head of a numerous force, he entered England on the 18th of October, and remaining till the 11th of November, wasted the country with fire and sword from sea to sea, and as far south as to the walls of Newcastle. It was during this visitation that the prior and convent of Hexham obtained from him the protection preserved by Hemingford. It is dated at Hexhildesham (Hexham), the 7th of November, and runs in the names of 'Andreas de Moravia, et Willelmus Wallensis, duces exercitus Scotiae, nomine praeclari principis Joannis, Dei gratia, Regis Scotiae illustris, de consensu communitatis regni ejusdem'—that is, Andrew Moray and William Wallace, commanders-in-chief of the army of Scotland, in the name of King John, and by consent of the community of the said kingdom. The John here acknowledged as King of Scotland was Baliol, now in the hands of Edward, and living in a sort of free custody in the Tower of London. Wallace's associate in the command was the young Sir

Andrew Moray, son of his faithful friend of that name who had retired with him from the capitulation of Irvine, and who had fallen at the battle of Stirling Bridge.

One of the most curious of the few public papers in which the name of Wallace occurs, has only been recently discovered by Dr. Lappenburg of Hamburg, in the archives of the antient Hanseatic city of Lübeck. It is a letter, in Latin, addressed to the authorities of Lübeck and Hamburg, informing them that their merchants should now have free access to all the ports of the kingdom of Scotland, seeing that the said kingdom, by the favour of God, had been recovered by war from the power of the English. The letter is dated 'Apud Badsingtonam [the true word, it has been suggested, is probably Haddingtonam], the 11th of October, 1297, that is, a few days before the invasion of Cumberland and Northumberland. It is in the name of 'Andreas de Moravia et Willelmus Wallensis, duces exercitus regni Scotiae, et communitas eiusdem regni'—like the Hexham protection—but without any mention of King John. The discovery was first announced, not quite accurately, in the 'Foreign Quarterly Review' for August, 1829; and the letter was, we believe, first printed in the Appendix to 'The Life of Sir William Wallace, by John D. Carrick,' 8vo., London, 1840, p. 113.

After his triumphant return from his incursion into England, Wallace assumed the title of Guardian of the Kingdom in the name of King John, whether formally invested with that dignity, or only hailed as such by the gratitude of his country. In a charter, printed in Anderson's 'Diplomata,' conferring the constabulary of Dundee on Alexander Skirmischur [Scrimgeour] and his heirs, and dated at Torphichen (in the county of Linlithgow) the 29th of March, 1298, he styles himself 'Willelmus Walays miles, Custos Regni Scotiae, et ductor exercituum ejusdem, nomine praeclari principis Domini Johannis, Dei gratia Regis Scotiae illustris, de consensu communitatis ejusdem.' The grant is stated to have been made with the consent and approbation of the nobility ('per consensum et assensum magnatum dicti regni').

But this supreme elevation did not last long. Supported only by his own merits and the admiration and attachment of his humbler fellow-countrymen, Wallace, a new man, and without family connection, would probably have found it difficult or impossible to retain his high place, even if he had had nothing more to contend with than domestic jealousy and dissatisfaction. Fordun relates that many of the nobility were in the habit of saying, 'We will not have this man to rule over us.' Meanwhile the energetic English king, who had been abroad when the defeat at Stirling Bridge lost him Scotland, had now returned home, and was already on his march towards the borders, at the head of a powerful army. A body of English, which had landed in the north of Fife, led by Aymer de Vallois, earl of Pembroke, is said by the Scottish authorities to have been attacked and routed by Wallace on the 12th of June, 1298, in the forest of Blackironside, in that county; but when the two main armies met on the 22nd of July, in the neighbourhood of Falkirk—the Scots commanded by Wallace, the English by their king in person—the former, after a gallant and obstinate resistance, were at last forced to give way, and the battle ended in a universal rout accompanied with immense slaughter.

This defeat did not put an end to the war; but it was taken advantage of by the Scottish nobility to deprive Wallace of his office of guardian or chief governor of the kingdom. The Scottish accounts say that he voluntarily resigned the supreme power: it is certain, at any rate, that Bruce, his rival Comyn, and Lamberton, bishop of St. Andrews, were now appointed joint guardians of Scotland, still in the name of Baliol. For some years after this our accounts of Wallace are slight and obscure; but he appears to have returned to the practice of the desultory warfare, with a chosen band of followers, in which he had originally distinguished himself. The legendary histories continue to detail his deeds of prowess performed in harassing the enemy both on their marches and in their camps and strongholds. And to fill up the story they also make him to have paid two visits to France, the first in 1300, the second in 1302. The next well-ascertained fact regarding him is, that when the Scottish leaders were at last obliged once more to submit to Edward at Strathorde, on the 9th February, 1304, Wallace was not included in the capitulation, one of the clauses of which (printed in the original French in Ryley's 'Placita Parlamentaria') is to the effect that, as for Wallace (Monsieur Guillaume de Galeys), he might if he pleased give himself up to the king's mercy ('qu'il se mette en la volunté et en la grace nostre seigneur le Roy, si lui semble que bon soit'). He was soon after summoned to appear before a parliament, or convention of Scotch and English nobility, held at St. Andrews; and, upon their not presenting themselves, he and Sir Simon Frisel or Fraser were pronounced outlaws. For some time his retreat remained undiscovered, although his active hostility still continued occasionally to make itself felt. A principal person employed in the attempts to capture him appears, from a paper in Ryley, to have been Ralph de Haliburton; but how he was actually taken is not known. Sir John Menteith (a son of Walter Stewart, earl of Menteith), to whose treachery his delivery to the English king is attributed by Blind Harry and popular tradition, appears to have really done nothing more than forward him to England after he was brought a prisoner to Dunbarton Castle, of which Menteith was governor under a commission from Edward. Mr. Carrick, who has attempted to refute what is said upon this matter by Lord Hailes, has taken no notice of the further vindication of Sir John Menteith in Mr. Mark Napier's 'Memoirs of John Napier of Merchiston,' 4to., Edinburgh, 1834, pp. 527, &c., and in 'Tracts, Legal and Historical,' by J. Riddell, Esq., 8vo., Edinburgh, 1835, pp. 145-149.

On being brought to London, Wallace was lodged in the house of William Delect, a citizen, in Fenchurch Street; and on the next day, being the eve of St. Bartholomew, he was brought on horseback to Westminster, and in the hall there, 'being placed on the south bench,' says Stow, 'crowned with laurel, for that he had said in times past that he ought to bear a crown in that hall,'' he was arraigned as a traitor, and on that charge found guilty, and condemned to death. After being dragged to the usual place of execution—the Elms in West Smithfield—at the tails of horses, he was there hanged on a high gallows, on the 23rd of August, 1305, after which, his bowels having been taken out while he yet breathed, and burnt before his face, his head was struck off, and his body hacked into quarters. His right arm was set up at Newcastle, his left at Berwick, his right leg at Perth, his left at Aberdeen; his head on London Bridge. Wallace's daughter by the heiress of Lamington married Sir William Bailie of Hoprig, whose descendants through her inherited the estate of Lamington.

WALLA'CHIA, or WALA'CHIA (*Zára Rumuniáska*, in Wallachian), is a principality and a vassal state of Turkey, or more correctly of Turkey and Russia. Its limits are, on the north the Carpathians and the principality of Moldavia; on the east that part of the Lower Danube which runs from south to north; on the south the Danube, and on the west the Danube and the south-eastern corner of Hungary. Its greatest length from west to east is 276 miles, and its greatest breadth from south to north is 127 miles; the area, according to Balbi, is 21,600 square miles of 60 to a degree of latitude, or 28,649 English square miles; the population is 970,000, according to the same authority.

The Carpathians are the principal mountains. [CARPATHIANS.] Several ranges of lower mountains and hills stretch from the Carpathians in a parallel direction south and south-east, and contain valleys between them, the upper part of which is narrow, but the lower part becomes wider as the valleys approach the Danube. Along this river there is a broad level tract consisting near the Danube of lowlands and marshes, which are exposed to the inundations of the river. However the most western part of Wallachia is generally mountainous, and the hills reach to the banks of the Danube. A great part of the country, especially the northern part, is covered with forests of firs, oaks, and beeches. The soil, except in the mountainous districts, is a rich mould, and of extraordinary fertility. In the elevated part of the country there are extensive pastures covered with aromatic herbs, which feed a great number of sheep, the flesh of which is as much esteemed as that of the sheep of Transylvania. In the level and marshy parts there is excellent pasture for cattle, of which great numbers are annually fattened. The principal river is the Danube. [DANUBE.] The other rivers are tributaries of the Danube; their sources are all in the Carpathians, and their direction is south in the western part of the country, south-east in the middle part, and east in the eastern part. The principal are—1, the Syll or Shyl, in the west; its sources are in Transylvania, but it soon leaves this country by a long and narrow defile called the Valkan Pass, where it enters Wallachia; it joins the Danube opposite the small town of Rahowa in Bulgaria; its length is nearly 140 miles. 2, The Alt or Aluta, east of the Syll. [TRANSYLVANIA.] 3, The Telorman; its sources are in 45° N. lat., between the Alt and the river Arjish, at the foot of the Carpathians; it joins the Danube opposite the town of Novogorod in Bulgaria, after a course of 100 miles. 4, The Arjis, Argis, or Arj, east of the Alt; its sources are in the Carpathians, 20 miles east of the Rothenthurm Pass, and it joins the Danube opposite the Bulgarian town of Turtuki, after a south-eastern course of 160 miles. The Dumbrowitza is a tributary of the Arjis, which it joins 16 miles north of the junction of the Arjis with the Danube; its course is almost parallel to that of the Arjis, and its length is 110 miles. 5, The Janolitza or Yanolitza comes from the Carpathians near the Tomosh Pass; at first it runs south for 30 miles, and afterwards south-east, east, and north-east till it reaches the Danube a little below Hirsowa; its whole course is nearly 170 miles. 6, The Buza, north of the Jalonitza, comes from Transylvania, flows through the pass of Bosau or Buza, and joins the Sereth 12 miles above the junction of this river with the Danube, after an easterly course of 120 miles. All these rivers are navigable for barges, but little is done to facilitate the navigation, which is rendered impracticable in many places by rocks, shallows, and other obstacles. Besides the larger rivers, there are many smaller streams which traverse the country. In the marshy districts there are several large lakes formed by branches of the Danube; and in the rainy season, or when the snow on the Carpathians melts, the low tracts along the Danube are inundated for many miles in breadth.

Climate and Productions.—The summers are exceedingly hot and the winters very cold; but the climate is healthy, except in the marshes, where bilious fevers prevail during the warmer months. The temperature is much milder than in Transylvania and Moldavia. The waters are abundantly supplied with fish; the trouts in the streams are of a large size; sturgeons are plentiful in the Danube, and in the same river a fish belonging to the genus *Silurus* of Linnæus sometimes acquires an extraordinary size. The mineral productions are those of the Carpathians, but the inhabitants have never worked the iron, copper, lead, silver, and gold, of which a considerable quantity is found in the sand of the rivers. The only mines are those of rock-salt, of which great quantities are got near Slanikul, and especially near Okna-Teleaga. Near this place there is a bitumen spring. Wallachia produces abundantly wheat (seldom less than 1,250,000 quarters annually, according to Wilkinson), barley, rye, hemp, tobacco, and similar productions of Middle and Southern Europe. Maize, or Turkish corn, was introduced into Wallachia in the beginning of last century by the hospodar Constantine Maurocordatos, and is now the principal food of the inhabitants. The vine grows well, and the produce is excellent, and would be equal to the best Hungarian wines if the inhabitants had more skill. The 'Rhamnus infectorius' yields annually 600,000 oka (a little more than a pound, and about the sixth part of the oka of Constantinople) of seed, which goes chiefly to Transylvania, where it is used for dyeing cloth, and especially twist. In the time of Wilkinson, about twenty years ago, there were about 2,500,000 sheep in Wallachia, which produced a great quantity of excellent wool, of which about 1,760,000 oka were annually exported. There are three different kinds of sheep, producing three different sorts of wool: Zigay, which is short and very fine; Zarkam, which is long and coarse; and Tartar, which is neither so long and coarse as the Zarkam, nor so short and fine as the Zigay. There is abundance of game of every description: 500,000 hare-skins are yearly exported. There is plenty of timber, but it rots in the forests. Only the third part of the country is cultivated, a consequence of the system of extortion and oppression which formerly prevailed in Wallachia. One third of all the lands belong to the clergy. The commerce was in former times entirely in the hands of the Jews and Armenians, and was of little importance, but it has considerably improved during the last thirteen years. The line of steamers established between Vienna and Constantinople has put Wallachia in direct communication with both these capitals. Several English, German, and French merchants reside at Bucharest.

Government.—The government is in every respect like that of Moldavia, from which country the political history of Wallachia is inseparable. [MOLDAVIA.]

Towns.—Bucharest, or more correctly Bukaresht [BUCHAREST], is the capital. Tergovist, or more correctly Tergowishti, north-west of Bucharest, was the capital of Wallachia till 1698, when the seat of government was transferred to Bucharest. Tergovist is situated on the Jalonitza, and contains about 5000 inhabitants; the whole place is covered with ruins of houses and palaces, which were abandoned by the nobility after 1698. The road from Bucharest to Kronstadt in Transylvania, leads through Tergovist. Ghiurgewo, on the Danube, opposite Rustshuk, was formerly a strong fortress, but the fortifications were razed in consequence of the peace of 1829. Busco, the seat of a bishop, is a small town. Ardsish or Arjish, on the Arjish river, towards its source, lies on the road from Bucharest to the pass of Rothenthurm and Hermannstadt. There is a beautiful church in this thriving little town, which is said to be the finest in Wallachia. Izlas is a small but busy town, a little west of the junction of the Aluta with the Danube. Krajova or Krayowa, a fine town with about 8000 inhabitants, has considerable commerce: it is situated on the Shyl, in the centre of Little Wallachia, or the western part of Wallachia, between the Aluta in the east, and Hungary and the Danube on the west. Krajova is generally called the capital of Little Wallachia. Braïlow, on the Danube, ten miles south of the junction of the Sereth with the Danube, in the north-eastern corner of Wallachia, was formerly one of the strongest fortresses on the Danube; but its fortifications have been (or are to be) razed, pursuant to the terms of the peace of 1829. It is also called Braïla. The town sustained many sieges against the Russians, who have taken it several times. Rimnik, which must not be confounded with Rimnik in Moldavia, lies west of Braïlow. In its vicinity is Okna-Mare, where there are rich mines of rock-salt. The great road from Yassy to Bucharest leads through Rimnik. Fokshan, or Fokzang, is partly in Moldavia. [MOLDAVIA, p. 304.] The southern and larger part is in Wallachia.

Inhabitants.—The majority of the inhabitants are Wallachians, besides whom there are 90,000 (?) gypsies, 20,000 Jews, 5000 (?) Armenians, and 3000 Greeks.

Origin and History of the Wallachians.—The Wallachians are not confined to Wallachia; they inhabit Moldavia and parts of south-western Russia; they are very numerous in Transylvania and eastern Hungary; they form part of the population of the Bukowina, and they are very numerous in Thrace, Macedonia, Thessaly, and Epirus. Their number has been estimated at three millions, but this estimate is rather low, and apparently does not comprehend the Wallachians of Macedonia and the adjacent countries, or the Kutzo-Wallachians, who form a very considerable part of the population in the countries mentioned above. As the Wallachian language is apparently derived from the Latin, it is generally supposed that the Wallachians are the descendants of the Roman colonists sent by Trajan into Dacia. But this is a mere hypothesis, and some well ascertained facts show that this opinion cannot be maintained.

It is true that after Trajan's time the Latin language made considerable progress in Dacia, but it is also true that the emperor Aurelian, when he ceded Dacia to the Goths, recalled the Roman provincials (provinciales) from Dacia and gave them lands in Moesia. This is stated by Vopiscus (*Aurelianus*, c. 39). There is not the slightest trace of a Roman population having lived in Dacia during the next eight centuries after Aurelian, and the name Wallachians is unknown in the history of Dacia during that period. This name however belonged to some people in Thrace, Macedonia, and Thessaly, though not before the ninth century, as we know from the Byzantine historians, who frequently mention the Vlachi (Βλάχοι), who lived chiefly in the country round Mount Pindus. In the twelfth century a part of the Vlachi, who were oppressed by the emperor Manuel, concluded an alliance with the Bulgarians and the Cumani, who inhabited Bulgaria and Dacia, and, commanded by two brothers, Asan and Peter, left Thrace and settled north of the Danube. In the beginning of the thirteenth century the inhabitants of Dacia were exterminated by the Mongols; and after the Mongols had withdrawn, numbers of foreign colonists, Bohemians, Moravians, Germans, and especially Wallachians, flocked, some to Transylvania, and others to the present countries of Moldavia and Wallachia, which thus received a new population. Sulzer states that the MS. chronicles of the Wallachians contain very good accounts of these migrations, which we also find mentioned in the Annals of Hungary and Transylvania, and it is always said that these Wallachians received certain lands to settle upon. It is in a document concerning a donation which King Bela IV. of Hungary made to the Knights of St. John, in 1247, that the names of some Wallachians first appear in the history of Hungary. These Wallachians were boyars, and lived in Transylvania. Three causes seem to have contributed to induce the Vlachi to settle north of the Danube—the oppression of the Greek emperors and nobles, the invasions of the Turks, and the opportunity of acquiring fertile lands and liberty in a country beyond the reach of the emperors and the Turks. Thus the inhabitants of Wallachia, Moldavia, and a great part of Transylvania and Hungary must be considered as descended from the Vlachi in Thrace, a Christian nation, belonging to the Greek church, and who used a kind of Roman language, as we still see from the Kutzo-Wallachians. That this Roman language was used in a considerable part of the Thracian peninsula is stated by the presbyter Diocleus in Stritter, who says that after the conquest of Macedonia by the Bulgarians, that is, in the twelfth century, these barbarians proceeded to the conquest of the 'Provincia Latinorum qui illo tempore Romani vocabantur, modo vero Morovlachi, hoc est Nigri Latini vocantur.' It is also remarkable that the Wallachians are Greek Christians, but that no facts are known in ecclesiastical history from which we can conclude that the Greek religion was introduced into Wallachia by missionaries, as was the case in Russia. This circumstance however is natural; for when the Wallachians arrived in their present country, they were already Greek Christians, and did not require missionaries. In short, the hypothesis that the Wallachians are the descendants of the Roman colonists in Dacia appears to be as untenable as the opinion according to which the Germans in Transylvania are the descendants of the Goths. However the fact that the Wallachians are descended partly from the Romans is proved by their language and their name.

Name.—The Wallachians call themselves Rumani or Romans. As to the name Wallachians, which is given them by foreigners, several hypotheses have been proposed. The name is said to be derived from *Wloch*, a Servian word signifying a 'shepherd,' or from the Wolochi, a Turkish nation living north of the Danube and in Russia. It seems however that the word Wallachian comes from the Slavonic *Włoch* (with a barred *l*), which among the Poles, the Servians, and other Slavonic nations still signifies an Italian, or a Roman, and seems to be the same as the German Wälsch, which likewise signifies a descendent from the Romans, either a French or an Italian, though its original meaning was rather a 'foreigner.' It cannot surprise us that the name of Blachi or Vlachi was given to these Romans before they emigrated to the north. From the seventh century, and even earlier, a great part of Thrace, Macedonia, Thessaly, Epirus, and Greece was occupied by Slavonic nations which mixed with the primitive Greek inhabitants, or in other parts with the Romanized nations. Hence the origin of the Wallachian language.

Language.—According to Thunman, one half of all the Wallachian words are Latin, and of the remaining half three-eighths are Greek, two-eighths Gothic, Slavonic, or Turkish, and three-eighths belong to a language which seems to be Albanian. The auxiliary verbs, the articles, the pronouns, the greater part of the prepositions, and the adverbs of place and time, as well as the numerals, the declensions, and the conjugations, are all Latin, and so is generally the groundwork of the language. The declension is thus: (1) Sing. Nom. *kinele* (the dog); Gen. *a kinelui*; Dat. *kinelui*; Acc. *pe* or *pre kinele*; Voc. *kine*; Ablat. *de la kinele*: Plur. Nom. *kiny*; Gen. *a kinilor*; Dat. *kinilor*; Acc. *pe* or *pre kiny*; Voc. *kini*; Ablat. *de la kiny*. (2) Sing. Nom. *duómnu* (the mistress); Gen. *a duomnu*; Dat. *duomnu*; Acc. *pe* or *pre duomnu*; Voc. *duomna*; Abl. *de la duomna*: Plur. Nom. *duómnele*; Gen. *a duomnelor*; Dat. *duomnelor*; Acc. *pe* or *pre duómnele*; Voc. *duomne*; Abl. *de la duómnele*. The auxiliary verb *fi* or *fire* (to be) goes thus:—Pres. Ind. *Yeu sünt*, *tu yésty*, *yell yeste*, *noi süntem*, *woi sündez*, *yey sünt*; Conj. *Se fin*, *se fii tu*, *se fie yell*, *se fim noi*, *se fiz woi*, *se fiz yey*: Imp Ind. *Yeu eram*; Conj. *Yeu ashi fi*: Defin. Ind. *Yeu fui* or *fussei*; Perf. *Yeu am fost*; Plusq. *Yeu fussessem*, &c. The regular verb *laudo* (I praise) goes thus: Pres. *Yeu laud*, *tu laussy*, *yell lauda*, *noi laudám*, *woi lauddtz*, *yey lauda*; Imp. *Yeu laudám*; Defin. *Yeu laudái*, *laudáshy*, *laudá*, *laudáram*, *laudáratz*, *lauddra*, &c.

The Wallachians use the Cyrillian alphabet, which consists of forty-two letters, and was invented by bishop Cyrillus about 870, when he first wrote in the old Slavonic language in Servia: the present Russian alphabet is derived from the Cyrillian. They have always had a written language, and the number of their chronicles, annals, and ecclesiastical works is considerable, but only a few of them are printed. G. Shinkay, of Shinka, has lately written a History of the Wallachians in his native tongue (4 vols. in 4to.), but this work is still in MS. The dictionaries are—'Dictionaria Rumanesc-Lateinesc, si Unguresca,' Klausenburg, 1822; 'Lesicon Romanesca-Latinesca Nemtesca, seu Lexicon Valachico-Latino-Hungarico-Germanicum,' Ofen, 1825. There are two newspapers in the Wallachian language—the 'Wallachian Courier,' published at Bucharest, and the 'Bee,' at Yassy. During the last thirteen years the Wallachians have exhibited considerable literary activity. The author of this article has been told by a Wallachian boyar who has studied in Germany and France, that all well-instructed Wallachians are animated by a desire to cultivate their language and to raise their literature from its present low condition, and that it is very probable that the Latin characters will be substituted for the Cyrillian, in order to facilitate the reading of Wallachian books in other countries. But if the higher classes in Wallachia show themselves inclined to adopt European civilization, the people in general are an ignorant and idle race, depraved by the long tyranny of their Turkish masters, as well as of their own. When asked why they do not cultivate their fertile lands, they used to answer, that it would be a pity to spoil such a fine wilderness by cultivation.

(Wilkinson, *An Account of the Principalities of Wallachia and Moldavia, with Political Observations relating to them*; Engel, *Geschichte der Walachei*; Sulzer, *Geschichte des Transalpinischen Daciens*; Thunman, *Geschichte der Nordischen Völker*; *Almanach de la Cour et de l'Etat de la Principauté de la Valachie* (in French and in Wallachian), Bucharest, 1840; Stritter, *Memoriæ Populorum*, in vol. i., part i. (*De Valachia*), gives a collection of the passages of the antients and later writers concerning the history of the Wallachians.)

WALLENSTADT, Lake. [GALL, ST.; SWITZERLAND.]

WALLENSTEIN. *Albrecht Wenzel Eusebius, duke of Mecklenburg, Friedland, and Sagan, count of Waldstein*, commonly called *Wallenstein*, was the third son of Wilhelm, baron von Waldstein, and Margaret Smirricka, baroness Smirricz. He was born in his father's castle of Hermanic, in Bohemia, on the 15th of September, 1583. The family of Waldstein, as the name indicates, is of German origin, and had belonged to the high nobility (Herrenstand) of Bohemia from the 13th century. In 1290 a knight or lord named Waldstein appeared at the court of king Ottokar of Bohemia, accompanied by his four-and-twenty sons, who, down to the youngest, bore coats of arms and the armour of knights. From his earliest youth Albrecht von Waldstein showed a spirit of independence and a haughtiness which often exposed him to the reproaches of his parents. He was only seven when, being chastised by his mother for a boyish fault, he cried out indignantly, 'Why, am I not a prince! nobody should venture to flog me;' and his uncle having once reproached him with being as proud as a prince, he coolly answered, 'Was nicht ist kann noch werden' ('What is not may yet be'). His delight was to be in the company of the military friends of his father. He lost his mother in 1593, and his father in 1595, and, although he was a younger son, he inherited considerable estates. The family of Waldstein belonged to the established Protestant church of Bohemia (the Utraquists); but this circumstance did not prevent Albrecht's uncle and guardian, Albrecht Slawata, lord of Chlum, a Roman Catholic, from putting his ward under the Jesuits at Olmütz, where he was to receive his education. The Jesuits soon succeeded in converting young Albrecht, an event which has been adorned with much fable. After having finished his education, he set out for Italy, accompanied by Peter Verdungus, the friend of Keppler, a good mathematician and a famous astrologer. He continued his studies at Pavia and Bologna, where Argoli, the astronomer, taught him the principles of the Cabbala. Besides the Cabbala and astrology, Albrecht acquired a thorough knowledge of the antient and almost all European languages; of the Roman, the canon, and the German law; and of mathematics and other sciences connected with the military art, which was always the chief object of his studies. Before he went to Italy he stayed some time in the university of Altdorf, where he signalized himself by many extravagances, if we may trust the stories with which credulous contemporaries or later generations have disfigured the memory of the most lofty genius of his time. Argoli told him that he would be a great man. Waldstein believed it. He always believed in astrology, and in later years the astrologer Seni was one of his principal counsellors.

Anxious to signalize himself by military deeds, Waldstein left Italy and went to Hungary, where the imperial armies were fighting against the Turks. At the siege of Gran he was amongst the foremost stormers, and his commander-in-chief, General Basta, appointed him captain on the walls of the conquered fortress. After the peace of Sitvatorok, in 1606, Waldstein returned to Bohemia, and married an aged but wealthy widow, Lucretia Nikessin, baroness of Landeck, who died in 1614, and left him fourteen large estates in Moravia. During his marriage, and till 1617, Waldstein devoted himself exclusively to the management of his estates; he proved an excellent farmer; he increased his wealth by economy; and he deposited large sums in the banking-houses of the Fugger and Welser, at Augsburg, who were then the richest merchants in Europe. In 1617 he raised a body of 200 dragoons, with which he assisted the archduke Ferdinand of Austria, duke of Styria, who was at war with the Venetians; he saved the fortress of Gradisca, which was hard pressed by the Venetians; and by paying his soldiers well, and keeping open table, he became the idol of the Styrian army. In a short time he saw himself at the head of several thousand men, and, after the campaign was finished, towards the end of 1617, to the advantage of the archduke Ferdinand, the emperor Matthias made him his chamberlain and colonel in his armies, and soon afterwards created him count. Immediately afterwards he married Isabella Catherine, the daughter of count Harrach, who was the favourite of the emperor, who, on this occasion, conferred upon Waldstein the dignity of a count of the Holy Roman Empire. The states of Moravia appointed him commander of the Moravian militia; and at the outbreak of the war between the Bohemians and the emperor, the Bohemians offered him an independent command in their armies. The Protestant members of the family of Waldstein were partly among the anti-imperial or Bohemian party; but Albrecht, less from religious than from political motives, refused to make common cause with the Bohemians, in consequence of which the Moravian states deprived him of his command of the militia, and confiscated his estates. Waldstein saved the military chest of Moravia, a considerable sum, which he put into the hands of the trustees of the emperor, who, to reward him for this service, appointed him quartermaster-general of the imperial army, which, in concert with the troops of Maximilian, duke of Bavaria, was to take the field against Frederic V., count palatine, who had been chosen king by the Bohemians. The counts Mansfeld and Thurn having advanced as far as the neighbourhood of Vienna, and attacked the imperial general Boucquoi, near Teyn (10th of June, 1619), Waldstein hastened to the assistance of Boucquoi, defeated the enemy, and thus saved the emperor from being made a captive in his own capital. In the battle on the Weisse Berg, near Prague (8th of November, 1620), the cavalry of Waldstein signalized themselves by their impetuous charges, but Waldstein was not present at the battle, being obliged by his commission as quartermaster-general to procure the necessary supplies for the imperial army. It seems that, the resources of the emperor being exhausted, Waldstein gave large sums for the support of his master, for which however he got an ample indemnification. After the overthrow of king Frederic of Bohemia, the estates of his adherents were confiscated, and the greater part were either sold by the emperor Ferdinand II. or given as rewards to his faithful servants; on many occasions also Ferdinand used to combine generosity and interest by selling them at a low price. The reward of Waldstein was the lordship of Friedland, worth about 600,000 gulden, for which he paid 150,000 gulden; and he bought more than sixty other lordships and estates, the value of which was estimated, at a very low rate, at 7,290,228 gulden, of which however Waldstein only paid a part, his sacrifices and services being taken into account. As the value of money was then at least three times greater than it is now, the amount of the property acquired by Waldstein in consequence of the Bohemian war, was at least 24,000,000 gulden (3,000,000*l.*) according to the present value of money; to which must be added the value of his personal estate.

Waldstein was neither intoxicated by his triumph nor by his wealth. In 1621 he took the field against Betlen Gabor, the prince of Transylvania, who stood on the frontiers of Germany, and was going to effect a junction with John George, margrave of Brandenburg-Jägerndorf, who was encamped near Jägerndorf, in the south-east corner of the then province of Silesia. Waldstein successively defeated both his adversaries, prevented their junction, and forced Betlen Gabor to sue for peace, which was granted on condition that he should give up his claim to the crown of Hungary, which he did. During the two ensuing years Waldstein was principally occupied with the management of his estates. But Betlen Gabor having again taken up arms against the emperor, Waldstein hastened to Hungary, and arrived just in time to save the imperial army under the Marquis of Caraffa, who was besieged in his camp at Göding, on the frontiers of Moravia, by the prince of Transylvania, count Thurn, and John George of Brandenburg-Jägerndorf. As a reward for this victory, the emperor, towards the close of 1623, conferred upon him the title of prince, and in the following year, 1624, created him duke of Friedland and prince of the Holy Roman Empire, an act which caused much jealousy among the other princes of the empire. In 1627 Waldstein bought the sequestrated duchy of Sagan in Silesia for 150,800 gulden, which was a little more than one-fourth of its value; and although he had acquired it as a free estate, he preferred to take it as a fief from the emperor, who invested him with it in 1628.

The declaration of war of the Union of Lower Saxony, headed by Christian IV., king of Denmark, put the emperor into great embarrassment. His army was partly disbanded, and with his remaining troops he was unable to open the campaign, notwithstanding the assistance of the army of the Ligue, commanded by Tilly: his finances were exhausted. Waldstein offered to raise an army of 40,000 men. He proposed to raise this force with his own funds, but he said, when once in the field, the army would subsist and be paid by ransacking those hostile provinces through which he should lead them. After long hesitation the emperor agreed to the proposition, and in two months Waldstein was at the head of 28,000, men with whom he marched towards the Lower Elbe. The renown of his military skill, his wealth, and his unbounded liberality towards the soldiers, was so great, that men flocked to his camp from all parts of Europe. Germans, Frenchmen, Irishmen, Scotchmen, Walloons, Croates, Poles, Hungarians, and Cossaks, formed an army of very heterogeneous elements, but the iron hand of their commander kneaded them into a well-united mass. His co-operation with Tilly, his victories over Mansfeld, his parallel march with this general towards Moravia, where Mansfeld and Betlen Gabor projected to join their armies, and the glorious result of this campaign for the imperialists, have been related elsewhere. [THIRTY YEARS' WAR.] The campaign was begun and finished in 1626. Waldstein lost 20,000 men by disease and fatigue, but in the beginning of 1627 he was again at the head of 50,000 men. His second campaign from Silesia to Denmark, and his junction with Tilly on the Lower Elbe, have likewise been related in another place. We shall only allude to the rapidity of his marches and the irresistible force of his advances. On the 1st of August, 1627, he was at Troppau, which he left for Sagan, where he stayed till the 19th for the purpose of making the necessary preparations for the memorable campaign which he was going to undertake. His army was incumbered by a heavy ordnance carried on clumsy carriages, by many women and children, by a host of servants and grooms of every description, and he had to cross a broad sandy tract where provisions were scarce, and where the roads were in their natural state. Yet since The towns were occupied by Danish garrisons.

put in motion by the power of his genius, this heavy body advanced with irresistible rapidity. On the 21st of August Waldstein was at Cottbus; on the 27th at Havelberg; and on the 30th he took Dömitz in Mecklenburg, after having performed a march of 250 miles in eight days, through a miserable country—a march which it would be difficult to perform for a modern army unincumbered by heavy ordnance and moving on excellent roads. On the 27th of September, his lieutenant, count Schlick, defeated the Danes near Aalborg in Jütland, and king Christian saved the remnant of his army by flying to his ships and escaping to the Danish islands. Waldstein hastened to the Belt, and it is said that, being unable to cross this channel for want of ships, in a fit of anger he ordered the sea to be bombarded with red-hot bullets.

The Danish war was finished by the peace of Lübeck (12th of May, 1629). Waldstein's reward were the duchies of Mecklenburg, with which he was invested by the emperor on the 16th of June, 1629, after the dukes Adolphus Frederick and John Albrecht had been dispossessed of them, for felony, by an imperial decree in 1628. Waldstein choose Wismar, the best port for a navy on the southern coast of the Baltic, for his residence, and obtained from the emperor the title of Admiral of the Baltic and the Oceanic Sea (the German Sea), for which ignorant historians have charged him with childish vanity. His plan was to form a navy with the assistance of the Hanseatic towns, and to prevent Gustavus Adolphus, the king of Sweden, from choosing Germany for the theatre of his ambition. From the beginning of the Danish war Waldstein had penetrated the secret views of that king. 'Bitt,' wrote he to his lieutenant Arnim, 'der Herr hab fleissig Aufsicht auf den Schweden, denn er ist ein gefährlicher Gast' ('I beg you, sir, to observe well the Swede, for he is a dangerous fellow'). 'Dem Gustav Adolph soll man keinen Glauben schenken, denn männiglich sagt dass er die Leute gern bei der Nase herumführt' ('You must not trust Gustavus Adolphus, for every man says that he likes to lead the people by the nose'). 'Den Schweden will ich gern zum Freunde haben, aber dass er nicht zu mächtig ist, denn amor et dominium non patitur socium' ('I should wish to have the Swede for my friend, but that he should not be too strong, for love and power cannot agree'). At a moment when his funds were much exhausted, he ordered 35,000 dollars to be raised immediately, which he intended to give as a reward to a 'certain merchant who was to do something in Sweden.' It has been pretended that Waldstein had formed the plan of murdering Gustavus Adolphus, but there are no grounds for this accusation, and it appears that the merchant had proposed to burn the Swedish fleet in Karlskrona. The plan was not put into execution. During the siege of Stralsund, Waldstein cried out that he would have the town if it were fastened to the sky with iron chains; but he was compelled to abandon the siege.

No sooner was Waldstein invested with Mecklenburg, than his numerous secret enemies changed their calumnies and intrigues into open accusations. The duke of Bavaria, Maximilian, was Waldstein's declared enemy. By the extraordinary success of the imperial arms, the power and influence of the Ligue, of which Maximilian was the head, had become secondary. Tilly hated Waldstein as his greatest rival. The pride of the princes of the empire was hurt by the elevation of a general who, though a lord in Bohemia, was only a nobleman of lower rank with respect to the nobility of the empire, and yet had been raised to the dignity of duke of Mecklenburg; and they reproached him with dispossessing the former dukes of Mecklenburg of their estates, an act of injustice however for which the emperor was perhaps more blameable than Waldstein. The despotic character of Waldstein, the haughtiness with which he treated both friends and enemies, his rapacity in the provinces either conquered or merely occupied by him, and the greediness of his officers and soldiers, were the cause of many charges. Waldstein often endeavoured to stop the rapacity of his lieutenants, and he severely punished several Italian and Spanish officers, who in revenge called him 'il tiranno' (the tyrant). To this was added the aversion which Waldstein showed to all foreigners, especially Italians and Spaniards, who crowded to the court and the army; and his hatred of priests, and principally the Jesuits, who were powerful at the imperial court. Maximilian of Bavaria, at the head of all the enemies of Waldstein, declared to the emperor that he and all Germany would be ruined if the 'dictator imperii' remained longer at the head of the imperial armies. Ferdinand, after long hesitation, dismissed Waldstein from his command in 1630, at the very moment when Gustavus Adolphus left the coast of Sweden for the invasion of Germany.

Waldstein, without making any complaints, retired to Bohemia, and resided alternately at Prague and at Gitschin. He lived with such splendour as to make the emperor himself jealous.

The invasion of Gustavus Adolphus, the defeat of the imperial armies at Leipzig, the conquest of Bavaria by the Swedes, and the death of Tilly, have been related. [THIRTY YEARS' WAR; TILLY.] The empire was on the brink of ruin, and there was only one man who could save it. This man was Waldstein. When the emperor requested and at last implored him to resume the command, he showed that he felt all his importance. After having declined the proposition several times, he at last agreed to it on the following conditions: that Waldstein should have the sole control of the army, which he promised to raise; and there should be no imperial authority within his camp; no peace should be concluded without his consent; he, as duke of Mecklenburg, being one of the belligerent parties; he should have full power to manœuvre and to take up his quarters however and wherever he should find it convenient; that he should have the sovereignty of the provinces that he might conquer; and that the emperor should give him as reward one of his hereditary states (Bohemia?), of which he should be the sovereign, though as a vassal of the emperor.

The campaign of Waldstein against Gustavus Adolphus has been told in the article on the Thirty Years' War. It would require the knowledge of a consummate general to decide whether Waldstein or Gustavus was the greater captain. But from the moment that Waldstein resumed the command, he directed all its operations, and Gustavus Adolphus acted under the impressions which he received from the plans of Waldstein. Waldstein's defence of the lines near Nürnberg can only be compared with the defence of the lines of Torres Vedras by the duke of Wellington. The march of the king of Sweden towards Bavaria, after his fruitless attempt on the lines near Nürnberg, was a great fault; and although the king soon perceived his error, and changed his plan by rapidly following Waldstein, this circumstance is another proof of what we have just said. It is true that Waldstein lost the battle of Lützen (6th of November, 1632), but able judges have given it as their opinion that on this occasion Waldstein showed his superiority to the king in the choice of the battle-field, while the king is said to have showed greater ability in the direction of his attacks. But the successful part of these attacks was the merit of duke Bernhard of Saxe-Weimar, the king having fallen in the beginning of the battle, while engaged in rallying his troops, which were disorganized in consequence of those fruitless attacks which he directed.

As to the military conduct of Waldstein after the battle of Lützen, we shall only add that he punished with death many generals, colonels, and inferior officers who had not behaved well in that battle. He soon repaired his losses, and his arms were victorious in Saxony and Silesia. But his haughtiness became insupportable, and he openly manifested his design to make himself a powerful member of the empire. This design had been sanctioned by the emperor, as already explained. The Jesuits and foreign generals at the court of the emperor availed themselves of the inactivity of Waldstein after the battle of Lützen to calumniate him to the emperor; and Waldstein having refused to relieve the duke of Bavaria, preferring a campaign in Silesia, this prince, his old enemy, joined the secret enemies of Waldstein. They represented him as designing to overthrow Ferdinand's power in Germany, and the emperor was the more ready to believe the accusation, as it transpired that France had offered to Waldstein to aid him in obtaining the crown of Bohemia; but Waldstein rejected these propositions, and continued to show his earnest desire to drive all foreigners out of Germany, enemies as well as friends. The emperor ordered him to withdraw from Bohemia and Moravia, and to take up his winter-quarters in Lower Saxony (December, 1633); but Waldstein neither would nor could obey this order, which he regarded as a violation of the conditions on which he had resumed the command. Upon this Maximilian of Bavaria urged the emperor to dismiss his disobedient general; and Waldstein, having been informed that the emperor had resolved to do it, declared that he would resign his command. His faithful lieutenants urged him not to abandon them, for they were all creditors of the emperor, who paid them very irregularly, and they were sure that they would never be paid at all if their commander should resign. In order to prove their invariable attachment, they signed a declaration at Pilsen, on the 12th of January, 1634, in which they promised to stay with Waldstein as long as he would be their commander. This is the famous declaration which has always been represented as a plot against the emperor. Piccolomini, Gallas, and several other Italian and Spanish officers availed themselves of the occasion to ruin Waldstein, whose wealth they were eager to divide among themselves; and the emperor, believing their mistatements, signed an order by which Waldstein was deprived of his command and declared a rebel (24th of January). Piccolomini and Gallas were commissioned to take Waldstein, dead or alive. The order was kept secret, but something transpired, and Waldstein, in order to prove his loyalty, relieved his lieutenants from their promise to stay with him till the last moment (20th of February). On the following day he sent two officers, Colonels Mohrwald and Breuner, to the emperor to declare in his name that he was ready to resign, and to justify his conduct; but Colonel Butler, an Irishman, treacherously informed Piccolomini of it, and the two officers were seized and not allowed to see the emperor, who was still deceived by the enemies of Waldstein. On the 20th of February the emperor ordered Waldstein's estates to be confiscated; and Pallas and Piccolomini approached Pilsen for the purpose of surprising Waldstein. In this extremity Waldstein took refuge within the walls of Eger; and in order to save his life, sent Duke Franz Albrecht of Saxe-Lauenburg to Duke Bernhard of Weimar, requesting him to receive him with a small body of faithful officers and soldiers. Bernhard, as well as the Swedish chancellor Oxenstierna, declined the proposition, thinking that it was only a trick. During this time Waldstein remained in the castle of Eger. He was accompanied by his most faithful officers, among whom Terzky, Kinsky, Illo, Neumann, and some traitors, such as Gordon, Butler, and Leslie, who were bribed by Piccolomini, and had promised to execute the bloody order of the emperor.

On the 25th of February, Gordon, who was commandant of Eger, gave a splendid entertainment to Waldstein's officers, at which the duke was not present on account of his ill health. After dinner an armed band rushed in, and the friends of Waldstein fell beneath their swords. Waldstein heard the cries of the murdered men. He opened a window and asked a sentinel what it meant. Suddenly Captain Deveroux, at the head of thirty Irishmen, rushed into his apartment; and while his men shrunk back at the sight of their great commander, who stood before them defenceless and in his night-dress, Deveroux advanced and cried out, 'Art thou the traitor who is going to ruin the emperor?' With these words he lifted his partisan. Waldstein, without uttering a word, opened his arms and received the deadly blow in his breast. He was always thoughtful, and spoke little, and so he was in his last moment: he fell and died silently.

His wealth was partly divided among his enemies, each of whom received a large share, for the revenue of Waldstein was estimated at 3,000,000 gulden (375,000*l.*, or 1,125,000*l.* according to the present value of money). Part of his estates were kept by the emperor, who paid for 3000 dead masses to be read for the soul of his great general.

To the present time it has generally been believed that Waldstein formed those treasonable schemes of which he was accused by his enemies; but the treason of Waldstein has never been proved. About twenty years ago Dr. Friedrich Förster from Berlin discovered many autograph letters of Waldstein in the family archives of the count of Arnim, at Boitzenburg, in consequence of which discovery he was admitted, by order of the emperor Francis I., to the secret part of the archives of the military council at Vienna, which had hitherto not been used by the biographers of Waldstein and the writers on the Thirty Years' War. Förster found a considerable number of letters, which he published under the title 'Waldstein's Briefe,' Berlin, 1828-1829, 3 vols. 8vo. Having been invited by the counts of Waldstein, who are descended from the brothers and uncles of Albrecht, to continue his researches, he was enabled to prove the complete innocence of Waldstein, and that he had fallen a victim to the intrigues of Piccolomini and his party. He published his results under the title 'Wallenstein, Herzog zu Mecklenburg, Friedland, und Sagan, als Feldherr und Landesfürst,' &c., Potsdam, 1834, 1 vol. 8vo. The counts of Waldstein brought a suit against the Austrian fiscus for the purpose of recovering those of Albrecht's estates which had been appropriated to the fiscus. It has lately been reported that the present emperor, Ferdinand I., without waiting for the legal decision, has ordered those estates to be restored to the counts of Waldstein.

WALLER, SIR WILLIAM, a distinguished military commander on the side of the parliament in the civil wars of the seventeenth century, was of the same family of the Wallers of Spendhurst, in Kent, from which the poet Waller was descended, and was born in 1597. After pursuing his studies for a time at Magdalen-hall and Hart-hall, Oxford, he went to complete his education at Paris; and while abroad he entered the service of the confederated powers (Sweden, Holland, and the Protestant princes of Germany) in the war which they carried on against the emperor after their league of the year 1626. On his return home he received from Charles I. the honour of knighthood. In 1640 Sir William Waller was returned to the Long Parliament for Andover; and he immediately took his place among the opponents of the court. His foreign education and service had given him a strong attachment to Presbyterianism; and he had also, it is said, smarted under the severities of the Star-chamber. On recourse being had to arms, Sir William was appointed one of the parliamentary generals, and he greatly distinguished himself on various occasions, especially in the reduction of Portsmouth, in September, 1642. He was however defeated at Lansdown near Bath, on the 5th of July, 1643; at Roundway Down near Devizes, by Lord Wilmot, on the 13th of the same month; and at the same place again on the 8th of September. On the 29th of March, 1644, Waller defeated Lord Hopeton at Cherryton Down near Winchester; but on the 29th of June following, he was in turn worsted by the royal forces at Cropredy-bridge in Oxfordshire. Some of these reverses which Waller sustained gave rise to warm counter accusations between him and Essex; he charging the commander-in-chief with wishing to sacrifice him; Essex retorting upon Waller with reproaches of want both of conduct and courage. Waller however was throughout stoutly supported by his party, the Presbyterians. The self-denying ordinance (passed 3rd April, 1645) deprived Waller of his command; but he continued to be looked upon as one of the leaders of the Presbyterian party in the House of Commons, till the impeachment of the eleven members, of whom he was one, by the army (23rd June, 1647), when he withdrew with the rest from the House. He returned however after a time, and continued to attend until he was driven out by force, along with all the other members of his party, by Colonel Pride, on the 6th of December, 1648. From this time we hear no more of him till after the death of Oliver, when, in August, 1659, he was taken up on the charge of being engaged in the Cheshire insurrection, headed by Sir George Booth, and was detained in custody till November following, when he was released on bail. He probably resumed his seat in the House of Commons, with the other secluded members, in February, 1660; and he was nominated one of the Council of State constituted by the House on the 25th of that month. To the Convention Parliament, which met in April, he was returned as one of the members for Middlesex; but he does not appear to have sat in any subsequent parliament. He died at Osterley Park in Middlesex, on the 19th of September, 1668. He had been three times married; and from his daughter Margaret, by his first wife, daughter and heiress of Sir Richard Reynell of Ford, in Devonshire, who married Sir William Courtenay of Powderham Castle, is descended the present Earl of Devon; from his daughter Anne, by his second wife the Lady Anne Finch, daughter of the first earl of Winchelsea, who married Sir Philip Harcourt, was descended the late Earl Harcourt.

Sir William Waller is the author of a work entitled 'Divine Meditations upon Several Occasions; with a Daily Directory,' which was printed in an 8vo. volume at London, in 1680; and also of a 'Vindication' of his own character and conduct, which was published from his manuscript, in 8vo., with an introduction by the editor, at London, in 1793. Both these works give a favourable impression of his honesty and ingenuousness, as well as of his shrewdness and general intellectual ability; and the second is of considerable historical value.

WALLER, EDMUND, a celebrated English poet, was born 3rd March, 1605, at Coleshill, in the county of Hertford. His father, Robert Waller, Esq. of Agmondesham, or Amersham, in Buckinghamshire, in which parish Coleshill is situated, represented a branch of an old Essex family, and had in early life followed the profession of the law. Edmund was the eldest of several sons and daughters, but he was still in his boyhood when his father died, leaving him an estate of 3500*l*. a year. Waller's mother was Ann, daughter of Griffith Hampden of Hampden in Buckinghamshire, and aunt of the patriot, who was consequently the poet's cousin. The relationship, if it is to be so called, of Edmund Waller to Cromwell, about which there has been some controversy or misconception, consisted in his uncle, William Hampden, the father of the patriot, having married Cromwell's aunt, Elizabeth; so that Hampden the patriot was first cousin both to the poet and to the protector. (Noble's *Memoirs of the Protectoral House of Cromwell*, ii. 65-67, where however Waller's estate is erroneously set down at 35,000*l*. per annum, and his father is in one place called Richard, instead of Robert.) Johnson, whose account is copied without either correction or acknowledgment by Chalmers, makes Waller's mother to have been the sister of the patriot, whose father he incorrectly names John.

Waller was educated at Eton, whence he proceeded to King's College, Cambridge. His earliest biographer, the writer of a memoir prefixed to the edition of his poems published in 1711, says that he obtained a seat in the House of Commons, at the age of sixteen, for the borough of Amersham. If so, he would appear to have been returned to the third parliament of James I., which met in January, 1621, and to which this borough of Amersham claimed the right of sending representatives, after having ceased to do so ever since the second year of Edward II. The claim was eventually allowed; but it may be doubted if Waller, although he may have been elected, was permitted to take his seat, or at least was recognised as a member, although he may have sat sub silentio, as was then sometimes done. No members for Amersham, or for Wendover and Great Marlow, which were similarly circumstanced, are given in the common lists of this parliament. Whether Waller was returned to the next, James's fourth and last parliament, which met in February, 1623, is not known; but it is probable that he was. In the first parliament of Charles I., which met in 1625, he was returned for Chipping-Wycombe. It is not certain that he sat in the next, which was called together in the following year; but he represented Amersham in Charles's third parliament, which sat from March, 1627, to March, 1628, and also both in the short parliament of April, 1640, and in the Long Parliament which assembled in November of the same year.

The earliest of Waller's poems is commonly assumed to have been produced towards the end of the year 1623, when the event which it celebrates happened, the escape of the prince (afterwards Charles I.) from being shipwrecked in the road at St. Andero, on his return from Spain. Yet it certainly was not published till some years later; and not only the title 'On the Danger his Majesty (being Prince) escaped,' &c., but even the verses themselves seem rather to imply that they were not composed at the time of the escape. Be this as it may, it is remarkable that the style and versification of this poem have quite as much neatness and finish as those of his latest days; so that, as has been said by one of his editors, as quoted by Johnson, 'were we to judge only by the wording, we could not know what was wrote at twenty and what at fourscore.' Dryden has stated (in the preface to his 'Fables') that Waller himself attributed the polish and smoothness of his versification to his diligent study of Fairfax's translation of Tasso. Clarendon says expressly that 'at the age when other men used to give over writing verses (for he was near thirty years when he first engaged himself in that exercise, at least that he was known to do so), he surprised the town with two or three pieces of that kind; as if a tenth Muse had been newly born, to cherish drooping poetry.' In truth, there are only two or three of his poems that could have been written before his twenty-fifth year.

Some years before this date he had married Ann, daughter of Edward Banks, Esq., a very wealthy citizen of London, having gained the heart and hand of the lady against all the interest of the court exerted in favour of a rival suitor. By this match he considerably augmented his fortune. His wife, after bringing him a son, who died young, and a daughter, who when she grew up married Mr. Dormer of Oxfordshire, died in childbed, and 'left him,' as Johnson says, 'a widower of about five and twenty, gay and wealthy, to please himself with another marriage.' The older accounts make him to have lost his wife in 1629 or 1630.

It could hardly then have been, as is commonly represented, almost immediately or very soon after this that he began to pay his addresses to the Lady Dorothea Sidney, the eldest daughter of the Earl of Leicester, whom he has made famous in many of his love verses under the name of Sacharissa. The high-born beauty rejected his suit, and in 1639 married Henry, lord Spencer, who, in 1643, was created earl of Sunderland, and was killed in September, the same year, at the first battle of Newbury. [Vol. xxiii., p. 296.] As Lord Spencer at the time of his marriage was certainly not quite nineteen, it is not probable that his bride could have been old enough to be sought in marriage eight or nine years before. Sacharissa, who, after the death of her first husband, married Mr. Robert Smythe, survived till 1683. Another of Waller's temporary attachments at this period of his life was to the Lady Sophia Murray, whom he has celebrated under the poetical name of Amoret. At last, soon after the marriage of Sacharissa, but in what year is not precisely known, he married a Miss Mary Bresse, or Breaux, of whom nothing is recorded, except that she brought him thirteen children, five sons and eight daughters, and that she was, according to Aubrey, the antiquary, distinguished both by her beauty and her good sense.

When government by parliaments was resumed, after an interruption of twelve years, in 1640, and Waller found himself again in the House of Commons, he joined the party in opposition to the court, where, although his fortune, wit, and poetical reputation had made him a distinguished figure, he is said to have been always looked upon with some suspicion as the near kinsman of Hampden. But his temper and position alike withheld him from going very far with the reformers or revolutionists; and on the approach of the crisis he seceded from his party, and seems even to have withdrawn from the House. When the king set up his standard at Nottingham, in August, 1642, Waller sent him a thousand broad pieces; and, although he soon after returned to his place in parliament, he is supposed to have done so by his majesty's permission or direction. In the House he now spoke openly on the royal side—'with great sharpness and freedom,' says Clarendon, 'which, now there was no danger of being outvoted, was not restrained; and therefore used, as an argument against those who were gone upon pretence that they were not suffered to deliver their opinion freely in the House; which could not be believed, when all men knew what liberty Mr. Waller took, and spoke every day with impunity against the sense and proceedings of the House.'

Waller was one of the commissioners sent by the parliament to the king at Oxford, after the battle of Edgehill, in January, 1643; and it was soon after this, in the end of May, that the design known as Waller's plot was discovered. It is difficult to say what was really the object of this so-called plot or conspiracy. The parliament denounced it as 'a popish and traitorous plot for the subversion of the true Protestant religion and liberty of the subject,' &c.; and May, in his 'History of the Parliament,' gives a minute account of the plans of the conspirators for taking into their own hands all the powers of government, and arresting the chiefs of the parliamentary party. On the other hand it is alleged that Waller and his friends had really no further object than to ascertain the state of opinion in the City of London, by making lists of the inhabitants, and dividing them into royalists, parliamentarians, and moderate men opposed to the excesses of either faction. There can be little doubt however that this is very much of an under-statement. Yet it may be questioned if Waller's design really had anything to do with another which was detected about the same time—a project of a loyal London merchant, Sir Nicholas Crispe, to raise an armed force, when a fit opportunity should occur, to act against the parliament, for which purpose he had obtained a commission of array from the king. Waller's chief confederate was his sister's husband, Mr. Tomkyns, who held the office of clerk of the queen's council, and had an extensive connexion and influence in the city; and their proceedings were discovered, according to one account, by a servant of Tomkyns, who, while lurking behind the hangings, overheard a conference between his master and Waller; according to another version of the story, by a sister of Waller, who was married to a Mr. Price, 'a great parliamentarian,' and her chaplain, Goode, who stole some of his papers. The commission of array granted to Crispe was found in the possession of Tomkyns; but this is explained as having happened through an accident, and Waller always denied that he knew anything of Crispe's scheme. In other respects his confessions were ample enough. 'Waller,' says Clarendon, 'was so confounded with fear, that he confessed whatever he had heard, said, thought, or seen; all that he knew of himself, and all that he suspected of others, without concealing any person, of what degree or quality soever, or any discourse which he had ever upon any occasion entertained with them.' Various ladies of rank, to whose intimacy he had been admitted, were implicated by his lavish revelations. In the end Tomkyns, and another person named Challoner, who was charged with having had a commission to raise money for the king, were hanged at their own doors: Tomkyns in Holborn; Challoner in Cornhill. Alexander Hampden, another relation of Waller's, was kept in prison till he died; and some others had their estates confiscated, and were long detained in confinement. Others made their escape to the king at Oxford. As for Waller, undoubtedly the prime contriver of the design, whatever it amounted to, his life was saved, but the facts connected with his deliverance are variously related. In the Life prefixed to his Works it is expressly asserted that he was arraigned at Guildhall along with Tomkyns and the rest, and condemned to death. Lord Clarendon, on the contrary, states that 'Waller, though confessedly the most guilty, with incredible dissimulation affected such a remorse of conscience, that his trial was put off, out of Christian compassion, till he might recover his understanding.' After he appeared to be in a more composed state, he was brought to the bar of the House of Commons, on the 4th of July, and there delivered a speech, which is printed in his Works, and which certainly indicates nothing like insanity, but is perhaps without a parallel for servility and baseness of spirit. He begged that he might not be exposed to a trial by a council of war, and Clarendon says that he prevailed in that request, and thereby saved his 'dear-bought life;' but, according to Whitelocke, he was actually made over to the tribunal he so much dreaded, and, being tried and condemned, was reprieved by Essex. He lay in prison a year, and was then set at liberty on an understanding that he should leave the country. Of his property, all that was exacted from him was a fine of 10,000*l.*; but it is affirmed by his first biographer, that he expended three times that sum besides in bribes. Altogether, we are informed, he was obliged to sell estates to the value of 1000*l.* per annum on this occasion. 'Yet,' remarks the writer of his Life in the 'Biographia Britannica,' 'his unparalleled wit and dexterity in saving his life will be the admiration of all ages.'

On his release, Waller retired to France, and took up his residence first at Rohan, afterwards in Paris, where, we are told, he lived in great splendour. We are led to suppose that he was allowed to draw the rental of so much of his large estates as he had not been obliged to sell; but according to the 'Biographia Britannica,' 'the chief support of his magnificent way of life was derived from his wife's jewels, which he had taken away with him;' and then we are told that, after ten years thus spent, he found himself reduced to what he called the Rump jewel. It was during his exile that, in 1645 (not 1640, as misprinted in the 'Biographia Britannica'), he published in 8vo. the first collection of his poetry, under the title of 'Poems, &c., written by Mr. Edmund Waller, of Beckonsfield, Esq., lately a member of the Honourable House of Commons.' At last, apparently about 1653, through the interest of Colonel Scrope, who was married to one of his sisters, he obtained Cromwell's permission to return to England; and came over and established himself at Hail Burn (Johnson calls it Hall-barn), a house he had built near Beaconsfield. Although his mother, who lived at Beaconsfield, and often, it is said, entertained the Protector in her house, continued a professed royalist, Waller soon insinuated himself into great familiarity and favour with Cromwell, to whom in 1654 he addressed one of the most elaborate and successful of his poetical performances, under the title of 'A Panegyric to my Lord Protector, of the present greatness and joint interest of his Highness and this Nation.' In a similar strain he afterwards took occasion, in celebrating Blake's victory over the Spanish fleet, in September, 1656, to recommend to Cromwell the assumption of the name, as well as the power of a king. The next of his poems is still in the same vein, 'On the Death of the Lord Protector;' but this is immediately followed in the collection by one 'To the King, upon his Majesty's happy Return,' which, if not as animated as his poem to Cromwell, is at least as adulatory. The Restoration however restored Waller to his former position more completely than his recal by Cromwell had done. He now became once more a first figure both at court and in the state. It does not appear that he sat in what is called the Convention Parliament, which brought the king back; but to the next, or Charles's Long Parliament, which met in March, 1661, and continued in existence till 1679, he was returned for Hastings; in the next, which met in March, 1679, he sat for Chipping-Wycombe; he does not appear to have been a member either of Charles's fourth parliament, which met in October, 1680, or of his fifth and last, which met in March, 1681; but to the first and only parliament of James II., which met on his accession in May, 1685, the octogenarian poet was returned as one of the members for Saltash; and, as appears from the 'Parliamentary History,' he continued, old as he was, to take an active part in the debates. Burnet, in his 'History of his Own Time', says, under the year 1675, 'Waller was the delight of the House; and even at eighty he said the liveliest things of any among them: he was only concerned to say that which should make him be applauded. But he never laid the business of the House to heart, being a vain and empty though a witty man.'

In 1665 Waller asked and obtained from King Charles the Provostship of Eton College; but Clarendon refused to put the seal to the grant, on the ground that the office could be held only by a clergyman. This incident is supposed to have instigated the vindictive poet to take a keen part in the proceedings of Buckingham and his faction, which brought about the destruction of the chancellor. After Clarendon's banishment, the provostship again became vacant, and Waller asked it again of the king; upon which his majesty referred the petition to the council, before whom the question was argued by counsel for three days, and was finally determined as before.

One of Waller's latest poetical performances was a copy of verses entitled 'A Presage of the Ruin of the Turkish Empire,' which he presented to James II. on his birthday (in what year is not stated). He was treated by James with kindness and familiarity; but does not appear to have shown any disposition to go along with him in his illegal courses. He did not live to witness the Revolution; he died at Beaconsfield, on the 21st of October, 1687. It is noted that his heir joined the Prince of Orange.

Of the children he had by his second wife, the eldest son, Benjamin, we are told in the 'Biographia Britannica,' was 'so far from inheriting his father's wit, that he had not a common portion, and therefore was sent to New Jersey in America.' He left his estate to his second son, Edmund, who repeatedly represented Amersham in parliament, attaching himself in the House to the neutral party called the Flying Squadron, was esteemed in his county 'a very honest gentleman and a man of good sense,' was not 'without a taste in poetry,' and ended by becoming a Quaker in his latter days. His third son, William, was a merchant in London; the fourth, Dr. Stephen Waller, became an eminent civilian; of the fifth nothing is known. [illegible] daughters, the eldest, Margaret, born at Rohan, was [illegible] father's favourite, and used to act as his ama[illegible] became the wife of the Rev. Dr. Birch. The [illegible] — Hervey, of Suffolk, Esq.; the fourth, — [illegible] fordshire, Esq. Eliza was living unmar[illegible] rothy, a dwarf, was sent away, not, like her [illegible] Jersey, but only to the north of England. [illegible] nothing is recorded; nor of the eighth any thing more than her name, Octavia, given to her from her place in the list.

The merits of Waller as a poet have been elaborately discussed by Johnson. He will scarcely be now admitted to have been even in his own day what he is called by the writer of his life in the 'Biographia Britannica,' 'the most celebrated lyric poet that England has ever produced;' unless perhaps we are to consider a lyric poet as meaning a poet who has written nothing but lyrics, and then the title would not be applicable to Waller. He was certainly, in so far as respects diction and versification, the most correct poetical writer that we had before Pope; and it cannot be questioned that his example had considerable effect in regulating the form and refining the manner of our poetry, although it may also have helped somewhat to tame its spirit. Yet, although there is not much glow of imagination in Waller, there is often a great deal more than mere prettiness or even elegance; his more serious pieces have frequently much dignity and elevation of thought, as well as of expression. And generally his language has the high merit of being a most lucid mirror and exponent of his meaning, giving out with perfect distinctness at least the lines and formal features of the idea, however deficient it may be in the power of reflecting coloured light, or rather, however little of that there may be for it to reflect.

WALLI'CHIA, a genus of plants named in honour of Dr. Wallich, superintendant of the East India Company's Botanical Garden at Calcutta. This genus belongs to the the natural order Buttneriaceæ, and has the following characters:—Involucel 3-4 leaved, distant from the flower, and small. The calyx 4-parted, with oblong linear lobes. The flower-bud oblong. The petals 4, spreading, reflexed, with thick villous claws. The stamens monadelphous, about 20; outer ones shortest. The ovary ovate, 8-celled, with single style and 8 stigmas. The fruit capsular, 8-celled, 8-valved, and a single seed in each cell. The only species is the *W. spectabilis*, which is a beautiful tree attaining a height of 30 or 40 feet. It is a native of Nepaul. It may be grown in a mixture of loam, peat, and sand, and may be propagated by cuttings.

WALLINGFORD, a parliamentary borough on the right or west bank of the Thames, in Moreton hundred, in the county of Berks, 49 miles from the General Post-Office, London, by coach-road through Brentford, Colnbrook, Maidenhead, Henley, and Nettlebed; or about 53 by the Great Western Railway, which passes within about two miles of the town.

There is reason to think that Wallingford existed in the time of the Romans, coins having been dug up here, and the form of the ramparts (not of the castle, which is of later origin) indicating that they had been traced by the Romans. The first historical notice of Wallingford is in A.D. 1006, when it was taken by the Danes. The name of the place is variously spelled in antient writers. In 'Domesday' it is called Walingeford, and is described as a borough which Edward the Confessor held, with 276 houses, paying gable-tax to the crown: the tenants were bound to render personal service to the king.

There was a castle here at the time of the Conquest, belonging to Wigod, a Saxon noble, who invited William the Conqueror, after the battle of Hastings, to come to Wallingford, where William received the homage of Archbishop Stigand and the principal nobles before marching to London. About a year after (A.D. 1067) Robert D'Oyley, a Norman baron, who had married Wigod's only daughter, built a strong castle at Wallingford, but whether on the site of Wigod's castle or not is not clear. In the civil war of Stephen this castle was held for the Empress Maud by Brien Fitzcount, to whom it then belonged. Stephen besieged it without success several times, and here the Empress found refuge after her escape from Oxford. In 1153, Henry, son of Maud, besieged a fort which Stephen had erected at Crowmarsh, on the opposite side of the Thames; and Stephen coming to its relief, a peace was concluded between the rival parties, which gave some rest to the long distracted kingdom. During the imprisonment of Richard I. Wallingford Castle was occupied by his brother John, but was taken from him by the king's party. In the troubles of John's reign one or two meetings of the king and barons were held at Wallingford; and in those of Henry III. (A.D. 1264) Prince Edward, the king's son (afterwards Edward I.), Prince Henry his nephew, and Richard, King of the Romans, his brother, were confined for a time in the castle. The castle was twice besieged in the troubles of the reign of Edward II. In Leland's time it had gone a good deal to decay: both he and Camden describe it as having a double wall, and Camden speaks of the 'citadel,' or keep, as standing on a high mound. In the civil war of Charles I. it was repaired and garrisoned for the king, and was regarded as a post of importance: it was not besieged till near the close of the war, when it surrendered to Fairfax, and was afterwards demolished so effectually, that, except part of the wall toward the river, scarcely any part of the buildings remains: the mound on which the keep stood is overgrown with trees.

Within the castle was a college, consisting of a dean and prebendaries. The buildings of this college, comprehending the chapel, and the dean's, priests', and clerks' lodgings, were purchased by the dean and canons of Christ Church College, at Oxford, and used by them as a place of retreat 'in times of sickness and visitation.' The clerks' lodging and the priests' lodging still remain, and are occupied as private dwellings. The dean's lodging and chapel have been demolished.

There was a Benedictine priory at Wallingford, founded in the reign of William the Conqueror, and suppressed among the smaller monasteries in 1535. There was a mint in the town in the reign of Henry III.

The borough of Wallingford comprehends the four following parishes:—

	Area in acres.	Houses.					
		Inhab.	Uninhab.	Build.	Total.	Families.	Population.
Allhallows	370	23	0	0	23	23	130
St. Leonard		158	8	2	168	214	824
St. Mary-le-More		201	6	0	207	209	1127
St. Peter		89	6	0	95	91	463
Wallingford Castle precinct, extra parochial		5	0	0	5	5	19
		476	20	2	498	542	2563

The returns are from the census of 1831: about one-seventh of the population was agricultural, and only four men were employed in manufactures. The population of the borough in 1821 was 2093, so that the increase in ten years was 470, or nearly 24 per cent., a considerable rate of increase for a town in a purely agricultural district. The precinct of the castle is incorrectly given in the census as within the borough. The population of Crowmarsh Street, which is on the opposite side of the Thames, in the parishes of Crowmarsh and Newnham Murren in Oxfordshire, and which may be regarded as a suburb of Wallingford, was, in 1831, about 300 (occupying sixty houses); and the hamlet of Winterbrook, which is in the parish of Cholsey in Berkshire, south of the town, and which may be regarded as another suburb, was about 100 (occupying nineteen houses), thus raising the population of the town and suburbs to about 3000.

The town stands in the eastern part of the area included in the boundaries of the borough, on the right bank of the Thames, over which is a stone bridge. The bridge was erected in the room of a very old bridge of nineteen arches, taken down in 1809, and connects the town with Crowmarsh Street. Wallingford consists of several streets, and has a remarkably neat and respectable appearance. The principal streets are paved, and were at the time of the Parliamentary Boundary Commissioners' Report lighted with portable gas, supplied from London. Some of the houses are of superior character. It has been asserted that Wallingford once contained fourteen churches; ten have been clearly made out, if not eleven: at present there are three, St. Mary's, St. Leonard's, and St. Peter's. All-Saints or All-Hallows was pulled down in 1643, having been disused for half a century: the rectory is now a sinecure. St. Mary's is the principal church. St. Leonard's was rebuilt in great degree after the siege in 1646, in which it had sustained great injury: it retains some portions of Norman architecture. St. Peter's was also ruined in the siege, and remained in ruins more than a century: it has a spire of very singular form, erected at the expense of Sir William Blackstone, the author of the 'Commentaries,' when the church was restored from its ruined condition. Sir W. Blackstone is buried in the church. There are meeting-houses for Independents, Baptists, Methodists, and Quakers. The chief trade of the place is in corn, flour, malt, and coal; malting is not so extensively carried on as formerly.

Wallingford is a borough by prescription, and has sent representatives to parliament since the time of Edward I.; they were returned by the inhabitants paying scot and lot. The number of members was reduced by the Reform Act from two to one. The boundaries of the borough were enlarged by the Boundary Act, by the addition of the parishes of Brightwell, Sotwell, North Moreton, South Moreton, Bensington, Crowmarsh, and Newnham Murren; the liberty of Clapcot, and the extra-parochial precinct of the Castle; and part of the parishes of Cholsey, Aston-Tirrel, and Aston-Upthorpe. By these additions the number of houses and the population of the borough were nearly doubled. The number of voters in 1835-6 was 354; in 1839-40, 368. By the Municipal Reform Act the borough has 4 aldermen and 12 councillors, but no commission of the peace, except on petition and grant. The municipal boundary was not altered by that act; but a more extended boundary, comprehending the Castle precinct, Crowmarsh Street, and Winterbrook, has been recommended by the Municipal Boundary Commissioners.

The living of St. Leonard is a rectory, united with the rectory of St. Mary and the chapelry of Sotwell, of the joint clear yearly value of 290*l*., in the gift of the lord chancellor; that of St. Peter is a rectory, of the clear yearly value of 100*l*., with a glebe-house. All are in the rural deanery of Wallingford, in the archdeaconry of Berks, and in the diocese of Oxford.

There were in the borough, in 1833, thirteen day-schools (including boarding-schools), with 123 boys, 83 girls, and 155 children of sex not stated; giving 361 children, or about one in seven of the population, under daily instruction. There were three Sunday-schools, with 150 boys and 190 girls. (Lysons's *Magna Britannia*; *Beauties of England and Wales*; *Parliamentary Papers*.)

WALLIS. [VALAIS.]

WALLIS, JOHN, was the eldest son of the Rev. John Wallis, incumbent of Ashford in Kent, where he was born November 23, 1616. The life of this eminent mathematician is very fully given in the 'Biographia Britannica,' which is our sole authority for the facts now to be stated respecting him.

The father of Wallis died when he was six years old, leaving five children to the care of his widow. As he died wealthy, his eldest son was brought up with great care and intended for a learned profession. In that day mathematical studies were rarely preparatory to the higher kind of pursuits; in the case of Wallis, even common arithmetic seems to have been neglected. He was fifteen years old when his curiosity was excited by seeing a book of arithmetic in the hands of his younger brother, who was preparing for trade. On his showing some curiosity to know what it meant, his brother went through the rules with him, and in a fortnight he had mastered the whole. At the age of sixteen, which was rather late at that time, he was entered at Emmanuel College in Cambridge, where he soon obtained reputation. Among his other studies, anatomy found a place; and he is said to have been the first student who maintained, in a public disputation, the doctrine of the circulation of the blood, which had been promulgated by Harvey four or five years before. There were no mathematical studies at that time in Cambridge, and none to give even so much as advice what books to read: the best mathematicians were in London, and the science was esteemed no better than mechanical. This account is confirmed by his contemporary HORROCKS, who was also of Emmanuel, and whose works Wallis afterwards edited. After taking the degree of master of arts, the county of Kent not being vacant in his own college, he was chosen fellow of Queen's, and took orders, in 1640. He was then chaplain in one and another private family, residing partly in London, till the breaking out of the civil war, in which he took the side of the Parliament. He made himself useful to his party by deciphering intercepted letters, an art in which he was eminent. Vieta, as we have seen, had deciphered, and Baptista Porta had written something on the subject, but only with reference to simple ciphers. In 1643, the sequestered living of St. Gabriel, Fenchurch Street, was given to him; and in the same year he published 'Truth Tried, or Animadversions on the Lord Brooke's Treatise on the Nature of Truth.' In this year also he came into a handsome fortune by the death of his mother. In 1644 he was appointed one of the secretaries of the Assembly of Divines at Westminster. He has given a succinct account of the proceedings of this body. (See the *Biographia Britannica*.) In this year also he married. In 1645 he was among the first who joined those meetings which afterwards gave rise to the Royal Society: but we do not hear of any particular attention to mathematics on his part till 1647, when he met with Oughtred's 'Clavis,' at which time he says he was a very young algebraist, being then more than thirty years old. He and James Bernoulli are alike in this, and differ from most others of the same celebrity, that they showed no strong tendency to mathematical pursuits at a very early age. When the Independents began to prevail, Wallis joined with others of the clergy in opposing them; and in 1648 subscribed a remonstrance against the execution of Charles I. He was then rector of St. Martin's Church in Ironmonger Lane, but in 1649 he was appointed Savilian professor of geometry at Oxford by the Parliamentary visitors, his predecessor, Dr. Turner, having been ejected. He now removed to Oxford, and applied himself diligently to mathematics. In 1650 appeared his Animadversions on the celebrated Richard Baxter's 'Aphorisms of Justification and the Covenant,' a moderate piece of theological controversy, undertaken, Wood supposes, at the desire of Baxter himself. At the end of 1650 he first met with the method of indivisibles in the writings of Torricelli, and from this time the researches begin, of which we shall presently have to speak. In 1653 he published, in Latin, an English grammar for the use of foreigners, with a treatise on the formation of articulate sounds prefixed. In the same year he deposited in the Bodleian Library a collection of deciphered letters, which afterwards caused some controversy. In 1654 he took the degree of doctor of divinity, and in the following year he published his 'Arithmetica Infinitorum,' with a treatise on Conic Sections prefixed. In 1655 he began his controversy with Hobbes, who, in his 'Elementorum Philosophiæ Sectio Prima,' had given a quadrature of the circle. Wallis answered this in a tract entitled 'Elenchus Geometriæ Hobbianæ.' Hobbes replied in 'Six Lessons to the Professor of Mathematics at Oxford:' on which Wallis published 'Due Correction for Mr. Hobbes, or School Discipline for not saying his Lesson right,' Oxford, 1656. Hobbes defended himself in Στιγμας, or 'The Marks of the absurd Geometry, &c. of Dr. Wallis,' London, 1657. Wallis answered in 'Hobbiani Puncti Dispunctio, in answer to Mr. Hobbes's Στιγμας,' Oxford, 1657. The controversy was renewed by Mr. Hobbes in 1661, in 'Examinatio et Emendatio Mathematicorum hodiernorum,' to which Wallis replied in 'Hobbius Heautontimoreumenos,' Oxford, 1663. Wallis, as may be supposed, had the right on his side; and we are disposed to regret that he did not allow his part of the controversy to appear in the collection of his works, though we cannot but respect the motive, namely, the desire not to attack an opponent after his death. In 1656 he published his treatise on the angle of contact, and a defence of it in 1685.

In 1657 Wallis published his 'Mathesis Universalis,' and in 1658 appeared, under the title of 'Commercium Epistolicum,' a correspondence arising out of a problem proposed to him by Fermat: also a sermon, 'Mens sobria serio commendata,' and a commentary on the Epistle to Titus. In 1658 the questions of Pascal on the cycloid appeared, which were answered by Wallis, and led to a controversy. About this time Wallis, who with others desired the restoration of the kingly power, employed his art of deciphering on the side of the Royalists; so that at the Restoration he was received with favour by Charles II., confirmed in his professorship and in the place of keeper of the archives at Oxford, and was made one of the royal chaplains. In 1661 he was one of the clergy appointed to review the Book of Common Prayer. He was of course one of the first members of the Royal Society, and from this to his death his life is little more than the list of his works. His tract on the Cuno-cuneus, or circular wedge, was published in 1663; his tract 'De Proportionibus,' and his treatise on the laws of collision, in the same year; his new hypothesis on the tides, 'De Æstu Maris,' in 1668; and the treatise on mechanics at different times, in 1669, 1670, and 1671. In 1673 he edited the works of Horrocks; the Arenarius and quadrature of Archimedes appeared in 1676; his edition of Ptolemy's Harmonics (to which other antient musicians were afterwards added) in 1680. His algebra appeared in English in 1685, and was translated into Latin with additions in the collection of his works: in the same year also, his treatise on Angular Sections and on the Cuno-cuneus. In 1685 he wrote theological pieces on Melchisedec, Job, and the titles of the Psalms. In 1687 appeared his celebrated work on logic. In 1688 he edited Aristarchus and fragments of Pappus. In 1691 he published his pieces on the Trinity, and on the baptism of infants; and, in 1692, his defence of the Christian sabbath against the Sabbatarians, or observers of Saturday. The collection of his works by the curators of the University press began to be made in 1692; the three volumes* bear the disordered dates of 1695, 1693, and 1699. In 1692 he was consulted upon the adoption of the Gregorian calendar, or new style, against which he gave a strong opinion, and the design was abandoned. In 1696, when the two first volumes of his works appeared, he was the remote occasion of beginning the controversy between the followers of Newton and Leibnitz. Some remarks were made on his assertions as to the origin of the differential calculus in the Leipsic Acts, which produced a correspondence, and this correspondence was published in the third volume. He died October 28, 1703, in his 88th year.

The character of Wallis as a man was attacked upon one occasion only, in which it was asserted that he had deciphered the king's letters after the battle of Naseby, to the great detriment of the royal cause and its followers. It was also said that the collection of deciphered letters which he gave to the University had some of its contents withdrawn by him when the Restoration was approaching. Wallis himself denied that he had deciphered† the king's letters on that occasion, though had he done so, it would, granting his adherence to the parliament to be justifiable, have been no more than his duty. A sort of repugnance exists to a decipherer, though common sense tells us that those who intercept and open an enemy's letter which, being written in common language, is in some sort confided to those into whose hands it may fall, are much more obnoxious to any charge than the decipherer of a letter which, being written in cipher, more resembles a defiance.

All that can be said against Wallis, if it amounts to anything, is just this, that when he desired the downfall of the kingly power, he used his talents against the king, and then, when, at another time and under very different circumstances, he wanted the restoration, he used his talents for it. And as to the charge of withdrawing the letters from the Bodleian, it ought to have been added, that when he presented them, it was with a written reservation to add or withdraw. The best testimony to the general character of Wallis is as follows:—He was exceedingly obnoxious to the high church party at Oxford, both from his low church principles and from his having been forced upon the University by external and democratic power. But all that his contemporary Wood, who will not admit him into the 'Athenæ Oxonienses' as an Oxford writer, can say or hint against him, amounts to as much as we have mentioned. And yet there was no want of disposition to disparage a Presbyterian in Wood, as witness the following liberal sentiment: 'The senior proctor, according to his usual perfidy (which he frequently used in his office, *for he was born and bred a Presbyterian*), did pronounce,' &c. &c. (*Ath. Oxon.*, ii. 1045).

Wallis, in his literary character, is to be considered as a theologian, a scholar, and a mathematician. As a divine, he would probably not have been remembered, but for his eminence in the other characters. His discourses on the Trinity are still quoted in the histories of opinions on that subject. At the time of South and Sherlock, much was written on the Athanasian Creed which was meant to be of an explanatory character: those who read South and Sherlock on the Trinity, may also read Wallis, who will be found inferior to neither; but many have considered him scarcely orthodox. If the character of Wallis has been elevated as a divine by his celebrity as a philosopher, his services as a scholar have for the same reason been, if not underrated, at least thrown into shade. He was the first editor of Ptolemy's Harmonics, of the commentary on it by Porphyrius, and of the later work of Briennius; as also of

Aristarchus of Samos. His editions contain collateral
formation of the most valuable character, tending to t
light upon his author, and exhibit an immense quanti
labour.

As a mathematician Wallis is the most immediate
decessor of Newton, both in the time at which he
and the subjects on which he worked. Those who in
to the opinion that scientific discoveries are not the
of the man, but of the man and the hour, that is, who
gard each particular conquest as the necessary co
quence of the actual state of things, and as certain to
from one quarter or another when the time arrives,
probably say that if Wallis had not lived, Newton w
but have filled his place, as far as the pure mathematic
concerned. By far the most important of his writing
the 'Arithmetica Infinitorum,' a slight account of w
we shall preface by some mention of the others.
'Mathesis Universalis' was intended for the beginner,
contains copious discussions on fundamental points o
gebra, arithmetic, and geometry, mixed with critical di
tations. The tract against Meibomius's dialogue on
fifth book of Euclid is wholly controversial. The tre
on the cycloid is that which was sent in answer to Pas
prize questions, revised. The work on mechanics is
largest and most elaborate which had then appe
though now principally remarkable from the use of
principle of virtual velocities. The voluminous tre
which it contains on the centre of gravity, though sho
in every page how near Wallis approached to the Diffe
tial Calculus, is not so interesting, even in that partic
as the *Arithmetica Infinitorum*. The treatise on alge
which first appeared in English in 1685, was reprinte
Latin (in the collected edition) in 1693, with additions
is the first work in which a copious history of the su
was mixed with its theory. The defect of this history
been adverted to in VIETA, p. 317; but when this is pa
over, it may safely be said that the algebra of Wallis is
of interest even at the present time, not only as an his
cal work, but as one of invention and originality.
tracts on the angle of contact, on the tides, on gravita
&c., are now completely gone by, and are only usefu
showing the state of various points of mathematics
physics.

The *Arithmetica Infinitorum* is preceded by a tre
on Conic Sections, in which the geometrical and alge
cal methods are both exemplified. At the comme
ment, though it is not immediately connected with an
plication to these curves, he opens with a declaratio
his adherence to the method of CAVALIERI, that of
visibles, but preferring the juster notion of compoun
an area out of an infinite number of infinitely small p
lelograms. At the beginning of the work Wallis ar
by this method at the areas of various simple curves
spirals. Those who understand how either the metho
Cavalieri is employed, or that of differentials, without
use of the organized methods, will easily see how clos
approach is made to the integral calculus, from one
stance:—In the latter science $\int x^2dx$, beginning at x
is $\frac{1}{3}x^3$: the corresponding theorem of Wallis is that
limit of $1^2+2^2+....+n^2$ divided by n^3 is the fracti
He then proceeds step by step until he is able to re
sent the whole or part of the area of any curve w
equation is $y=(a^2\pm x^2)^n$, n being integer: having p
ously found the area of any curve contained under $y=$
n being positive or negative, whole or fractional. An
is here to be remarked that, though he does not absolu
exhibit such symbols as x^{-2}, $x^{\frac{3}{2}}$, he makes use of fracti
and negative indices, applying the fractions and neg
quantities, though not explicitly writing them in
modern manner. This step was a most important on
it put under his control, in effect, all that the inte
calculus can do in the case of monomial terms and
combinations. Wallis was eminently distinguished by
power of comparison and generalization, and he ha
large portion of the faith in the results of algebra w
has led to its complete modern establishment, in w
hardly any of that sort of faith is wanted. And those
would smile at his idea of negative quantities which
greater than infinity, should remember what results
tience and inquiry have produced out of the equ
absurd notion of those same quantities being *less t*
nothing. It is not quite certain that the former phr

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* Each volume ought to have a portrait, those of the two first with a skull-cap, a broad band, and a meek face; that of the last with a flowing wig, and the look of a polemic: but both the puritanical and the high-church portraits have the coat of arms appended. The first volume has a double title page, one for the whole set (1699).

† It has been suggested that, as Charles's private cabinet was taken at Naseby, in all probability the key of the cipher was taken with the letters. But in our day it would be asked what it mattered whether the letters which Wallis deciphered were those of Charles, or of his generals and ministers.

ology will not yet take its place, under definitions, by the side of the latter.

This talent of generalization, in which Wallis was superior to any preceding mathematician, enabled him to avail himself of ideas which the ordinary processes of arithmetic and algebra had offered for centuries without results. Having, by his use of fractional indices, been able to supply every case of $\int x^m dx$, or an equivalent result, it struck him that $\int (a^2 - x^2)^n dx$, still using modern symbols, must be capable of a similar interpolation. The case of $n = \frac{1}{2}$ obviously gives the circle, and after making various attempts, he was enabled to present the well-known result, which is still remembered as a result; but the method which produced it is, though anything but forgotten, not always duly remembered as belonging to Wallis. This result is as follows, in modern terms:—π being the ratio of the circumference to the diameter, $\frac{1}{2}\pi$ lies between

$$\frac{2^2.4^2.6^2.\ \ldots\ (2n)^2}{1^2.3^2.5^2.\ \ldots\ (2n-1)^2}\cdot\frac{1}{2n+1} \text{ and}$$
$$\frac{2^2.4^2.6^2\ \ldots\ (2n)^2}{1^2.3^2.5^2\ \ldots\ (2n-1)^2}\cdot\frac{1}{2n+2},$$

whatever integer n may be. It is frequently expressed thus:—

$$\frac{\pi}{4} = \frac{2}{3}\times\frac{4}{3}\times\frac{4}{5}\times\frac{6}{5}\times\frac{6}{7}\times\frac{8}{7}\times \ldots \text{ ad infinitum.}$$

The works of Wallis contain many other results which must be considered as advanced specimens of the integral calculus in every thing but form; such as the rectification of the parabola, which he showed to depend upon the quadrature of the hyperbola. The BINOMIAL THEOREM was a corollary of the results of Wallis on the quadrature of curves, the sagacity of Newton supplying that general mode of expression which it is extraordinary that Wallis should have missed.

We have not spoken of the work on logic, which is not only of the highest excellence, but is perhaps, owing to the change of notation and methods in mathematics, the only work of Wallis on the elements of a subject which we could now recommend a student to read. In conclusion we may say of the subject of this article, that it rarely happens that there is so singular a union of originality and labour.

WALLIS, SAMUEL, the first navigator after Quiros (assuming that Quiros's Sagittaria is Tahiti) who discovered the island of Tahiti. The date of Wallis's birth and his parentage are unknown. In 1755 he was lieutenant of the Gibraltar, a twenty gun ship, from which he was promoted to be lieutenant of the Torbay seventy-four, Vice-Admiral Boscawen's flag-ship. On the 8th of April, 1757, he received his commission as captain of the Port Mahon, of twenty guns, and was sent to North America with Holburne, who commanded the expedition against Louisburg. In 1760 he was sent to Canada in command of the Prince of Orange, a reduced third-rate; and on his return was employed on the home station. There is no account of him from this time till his being appointed to the Dolphin in August, 1766. He was sent with the Dolphin (24 guns) and the Swallow (14 guns, Captain Carteret) to continue and extend the discoveries of Commodore Byron in the Pacific. They sailed on the 22nd of August, 1766, from Plymouth. The Dolphin and Swallow parted company on the 11th April, 1767, as they were clearing the western end of the Straits of Magalhaens; the Dolphin returned to the Downs on the 19th of May, 1768; the Swallow did not arrive at Spithead till the 20th of March, 1769. After parting company with his consort, Wallis discovered Easter Island on the 3rd of June, 1767; and on the 19th of June, Tahiti, which he called King George's Island, and Cook called Otaheite. He left the island on the 27th of July, reached Tinian on the 17th of September, Batavia on the 30th of November, the Cape of Good Hope on the 4th of February, 1768, and the Downs, as mentioned above, on the 19th of May. The only record preserved of Wallis's circumnavigation of the globe is that printed in Hawkesworth's 'Voyages to the Pacific.' It appears to be a literal transcript of the navigator's diary. It indicates a painstaking, sensible, and veracious man. He was the first to bring down the fabulous stature of the Patagonians to its real altitude. It was Wallis who recommended Tahiti as the station for observing the transit of Venus over the sun's disk in 1769.

After his arrival in England, Wallis remained without employment till 1771, when, on the equipping of a naval force in consequence of the rupture with Spain about the Falkland Islands, he was appointed to the Torbay seventy-four. He retired from active service in the following year, and never again commanded a ship, except for a short time in 1780. In that year he was appointed extra-commissioner of the navy, an office which he held till the peace, when it was for a time discontinued. It was revived in 1787, and Wallis was again nominated to fill it, which he did till his death, in 1795.

Wallis's domestic history is a blank. A Gilbert Wallis, who was appointed captain of the Port Mahon frigate, in 1738, died in 1740. The 'Gentleman's Magazine' for December, 1796, notices the marriage of the sole daughter and heiress of Samuel Wallis, late commissioner of His Majesty's Navy, to Samuel Stephens, barrister-at-law.

(Charnock, *Biographia Navalis*; Hawkesworth, *Voyages for making Discoveries in the Southern Hemisphere; Annual Register; Gentleman's Magazine:* Quiros, *Narratio de Terra Australi Incognita.*)

WALLIS ISLAND is a small island in the Pacific, the centre of which is traversed by 13° 18′ S. lat. and by 176° 20′ W. long. It received its name from Capt. Wallis, who discovered it in 1767. It extends from five to six miles from north to south, but it is not much more than half these dimensions in width. The interior of the island is rather high, but along the shore it is low and rocky. The island is surrounded by a reef, in which a break occurs on the west side, which is only sixty fathoms wide. In this break a vessel may anchor in eight fathoms water. The reefs are from two to three miles from the shore. The island is covered with trees to the water's edge, and many of them are of large size. In some parts there are plantations of cocoa-nuts. There are several rills of water in the island. The inhabitants go naked, except that they wrap a kind of mat round their middle. They are armed with maces or clubs; but Capt. Wallis, the only navigator who has visited this island, had no intercourse with the natives.

(Hawkesworth's *Account of the Voyages undertaken for making Discoveries in the Southern Hemisphere*, vol. i.)

WALMESLEY, CHARLES, an English mathematician and astronomer, was born in the year 1721: being a member of the Roman Catholic church, he became a monk of the Benedictine order in this country, and he took the degree of doctor in theology in the Sorbonne. In 1750 he was elected a Fellow of the Royal Society of London, and six years afterwards he was made a bishop, and apostolical vicar of the western district of England.

His principal work, which is an extension of the 'Harmonia Mensurarum' of Cotes, is entitled 'Analyse des Mesures des Rapports et des Angles, ou Réduction des Intégrales aux Logarithmes et aux Arcs de Cercle,' 4to., Paris, 1749; in the same year he published his 'Théorie du Mouvement des Apsides,' 8vo., and in 1758 the treatise 'De Inæqualitatibus Motuum Lunarium,' 4to., Florence.

Dr. Walmesley was one of the mathematicians employed in regulating the calendar in this country, preparatory to the change of the style, which took place in 1752, and he wrote several papers on astronomical subjects, which were published in the 'Philosophical Transactions.' As a theological writer he is known only by his commentaries on, and explanations of the Apocalypse, Ezekiel's vision, &c. He died at Bath, in the 76th year of his age.

WALNUT-TREE, the common name of the species of *Juglans*, a genus of plants belonging to the natural order Juglandaceæ. All the species are large trees. The flowers are unisexual, and those containing the stamens and pistils are found on the same tree. The staminiferous flowers are arranged in cylindrical drooping solitary catkins, which are developed from buds borne by shoots produced the year previous to that in which the catkin appears. The calyx is composed of 5 or 6 scales, which are attached to a bractea at a distance from its base and tip. The stamens are from 18 to 36 in number. The pistiliferous flowers are solitary, or only a few in a group, and are terminal on a shoot developed in the same year. The calyx is ovate, including the ovary, and adhering to it, except at the four-toothed tip. The petals are 4, small, and inserted into the free part of the calyx. The ovary has one cell, and one erect ovule. The stigmas are two or three, and fleshy, scaly with glands. The fruit a drupe. The covering of the nut is a fleshy husk of one piece, that bursts irregularly. The nut is woody, consisting of two valves. The seed single, erect, lobed, wrinkled. There are four species of Juglans, three of which are natives of North America and one of Asia. The genus Carya, to which the hickory-trees belong, was formerly included under Juglans, but was separated by Nuttall. The species of Juglans are much more rapid in their growth than those of Carya, and are furnished with only simple aments.

The Royal or Common Walnut-tree (*Juglans regia*) is the oldest and the best known of the species. Its leaves are furnished with from 5 to 9 oval, glabrous, obscurely serrated leaflets. The fruit is oval and seated on a short inflexible peduncle. The nut is rather oval, and uneven. It is a native of Persia, in the province of Ghilan on the Caspian Sea. It was also seen by Loureiro in the north of China; and Pallas, who saw it in Taurida and south of the Caucasus, supposed it indigenous there.

The walnut-tree was known to the Greeks under the name of Persicon, Basilicon, and Caryon. It is uncertain at what time it was first cultivated in Europe, but it was cultivated by the Romans before the death of the emperor Tiberius. Its wood was much valued by the Romans, and the nuts were also eaten. There is no history of the introduction of this tree into Great Britain, but it is now very commonly cultivated in this country, although it fails to propagate itself by its seeds. It is only however in the southern and middle parts of England that the walnut brings its fruit to perfection.

The walnut, when full-grown, is a large handsome tree with strong spreading branches. Its trunk is thick and massive, and covered with a deeply furrowed bark; the branches are of a grey colour, and smooth. The leaves, when bruised, give out a very peculiar aromatic odour, and in the heat of summer this scent is sometimes so powerful as to produce unpleasant effects on persons who approach these trees. The foliage is graceful and light, and of a bright yellowish green colour, which contrasts well with trees having foliage of a darker shade. Its leaves are almost the latest to appear, and the first to fall. It grows very rapidly and vigorously in the climate of London, and trees will attain a height of 20 feet in ten years. It sends down into the earth a large tap-root, with numerous branches, and, on account of the size and strength of the roots, there is no tree more able to resist the effects of wind, or better adapted for exposed situations. It is said that plants will not grow under its shade; this probably arises from the bitter properties of its leaves: when they are not allowed to accumulate, the shade of the walnut does not appear more injurious than that of other trees.

The uses of the walnut are very various. Before the introduction of mahogany and other woods, the wood of the walnut was held in higher estimation than that of any other European tree. It is on this account that it was so extensively cultivated in this country and on the Continent three or four centuries since. The timber of the walnut is light, a cubic foot weighing when green 58¼lbs., and when dried scarcely 47lbs. When the tree is young, the wood is white, and in this state very much subject to be worm-eaten; but as the tree grows older, the wood becomes more compact, and is of a brown colour, veined and shaded with brown and black. In France and Germany it is still much used by turners, cabinet-makers, joiners, coachmakers, and musical-instrument makers, who prefer the wood which has grown on poor hilly soils. The wood of the roots is the most beautifully veined. One of the most important uses of walnut-timber is the making of gun-stocks. For this purpose it is well adapted on account of its strong lateral adhesion, its lightness, and its not being liable to splitting or warping in the working. The demand for walnut-wood for this purpose was immense during the late war on the Continent, and it was stated in 1806 that France required 12,000 trees annually for the making of guns. The government of France still maintains large plantations of walnut-trees for supplying her army with gun-stocks. In England the walnut has seldom been used except for the higher priced fire-arms, but such was the demand for it for that purpose at the beginning of the present century, that single walnut-trees were sold for as much as 600*l*. This led to the importation of walnut-timber from the Black Sea, and also of the timber of the black walnut from America, so that the cultivation of the tree as timber is almost at an end in England.

The walnut is of more value at the present day on account of its fruit than of its timber. In almost every stage of its growth the fruit of the walnut is used for the table. When young, green, and tender, it is pickled and preserved with the husks on. About the end of June they may be preserved with or without their husks. 'The green and tender nuts,' says Gerard, 'boyled in sugar and eaten as suckade, are a most pleasant and delectable meat, comfort the stomach, and expell poyson.' When they are about half-ripe, a liqueur is distilled from them, which is considered to possess medicinal properties. In August, before they are quite ripe, the French eat them in what they call *en cerneaux*, scooping out the kernel with a knife, and eating it with vinegar, salt, pepper, and shallots. When the nuts are fully ripe, which is generally at the end of September or the beginning of October, the kernel, deprived of its investing skin, is eaten in great quantities. As long as the skin can be easily removed, they are a nutritious and healthy article of diet; but when they get dry, so that their skins stick to them, they become indigestible. In no part of England do they constitute an important article of diet, but in many parts of France, Spain, Germany, and Italy people live during the season of their ripening almost entirely on walnuts. A great number of the walnuts consumed in England are of foreign growth. In 1831 there were imported from France and Spain 23,578 bushels, which paid a duty of 2*s*. per bushel. On account of the large consumption of the fruit, both as an article of diet at home and for exportation, the walnut-tree is still largely cultivated in many parts of the Continent. The district of the Bergstrasse on the Rhine, between Heidelberg and Darmstadt, is almost entirely planted with walnut-trees. Evelyn states that such is the importance attached to the growth of this tree, that 'in several places between Hanau and Frankfort in Germany, no young farmer is permitted to marry a wife till he brings proof that he is a father of a stated number of walnut-trees; and the law is inviolably observed to this day for the extraordinary benefit which this tree affords the inhabitants.' The fruit of the walnut is commonly gathered by thrashing the tree with a long pole. By many this process is thought to be beneficial to the tree, and barren walnut-trees are often thrashed to make them bear. But although barren trees may be made to bear by reducing the excessive growth of their shoots by breaking them off, it is no proof that the same process is good for healthy bearing trees. The natural process of separating the fruit from the tree is undoubtedly the best, and gently shaking the branches till the fruit falls has been recommended by many walnut-growers as much preferable to thrashing. The nuts should be gathered at the time they easily fall out from the husk, and then exposed to dry for a day or two in the sun. The best mode of keeping the nuts fresh for eating is to bury them in dry soil or sand, so deep as not to be reached by frost or the heat of the sun, or by rain: or they may be placed in dry cellars and covered with straw. 'When the nut is to be preserved through the winter for the purpose of planting in the following spring, it should be laid in a rot heap as soon as gathered, with the husk on; and the heap should be turned over frequently in the course of the winter.' (Loudon.)

The albumen which constitutes the bulk of the seed of the walnut contains an oil, which is used in large quantities, especially on the Continent. It is obtained by reducing the seeds to a pulp by means of a stone wheel and basin, and then expressing the oil, first without heat, and then by the application of heat. The oil requires great care in keeping, as it becomes tainted by slight changes in the state of the atmosphere. That which is cold-drawn keeps best, and is alone used for the purposes of diet. It has however always the taste of the walnut, which is to some persons disagreeable. The oil obtained by heat is used by artists, and also for lamps. Artists use this oil in mixing white, or any delicate colour; and they prefer it on account of the rapidity with which it dries. In copper-plate printing also, in Paris, walnut-oil is considered indispensably necessary in order to obtain a fine impression, whether in black or in colours. For this purpose the oil is prepared in various ways, according to the several colours with which it is to be mixed. In all cases it is reduced in bulk by boiling or by setting fire to it, so as to reduce it to the required consistency. One bushel of nuts, it is said, will yield about seven pounds of this oil. The mass which is left after the oil is expressed is made into cakes, and used as food for swine, sheep, and poultry, and in some places it is made into candles, which give a tolerably good flame.

The husks and root of the walnut both yield a dye, which is much used by gypsies and theatrical performers for staining the skin brown. It is also used by cabinet-makers and joiners to stain white and yellow woods of a dark brown or black colour, like that of the walnut. In the preparation of the dye from the husks they should be allowed to rot, and then boiled in water, adding to the decoction fresh water, according to the colour required to be produced by the solution. The sap of the walnut-tree contains a large quantity of saccharine matter; and in some countries the trees are tapped for the purpose of obtaining the sap, which by evaporation is converted into sugar. It is also in many parts of Europe and Asia fermented and made into wine, and a spirit is also distilled from it. The leaves of the walnut, as well as other parts of the tree, contain a large proportion of alkali in them; and in some parts of France they are collected and burned for the sake of the potassa contained in the ashes.

The bark of the leaves, the husks, and the oil of the walnut have all been used in medicine, and had at one time a great reputation. All parts of the plant, excepting the albumen of the seed, possess a bitter principle, which acts as a tonic and an anthelmintic, and has been its great recommendation as a medicine. Cowley, in his 'Plants,' sums up the virtues of the walnut in the following lines:—

> 'On barren scalps she makes fresh honours grow.
> Her timber is for various uses good:
> The carver she supplies with useful wood.
> She makes the painter's fading colours last.
> A table she affords us, and repast,
> E'en while we feast, her oil our lamp supplies.
> The rankest poison by her virtues dies;
> The mad dog's foam and taint of raging skies.
> The Pontic king, who lived where poisons grew,
> Skilful in antidotes, her virtues knew.'

Anglers employ an infusion of the leaves or husks for pouring upon the earth, in order to procure worms, which it speedily brings to the surface.

There are several distinct varieties of the walnut cultivated. The *maxima* is known by the large size of its nuts, and is called the double large French. The nuts are twice the size of any other; but in drying, the kernels shrink to half their size, so that they ought to be eaten as soon as they are gathered. This is a fine handsome tree with large leaves, but its timber is not so durable as that of the common walnut. The thin-shelled or Titmouse Walnut (*J. r. tenera*) has very thin shells, so much so that birds of the Titmouse family pierce them with their bills and eat the kernel. The fruit of this variety is considered the best for eating, and it also yields the largest quantity of oil. The late-leaved Walnut (*J. r. serotina*) is a very desirable variety in districts where the frosts are severe in spring. Its leaves do not appear before the end of June, and it ripens its fruit as early as the other varieties. There is a variety known in Norfolk and Suffolk by the name of the Highflyer, which is said to yield the best nuts of any of the English varieties. Several other varieties are enumerated in continental lists; and in the Fruit Catalogue of the Horticultural Society for 1832, nine varieties were recorded as growing in the gardens of the Society.

The Black Walnut-tree (*Juglans nigra*) has leaves with from 13 to 17 leaflets, which are unequal at the base, serrated, and somewhat downy. The fruit is globose, roughish, with minute prominent points, situated upon a short inflexible peduncle. The nut is globose, somewhat compressed at the sides, ridged, and furrowed. This is a North American tree, and is found in all parts of the United States, as far as 40° 50′ N. lat. It is abundant in the forests about Philadelphia, and is met with from Goshen to the banks of the Mississippi, throughout an extent of 2000 miles. It is one of the first trees that was introduced from America to Europe, having been brought to England by the younger Tradescant in 1656. The black walnut is a rapid-growing tree, and attains a height of 50 or 60 feet in about 40 years. It bears fruit in this country, but it is very much inferior to that of the European walnut. The wood of this tree is used almost for the same purposes as that of the last. It is heavier, stronger, susceptible of a finer polish than the European species, and is not so liable to be attacked by worms.

The Grey Walnut or Butternut Tree (*Juglans cinerea*) has 15 to 17 leaflets, rounded at the base, serrate, and tomentose beneath. The petiole villous. The fruit oblong-ovate with a taper tip, downy, and covered with small transparent vesicles containing a viscid matter. The nut is oval with very prominent irregular ridges. This tree is from North America. It is found in Upper and Lower Canada and in the temperate regions of the United States. This tree attains in its native regions a height of about 50 or 60 feet. Although it was introduced into this country about the same time as the last species, there are very few large specimens in this country. The kernel of the nuts is thick and oily, and soon becomes rancid, and hence probably the names of butter-nut and oil-nut. The wood is used in the districts where it grows for the same purposes as the last. Its bark possesses considerable medicinal powers, and is used in the United States as a purgative and as an application in toothache. Its leaves also are so acrid, that they are employed, when powdered, as a substitute for cantharides.

All the species of Walnuts are best propagated by the nut, which, when the tree is intended for ornament or timber, should be sown in the place where it is wished it should remain, as the large tap-root of these trees is likely to be injured by removing them, although with great care they may be successfully transplanted. When trees are planted for the sake of their fruit, they are mostly increased by budding, grafting, and sometimes by layering. 'The most approved and successful mode of budding, and which is the one chiefly adopted on the Continent, is that called the *flute* method, in performing which an entire ring of bark, containing one or more buds, is exactly fitted to the upper extremity of the stock, which is also denuded of its bark; should the stock be larger than the ring containing the buds, the ring requires to be slit up, but if this exceeds the stock, then a small portion requires to be cut out so as to make it fit. Mr. Knight also invariably succeeded in budding the walnut by using the minute buds that are found at the base of the annual shoots of this tree, which, as he says, " are almost concealed in the bark, and which rarely, if ever, vegetate, but in the event of the destruction of the large prominent buds which occupy the middle and opposite ends of the annual wood."' (Selby.) These he inserted on yearly stocks which grew in pots, the vegetation of which had been retarded by exposing them during the spring and early part of the summer in a northern aspect, until the above-mentioned buds were formed on the current year's shoots of the trees intended to be propagated, when the pots containing the young plants were brought into a forcing-house and there budded. There is no tree that requires less pruning than the walnut, and where large branches are cut off, it is almost invariably followed by a decay of the tree at the spot where abscission was performed. The best soil for the walnut is a deep, stiffish, dry-bottomed loam. It will thrive however almost anywhere, provided the soil is free from stagnant moisture. The best fruit is obtained from trees growing on calcareous soils.

Previous to the time of the publication of Nuttall's 'Genera of North American Plants,' the various species of North American trees called hickory were regarded as species of the genus Juglans. These Nuttall referred to a new genus, Carya. [CARYA.] There is another species, formerly referred to Juglans, and called *J. fraxinifolia*, that Kunth has made into a genus called *Pterocarya*. It differs from Juglans in its fruit having two wings, and in the embryo not being accompanied by albumen. It is a native of moist woods at the foot of the Caucasus, and hence called *P. caucasica*. It is a small tree with an ample bushy head, attaining a height of 30 or 40 feet. Its leaves are alternate, very large, commonly having 19 leaflets, which are oblong, denticulate, with blunt teeth. Each of the leaflets has one of the sides shorter than the other. It has not been much planted in Great Britain, but it is well adapted for small gardens and arboretums as an example of the natural order Juglandaceæ.

(Loudon's *Arb. et Frut. Brit.*; Selby's *British Forest-Trees*; Burnett's *Outlines of Botany*; Michaux, *North Amer. Sylva*; *Encyclopædia of Gardening*.)

WALPOLE, SIR ROBERT, Earl of Orford, was the third son of Robert Walpole, Esq., M.P. for Castle Rising, by Mary his wife, only daughter and heiress of Sir Jeffery Burwell, and was born at Houghton, on the 26th of August, 1676. He was educated at a private school at Mas singham, and afterwards on the foundation at Eton, and at King's College, Cambridge; and although he was naturally averse to study, he applied himself with sufficient diligence to become a good classical scholar. On the death of his elder surviving brother, in 1698, he gave up his scholarship at King's College, and very shortly withdrew from the university, and resided with his father in the country. On the 30th of July, 1700, he married Catherine, daughter of Sir John Shorter, lord mayor of London; and on the 28th of November following his father died, and left him in possession of the family estate. He immediately entered parliament as member for Castle Rising; and at once engaged in business with much activity, and joined the Whigs in promoting the Protestant succession. Although his first attempt at oratory does not appear to have been very successful, he was not long in distinguishing himself as an able and practical debater and an acute politician. He attracted the attention of the great leaders of the Whig party; and in March, 1705, when their influence had risen in parliament and in the cabinet, he was appointed one of the council to Prince George of Denmark, then lord high admiral. In this capacity he showed so much prudence and firmness under peculiar difficulties, that he won the esteem and confidence of Godolphin and the Duke of Marlborough. Henceforward he assumed a high position in parliament; and in 1708, on his promotion to the office of secretary-at-war, the management of the House of Commons was entrusted to him by his party. In 1710 he was appointed one of the managers for the impeachment of Sacheverel. He had strongly opposed that proceeding in private; but when it had been determined upon, the duty of conducting it chiefly devolved upon him. He afterwards published a pamphlet, entitled 'Four Letters to a Friend in North Britain upon the publishing the Trial of Dr. Sacheverel,' in which he laboured to identify the party who supported Sacheverel with the Jacobites who were plotting to raise the Pretender to the throne. By the intrigues of Mrs. Masham and the Tories, and by disunion amongst themselves, the Whig administration was shortly broken up; when Harley thought so highly of Walpole's talents and influence, that he vainly endeavoured to persuade him to accept a place in the new administration, and declared him to be worth half his party. Party spirit was then most virulent, and in order to crush their opponents the Tory government under Harley and St. John charged the ex-ministers with extensive corruption and inaccuracy in the public accounts. The defence of his colleagues was ably conducted by Walpole; but he was punished for his zeal on their behalf, by a similar accusation directed against himself personally. On the 17th of January, 1712, a majority of the House resolved that while secretary-at-war he had been 'guilty of a high breach of trust and notorious corruption,' and that he should be committed to the Tower and expelled the House of Commons. He refused to make any acknowledgment or concession, and remained a prisoner in the Tower until the prorogation. Meanwhile his friends looked upon him as a martyr to their cause, and flocked to his apartments, which bore, it is said, the appearance of a crowded levée, rather than of a prison. He was re-elected for Lynn; but (in accordance with a doctrine afterwards declared illegal in the case of Wilkes) was declared incapable of sitting in that parliament. He did more for his vindication with his pen while in prison, than he could have done in the face of his enemies, who had already condemned him. A pamphlet published by him at that time was declared by his party to be a complete refutation of the charges affecting his character. Whether this be so or not, his expulsion was no obstacle to his future advancement, but rather increased his influence. At the dissolution, in August, 1713, he again entered parliament as member for Lynn, and took a distinguished part in all the debates and in the counsels and intrigues of his party.

On the accession of George I., Walpole, with his brother-in-law Viscount Townshend, had a principal share in the formation of the Whig administration. He was himself appointed paymaster-general of the forces and of Chelsea Hospital. The dissolution of 1715 having gained a large majority for the Whig ministry, they had an opportunity of avenging themselves for the persecution they had suffered from their predecessors in office. The intrigues of many of the leading Tories in favour of the Pretender during the last four years of the reign of Queen Anne, had been notorious; and apart from political expediency, it became the duty of the ministers of the first king of the House of Hanover to denounce, and, if possible, extinguish the faction that had nearly succeeded in altering the succession to the throne. Walpole drew up the report on which the impeachments and attainders that followed were founded, and took a leading part in all the prosecutions. The rebellion in favour of the Pretender soon afterwards broke out, in the midst of which Walpole was appointed first lord of the treasury and chancellor of the exchequer. The fatigue and anxiety of that alarming time brought on a severe illness. Before his recovery the memorable Septennial Bill, which had been prepared with his concurrence, was passed. It was perhaps scarcely justifiable on constitutional grounds to prolong the duration of a parliament that had only been chosen for a shorter term; but the extraordinary circumstances of the country, a threatened invasion, a strong party—possibly even a parliamentary majority—favourable to the claims of the Pretender, rendered a dissolution at that time highly dangerous to the public peace and to the safety of the crown. Disunion in the cabinet and the constant intrigues of the Hanoverian courtiers and the king's mistresses broke up this administration, which would otherwise have had a fair chance of stability; and in April, 1717, Walpole delivered up his seals to the king, in spite of his majesty's earnest solicitations that he would retain them in connection with a new ministry. Before his resignation Walpole had submitted to parliament a plan for reducing the interest of the national debt, and for establishing a sinking-fund. The resolutions had already been agreed to, but the bill for giving effect to them was left to his successors to carry through. (See 5 Geo. I., c. 3.) Walpole remained in opposition until 1720. Meanwhile he distinguished himself by the ability and practical knowledge with which he opposed the measures of government. He exposed the South Sea scheme for liquidating the national debt when first propounded by the government; and though parliament was deluded by its plausibility and magnificence, and scarcely listened with patience to his arguments, the country had soon reason to remember his remarkable prediction, that 'Such will be the delusive consequences, that the public will conceive it a dream.'

In June, 1720, he consented to take office, and was appointed paymaster-general of the forces, while Lord Townshend was made president of the council; but he did not cordially support the administration or engage much in business until the ruinous panic caused by the failure of the South Sea speculations had verified his prediction. He was then unanimously called upon to devise measures for the restoration of public credit. No minister was ever placed in a more difficult position. The terror and phrenzy of the public, the indignation of parliament, the helplessness of his colleagues, and the equivocal connection of some of them with the scheme, were obstacles to the proper consideration of so pressing a subject. It was indeed impossible to repair the mischief already done, or to indemnify parties for the losses they had sustained, but he succeeded in restoring public credit; and he undoubtedly showed both firmness and moderation in the punishment of those who had been guilty of participation in the frauds of the Company. Lord Sunderland had been accused of receiving fictitious stock, but by the exertions of Walpole he was acquitted. He was not however sufficiently cleared in public estimation to retain his office of first lord of the treasury, and on his resignation, in April, 1721, Walpole was appointed in his place, with an administration highly favourable to his interests.

Having settled for a time the financial affairs of the country, Walpole immediately turned his attention to commerce. He found heavy taxes and restrictions upon the imports and exports of many of the most important articles of commerce, and with a spirit far in advance of his age, he removed them. One hundred and six articles of British manufacture were allowed to be exported, and thirty-eight articles of raw materials to be imported, duty free. In June, 1723, the king created Walpole's son a peer, by the title of Baron Walpole of Walpole, in the county of Norfolk. Walpole had declined this honour himself, from the fear of losing his influence over the House of Commons if removed to the Upper House, but other marks of royal favour were not wanting. In 1724 he was created a Knight of the Bath, and in 1726 was installed a Knight of the Garter. But though strong in parliament, and standing well with the king, Walpole was continually in danger from the intrigues of the court. On the accession of George II., however, Walpole was so fortunate as to find a protector in Queen Caroline, whose influence over the king enabled her to maintain Walpole in office, although a change had been determined upon, and afterwards to support him against the persevering machinations of all parties.

To follow Sir Robert Walpole through the events of his long administration would require little less than a history of his times. There were no important debates in parliament, no deliberations in the cabinet, no negotiations with foreign states, in which he did not bear the most conspicuous part as the first statesman of his day. The most remarkable measure proposed by him, and that which is perhaps the most creditable to his talents as the minister of a commercial country, was his Excise scheme, brought forward by him in 1733. The object of this measure was to convert the Customs' duties payable upon certain articles of import immediately on their arrival in port, into Excise duties payable on taking them out of warehouses, for home consumption. He also proposed to confine the taxed commodities to a few articles of general consumption, and to exempt from taxation the principal necessaries of life and all the raw materials of manufacture. The plan itself and the arguments by which he supported it prove the soundness of his views of taxation and commerce; but unhappily the measure was artfully misrepresented as a scheme for a general Excise, and the country being misled by the able writers opposed to the minister, by the clamours of those interested in existing abuses, but more than all by the unpopular name of 'Excise,' were almost unanimous in its condemnation. Public feeling became at length so excited that a popular outbreak seemed to threaten any further progress with the bill; and Sir Robert was very reluctantly obliged to abandon it. He was fully persuaded of its great advantages to the country, but said, 'I will not be the minister to enforce taxes at the expense of blood.'

In 1737 the influence of Walpole was much shaken, first by the quarrel between the king and the Prince of Wales, and the avowed hostility of the latter to the king's government, and especially to Walpole, who had been chiefly consulted by the king; and, secondly, by the death of Queen Caroline. The high regard of the queen for Walpole was testified even on her death-bed. Turning to the minister, who with the king was standing by her bedside, she said to him, 'I hope you will never desert the king, but continue to serve him with your usual fidelity;' and pointing to the king, she added, 'I recommend his majesty to you.' Shortly afterwards the king showed Walpole an intercepted letter, in which it was affirmed that the minister had now lost his sole protector. 'It is false,' said he; 'you remember that on her death-bed the queen recommended *me* to *you*.'

Walpole was soon in the midst of great embarrassments. The king, the people, a strong minority in the Commons, a majority in the Lords, and a preponderance in the cabinet, were eager for war with Spain. Walpole endeavoured to avert it as a national calamity, but was overpowered by the union of so many parties in its favour. He then felt how much his popularity had suffered from his opposition to the war, and feared that any failures would be laid to his charge. He entreated the permission of the king to resign, but his majesty exclaimed, 'Will you desert me in my greatest difficulties?' and refused to accept his resignation. In the midst of the discussions upon the Spanish war, he had also been deserted by the Duke of Argyle, whose talents in debate and personal influence became a serious obstacle to his measures. Discord ensued in the cabinet, and the opposition in parliament became more strenuous than ever. In February, 1740, a motion was made, by Sandys, for an address to the crown for the removal of Sir Robert Walpole 'from his majesty's presence and counsels for ever.' No distinct charges were made against the minister to justify so strong an address; but every complaint against the measures of his government, foreign or domestic, during the last twenty years, was used as a reason for his dismissal. 'If it should be asked,' said Sandys, 'why I impute all these evils to one person, I reply, because one person grasped in his own hands every branch of government; that one person has attained the sole direction of affairs, monopolized all the favours of the crown, compassed the disposal of all places, pensions, titles, ribands, as well as all preferments civil, military, and ecclesiastical.' Walpole defended himself with becoming boldness and dignity, and referred with pride to the successes of his administration. The motion was negatived by a large majority, and a similar motion in the House of Lords met with the same fate. But, notwithstanding this triumph, his power was nearly exhausted. A dissolution immediately followed; his opponents were active at the elections, many of his friends kept back, he himself was indolently confident of success, and on the meeting of the new parliament he found himself in a bare majority. After several close divisions, he was, on the 2nd of February, 1742, left in a minority of sixteen, on the Chippenham election case. On the 9th he was created Earl of Orford by the king, and on the 11th he resigned. On taking leave of him the king burst into tears, expressed his regret for the loss of so faithful a counsellor, and his gratitude for his long services.

No sooner was a new administration formed under Pulteney (which, through the influence and address of Walpole, had been composed chiefly of Whigs), than an attack was made upon the ex-minister. On the 9th of March Lord Limerick moved in the House of Commons for a secret committee to inquire into the administration of Sir Robert Walpole during the last twenty years, but his motion was lost by a majority of two. Lord Limerick very soon made a second motion, but proposed to include only the last ten years in his inquiry. This motion was carried by a majority of seven, and a committee of secrecy was appointed. Of the twenty-one members of this committee, nominated by ballot, all except two had been Walpole's uniform opponents. The committee, failing to obtain the evidence of corruption which they had expected, endeavoured to pass a bill of indemnity to all persons who would make discoveries, but this invidious and unjust measure was rejected by the House of Lords. The committee nevertheless made a report, in which they charged Walpole—1, with having used undue influence at elections; 2, with grants of fraudulent contracts; and, 3, with peculation and profusion in the expenditure of the secret service money. These charges were but ill supported, and considering the clamours that had been raised against the minister, the decided enmity of the committee, and the ample means at their disposal, the report must be regarded, if not as a verdict of acquittal, at least as one of *not proven*. A motion for renewing the inquiry was repeated in the following session, but was defeated by a large majority. From this time Walpole took very little part in public affairs. He was frequently consulted by the king, and retained much political influence, but rarely spoke in the House of Lords, having observed to his brother that he had left his tongue with the Commons. After dreadful suffering from the stone, which he bore with admirable fortitude, he died on the 18th of March, 1745, in the sixty-ninth year of his age, and was buried in the parish church at Houghton.

The character of no public man has ever been more misrepresented than that of Walpole. He had the misfortune to be actively opposed by the first wits of his day. The brilliant talents of Bolingbroke, Chesterfield, Swift, and Pope filled the press with sarcasms, and misled the public by the most artful misconstruction of his acts. Even the stage was made subservient to opposition. In parliament he also had able opponents, men of greater talents and acquirements than himself, but not perhaps more able and ready in debate. Supported as they were by the literary talents of their friends, and having more plausible and popular topics to dilate upon, they succeeded in maintaining a perpetual outcry against the minister. How far he deserved it may in some measure be judged from the fact, that no points of his policy met with so much execration as his Excise scheme and his resistance to the Spanish war; both of which have since been applauded by posterity. As regards the corruption with which he was charged, Burke affirmed that he was less chargeable with it than any minister who ever served the crown for so great a length of time. At all events the Commons, being then comparatively unrestrained by popular election, were more open to corruption than at the present day, and the low morality of the times encouraged it. The extremely difficult circumstances in which Walpole was placed by the claims of the Pretender and the unpopularity of the House of Hanover, must also be pleaded in his justification. His zeal for the Protestant succession was certainly the main principle of his political life and administration. The same great authority who vindicated him from the charge of systematic corruption thus sums up his services:—'The prudence, steadiness, and vigilance of that man, joined to the greatest possible lenity in his character and his politics, preserved the crown to this royal family; and with it their laws and liberties to this country.' (Burke's *Appeal from the New to the Old Whigs*, p. 63.)

In private life he was distinguished by his hearty good nature and social dispositions. His conversation and manners were somewhat coarse and boisterous, but he had the happy art of making friends, and great powers of persuasion. For business of all kinds he had an extraordinary capacity, and the ease with which he executed it led Lord Hervey to say that 'he did everything with the same ease and tranquillity as if he was doing nothing.'

(Coxe's *Memoirs of Sir Robert Walpole*; Smollett's *History*; Tindal's *Continuation of Rapin*; *Historical Register*; *Political State of Great Britain*; Chandler's *Debates*; Horace Walpole's *Reminiscences*.)

WALPOLE, HORACE (Earl of Orford), an ingenious and accomplished writer of the last century, was the third and youngest son of Sir Robert Walpole, by Catherine Shorter, his first wife, and was born October 5th, 1717. When he had finished his education at Eton, and at King's College, Cambridge, he left England and travelled on the Continent for more than two years. For the greater part of this time he was accompanied by Gray, the poet, with whom he had formed a friendship at school; but a difference unfortunately arose between the two friends, and they parted at Reggio, in July, 1741, and returned to England by different routes. On his return home in September, 1741, Walpole took his seat in the House of Commons as member for Callington, for which place he had been elected during his absence. His father's administration was at that time in the midst of the difficulties which shortly afterwards caused its downfal, and he could not fail to be deeply interested in all that passed. He did not however take any prominent part in the debates. His first speech was delivered in March, 1742, on a motion for inquiring into the conduct of Sir Robert Walpole for the preceding ten years of his administration, and was favourably noticed by Mr. Pitt, afterwards Lord Chatham, and by Secker, at that time Bishop of Oxford. When the interest excited by his father's affairs had subsided, he was very rarely induced to address the House. He moved the address in 1751, and spoke in 1756 on the question of employing Swiss regiments in the colonies. In 1757 he exerted himself with much ardour in favour of the unfortunate Admiral Byng. These are the chief events of his public life, although he remained in parliament till 1768, a period of twenty-eight years. In 1744 he had exchanged his seat for Callington for Castle Rising; and from 1754 he represented King's Lynn, the borough which had returned his father for many years to parliament. Public life was not suited to Horace Walpole's pursuits and tastes, but he was always much interested in politics. His family connections had early identified him with the Whig party, but his speculations verged upon republicanism. To show his reverence for popular rights and his affected hatred of kings, he hung up in his bedroom an engraving of the death-warrant of Charles I., and wrote upon it, 'Magna Charta.' These abstract opinions however were not likely to lead him into any practical extravagance, for his habits and temper of mind were fastidiously aristocratic.

The principal amusement and business of Walpole for many years of his life were the building and decoration of his Gothic villa of Strawberry Hill, at Twickenham. It was originally a small cottage, which he purchased in 1747, but grew under his hands into a so-called mansion of considerable extent. It would be difficult to compliment his taste in architecture, but the Gothic style was not at that time in vogue, and many faults and absurdities which are now apparent at Strawberry Hill must be referred to the novelty of the attempt to apply to a modern domestic residence the characteristics of an antient style. He collected works of art and curiosities of every description to ornament his house and gratify his tastes—prints, pictures, miniatures, armour, books, and manuscripts. He was enabled to indulge in these expensive pursuits by the profits of three sinecure offices which his father had obtained for him, viz. usher of the exchequer, comptroller of the pipe, and clerk of the estreats.

To the tastes of a virtuoso he added those of a man of letters. His earliest compositions were in verse, and though many of them are sprightly and agreeable, they are not imaginative, and evince but little aptness for versification. In 1752 he published his 'Ædes Walpolianæ,' a work of little pretension, being in fact a catalogue of his father's pictures at the family-seat of Houghton Hall in Norfolk; but, like other literary works of the same author, it was consistent with his favourite pursuits and studies, while it ministered to his family pride. In 1761 he commenced the publication of 'Anecdotes of Painting in England,' which were not completed until 1771; and in 1763 he added a 'Catalogue of Engravers.' Both these works were founded upon materials supplied by Vertue, the celebrated engraver, which Walpole worked up into several entertaining volumes of anecdote and criticism upon the fine arts. In 1758 he published his 'Catalogue of Royal and Noble Authors.' In this work he contrived to enliven a long list of peculiarly dull writers with agreeable anecdotes, and a smart and happy style of writing, for which he is remarkable.

Walpole's celebrated novel, the 'Castle of Otranto,' appeared in 1764, as a translation, by William Marshall, from the Italian of Onuphrio Muralto, which the author intended as an anagram of his own name. This romance, being in a new style, excited various opinions at the time, but it was, on the whole, eminently popular and successful, and is still read with interest as one of our standard novels. In the opinion of Sir Walter Scott, 'The applause due to chastity of style, to a happy combination of supernatural agency with human interest, to a tone of feudal manners and language, sustained by characters strongly marked and well discriminated, and to unity of action, producing scenes alternately of interest and grandeur—the applause, in fine, which cannot be denied to him who can excite the passions of fear and pity, must be awarded to the author of the "Castle of Otranto."' Lord Byron goes even further in his praise, and calls the 'Castle of Otranto' the first romance in our language.

Four years later, another work of imagination was published. The tragedy of 'The Mysterious Mother' is founded upon a disgusting tale of incest 'more truly horrid even than that of Œdipus,' as Walpole himself describes it, and is worked up with great dramatic spirit. It is perhaps the work which indicates most strongly Walpole's powers of genius and imagination.

His next publication was the 'Historic Doubts on the Life and Reign of King Richard III.,' a remarkably ingenious and acute examination of the evidence upon which historians have founded their accounts of the principal events of that period. Besides these larger works, he was continually publishing minor compositions, such as various papers in the 'World' and other periodicals, his 'Essay on Modern Gardening,' the 'Hieroglyphic Tales,' and 'Reminiscences of the Courts of George I. and II.' He also prepared 'Memoirs' of the ten last years of the reign of George II., which were not published until after his death. These contain many curious events not recorded elsewhere, but little reliance can be placed upon them as an historical work, for the author's prejudices and political partialities are too open to entitle his evidence or judgment to much weight.

But the cleverest and certainly the most entertaining of all Walpole's writings are his letters, addressed to various friends, collected by himself, and published at different times since his death. Walter Scott calls him 'the best letter-writer in the English language,' and Byron speaks of his letters as 'incomparable.' Another writer remarks that 'his epistolary talents have shown our language to be capable of all the charms of the French of Madame de Sévigné.' No one indeed can fail to be entertained by the inexhaustible fund of anecdote, of gossip, of lively and fanciful conceits, of scandal, and of *bons-mots*, with which nearly every page is enriched. The style is gay and sprightly, and admirably suited for correspondence. Had his letters been the spontaneous communications of a friend unbending his mind in familiar intercourse with another, and writing without forethought or labour, they could only have been the work of a man of the highest talent; but a less exalted opinion is necessarily formed of the man, when we discover that the ease and freedom of style which we have been entrapped into admiring as natural, were the result of laborious care and study. He was always on the alert collecting anecdotes, and dressing up epigrams which he afterwards inserted in his letters as if they had occurred to him at the moment. Many of his letters were published in the 4to. edition of his works in 1798, and subsequently his letters to Mr. Montagu and Mr. Cole, to Lord Hertford and the Rev. Henry Zouch, and lastly to Sir Horace Mann, have appeared at different times. The last are the most valuable and complete collection for reasons stated by their editor, the late Lord Dover, in his preface to that correspondence. 'Sir Horace's constant absence from home, and the distance of his residence (at the court of Tuscany) from the British Islands, made every occurrence that happened acceptable to him as news. In consequence, his correspondent relates to him everything that takes place, both in the court and in society, whether the anecdotes are of a public or private nature, and hence the collection of letters to him becomes a most exact chronicle of the events of the day, and elucidates, very amusingly, both the manners of the time and the characters of the persons then alive.' The whole of the letters of Horace Walpole have since been collected, and were published, in 1840, in six volumes, octavo. This series comprises a period of more than sixty years, from 1735 to 1797.

Horace Walpole had not been contented with collecting rare and curious books and publishing his own works, but, still further to gratify his literary tastes, he established in 1757 a private printing-press at Strawberry Hill. Here he printed the Odes of Gray with Bentley's illustrations; his own 'Anecdotes of Painting;' a 'Description of Strawberry Hill;' a quarto edition of 'Lucan,' with the notes of Grotius and Bentley; a 'Life of Lord Herbert of Cherbury,' by himself; Hentzner's 'Travels;' and Lord Whitworth's 'Account of Russia.' He had also, so early as the year 1768, formed an intention of printing a quarto edition of his own works, which he soon afterwards commenced. But he never proceeded beyond the second volume, in consequence (as his editor, in 1798, says) of 'his frequent indispositions, and the unimportant light in which, notwithstanding the very flattering reception they had met with from the world, he always persisted in considering his own works.'

In 1791 he succeeded his nephew, George, third earl of Orford, in the title and estates of his family, and it is curious that, notwithstanding his high respect for rank and title, he was not gratified by this accession of dignity. He never even took his seat in the House of Lords, and rarely used the title when he could avoid it. Some of his letters after that period were signed by 'the uncle of the late Earl of Orford.' He lived for six years afterwards, in the full possession of all his faculties, though his limbs had been paralyzed by the frequent attacks of the gout, from which he had suffered. He died in the 80th year of his age, at his house in Berkeley Square, on the 2nd of March, 1797.

Horace Walpole cannot be regarded either as a wise or as a great man. Weakness, vanity, and inconsistency were prominent features of his mind, and his works do not prove it to have been susceptible of great elevation of thought or principle. He had a natural taste for small and trifling things, and an aversion to the more important business of life; but then it is true that he always professed to be a gentleman of ease and fashion, whose literary efforts were undertaken not for fame, but for recreation. He affected to disclaim the character of a man of letters, but was acutely sensitive to criticism, greedy of praise, and envious of the fame of others. He pretended to despise the court, yet all his thoughts were of kings, princes, and courtiers. He was a republican and an aristocrat. He worshipped rank, yet when it fell to his lot was reluctant to assume it. In private life he showed no remarkable virtues, nor is he chargeable with any serious faults.

(*Preface* to *Works*, 4to., 1792; Sir Walter Scott's *Lives of the Novelists*, vol. iii., p. 299; Lord Dover's *Life of Horace Walpole*, prefixed to the 'Letters to Sir Horace Mann;' *Edinburgh Review*, December, 1818, No. lxi.; *Quarterly Review*, No. xxxvii., April, 1818; *Edinburgh Review*, No. cxviii., July, 1833; *Works and Correspondence of Horace Walpole*.)

WALRUS. [SEALS, vol. xxi., p. 168.]

WALSALL, a parliamentary borough in the southern division of the hundred of Offlow, in the county of Stafford, 119 miles from the General Post-Office, London, by St. Albans, Dunstable, Towcester, Daventry, Coventry, and Birmingham (from which last place it is about 8 miles distant); or by Birmingham railway to Birmingham, and from thence by Grand Junction railway to Bescot Bridge, half a mile from Walsall, 124 miles, travelled in about 6 hours.

The manor of Walsall antiently belonged to the crown, and the corporation claims to be by prescription. The place is not mentioned in 'Domesday,' nor is any historical interest attached to it.

The borough and parish are co-extensive, and comprehend the two townships of the Borough and the Foreign:—

	Area in Acres.	Houses in 1831.				Pop. in 1831.	
		Inhab.	Uninhab.	Buildg.	Total.	Fam.	Persons.
Borough township	100	1269	87	5	1361	1306	6,401
Foreign township	7820	1616	100	12	1728	1654	8,665
	7920	2885	187	17	3089	2960	15,066

A portion of the Foreign township is separated from the rest of the parish, and is insulated by other parishes.

The population in 1821 was 11,914, so that there was an increase in ten years of 3152, or more than 25 per cent. Scarcely any part of the population of the parish is agricultural.

The town is in the southern part of the parish, in the Borough township, beyond the limits of which it extends in almost every direction: it consists of several streets irregularly laid out, paved, lighted with gas, and lined with an unusual proportion of good houses. The parish church of St. Matthew is in the centre and highest part of the town: it was taken down in the earlier part of the present century, and rebuilt, excepting the tower and the chancel, which were allowed to remain; the chancel has however undergone great alterations: the tower is of fine proportions, and is surmounted by a lofty spire, which, from its commanding situation, forms a conspicuous object. There are three other Episcopal churches or chapels in the parish: St. Paul's, a handsome building of Grecian architecture, in the town, erected by the trustees of the grammar-school; a chapel at Walsall Wood, in the detached part of the parish; and one at Bloxwich, a populous village above two miles north of the town. There are in the town several places of worship for Protestant dissenters, and two Catholic chapels, one of them a handsome Grecian edifice. There is a town-hall, an old respectable building, with the borough gaol, which is altogether insufficient, in the basement story. A handsome public library and news-room, with a Doric colonnade, has been erected, and there are commodious premises for the grammar-school.

Walsall is situated on the eastern border of the South Staffordshire coal-field, and of the Warwickshire and Staffordshire iron district, and partakes largely of that manufacture. In 1831, 1200 men, besides women and children, were employed in making guns, gas-tubes, chains, locks, keys, spades, shovels, hinges, screws, files, edge-tools, buckles, stirrup-irons, bridle-bits, and machinery. There are brass and iron foundries; and in the vicinity are coal-pits and freestone quarries. Considerable trade in malt is carried on; there are a weekly market (on Tuesday), and three yearly fairs. The manufacture of brass and iron goods is carried on in the outparts of the parish, and especially in the village of Bloxwich, as well as in the town. There is one banking establishment in the town.

Walsall appears to be a borough by prescription, but is of comparatively modern origin, and its franchises and immunities were originally of little importance. By the Reform Act it was empowered to return one member to parliament. The parliamentary borough does not include the detached portion of the municipal borough and parish. The number of voters in 1835-6 was 679; in 1839-40, 837; showing an increase in four years of 158. By the Municipal Reform Act the borough, retaining its original limits for municipal purposes, was divided into three wards, with six aldermen and eighteen councillors. It has a commission of the peace. There are quarter-sessions, petty sessions weekly, and a Court of Record for causes under 20*l*.

The living of Walsall is a vicarage, of the clear yearly value of 368*l*., with a glebe-house; the perpetual curacies of St. Paul and Bloxwich are of the clear yearly value of 50*l*. and 143*l*. respectively; Bloxwich has a glebe-house. The value of Walsall Wood is not given. All are in the rural deanery of Tamworth and Tutbury, the archdeaconry of Stafford, and the diocese of Lichfield and Coventry.

There were in the parish, in 1833, one infant-school with 35 boys and 35 girls; twenty-one other day-schools, with 705 boys and 488 girls: making a total of 1263 children, or about one in twelve of the population under daily instruction. One of the day-schools was an endowed grammar-school with 60 boys; another an endowed English school with 84 boys; two were national and blue-coat schools combined, with 194 boys and 139 girls; and eight others were partly supported by endowment or subscription, and one by a grant from the grammar-school. Four day-schools were also Sunday-schools, with 298 boys and 242 girls; besides which there were four other Sunday-schools, with 670 boys and 528 girls: making a total of 1738 children under instruction on Sunday. There are some almshouses and several charitable bequests for the poor of the town. Races are held about Michaelmas, and assemblies at the race time and other times. (Rickman's *Gothic Architecture; Parliamentary Papers.*)

WALSHAM, NORTH. [Norfolk.]

WALSINGHAM, NEW AND OLD. [Norfolk.]

WALSINGHAM, or WALSINGHAMUS, THOMAS, an English historian of the fifteenth century, was a native of Norfolk, and a monk of the Benedictine abbey of St. Albans. Bishop Nicolson conceives that he was 'very probably regius professor of history in that monastery about the year 1440.' He is the author of two historical works which have come down to us, the one entitled 'Historia Brevis, ab Edvardo primo ad Henricum quintum' (it extends in fact from A.D. 1273, the first year of Edward I., to 1422, the last year of Henry V.); the other, 'Ypodigma Neustriae, vel Normanniae, ab irruptione Normannorum usque ad annum 6 regni Henrici quinti' (A.D. 1418). Both these works were published together by Archbishop Parker, in folio, at London, in 1574. Both are also contained in Camden's 'Anglica, Normannica, Hibernica, Cambrica à Veteribus Scripta,' fol., Francof., 1603; the 'Historia Brevis,' from p. 57 to 408; the 'Ypodigma Neustriae,' from p. 409 to 592. Walsingham, in his 'Historia Brevis,' takes up the narrative from the point where Matthew Paris ends; 'and he might well,' Nicolson observes, 'seem to be Paris's continuator, were his language answerable to his matter.' But although his style is not to be commended, Walsingham has in both his works preserved many facts which are not elsewhere to be found. His account of the reign of Edward II., according to Nicolson, is wholly borrowed from Sir Thomas de la More, or Moor, a contemporary writer, who drew up a Life of Edward II. in French, of which there is also a Latin translation in Camden's 'Anglica,' &c., pp. 593-603.

WALSINGHAM, or WALSYNGHAM, SIR FRANCIS, an English statesman of distinguished ability, was descended from an antient family, and was born at Chiselhurst in Kent, it is commonly stated in the year 1536. The authority for this date we believe to be an account, transmitted by a correspondent to the publishers of a work called 'British Biography,' vol. iii., 8vo., London, 1767, of an original picture of Walsingham painted in 1578, making him then forty-two years of age. (See note to p. 295.) He was the third and youngest son of William Walsingham, Esq. of Scadbury, in the parish of Chiselhurst; and of Joice, daughter of Edmund Denny, Esq. of Cheshunt in Hertfordshire.

After studying at King's College, Cambridge, Walsingham went to travel on the Continent; and he remained abroad, making active use of his opportunities of examining the state of foreign countries and acquiring their languages, till after the accession of Elizabeth. On his return to England his accomplishments recommended him to the notice of Cecil, under whom he was soon introduced to high and confidential employment in the public service. His first important mission is generally assumed to have been to France in the earlier part of the reign of Charles IX., but nothing further is known of it than what is stated in his epitaph, that after reaching the age of manhood (matura jam aetate) he was Queen Elizabeth's orator, or representative, at the court of the king of France (apud Gallum), for several years, in a most turbulent time. But it does not appear why the words in the epitaph may not refer to what is generally called Walsingham's second French embassy, upon which we know that he was sent in August, 1570, and which detained him at Paris till April, 1573. On his return home he was appointed one of the principal secretaries of state and sworn of the Privy Council; and soon after he was knighted. In 1578 he was sent as ambassador to the Netherlands; in 1581 again to France; and in 1583 to Scotland. In October, 1586, having had all along the chief direction of the measures that were taken for the detection of Babington's conspiracy, he served as one of the commissioners at the trial of Mary Queen of Scots. Soon after this, according to his epitaph, he was made chancellor of the duchy of Lancaster; but he appears to have still occupied himself chiefly with the conduct of foreign affairs, and it must have been in 1587 that, if we are to believe a story which is commonly told, he managed to retard for a whole year the preparation of the Spanish Armada, by getting the bills upon which the money was to be raised protested at Genoa, through the agency of Sutton, the founder of the Charter House, having previously discovered the design of the King of Spain in fitting out that armament by having the letter of his majesty to the pope, in which the secret was intimated, stolen from the cabinet in which it was looked up, though the medium of a Venetian priest retained as his spy at Rome, who got a gentleman of the bedchamber to take the key out of his holiness's pocket while he was asleep. Such a proceeding, strange as it now sounds, was not at all foreign to the spirit or practice of the statesmanship of that age, and was quite after the manner of Walsingham, whose whole system was founded upon and maintained by bribery, espionage, and all the forms of deception. 'To him,' says his warm admirer and panegyrist, Lloyd, 'men's faces spake as much as their tongues, and their countenances were indexes of their hearts. He would so beset men with questions, and draw them on, that they discovered themselves whether they answered or were silent. He outdid the Jesuits in their own bow, and overreached them in their own equivocation and mental reservation; never settling a lie, but warily drawing out and discovering truth. So good was his intelligence, that he was confessor to most of the papists before their death, as they had been to their brethren before their treasons. He maintained fifty-three agents and eighteen spies in foreign courts; and, for two pistoles an order, had all the private papers in Europe. . . . . Few letters escaped his hands; and he could read their contents without touching the seals.'

For all this, Walsingham was the very reverse of a man of mere policy and expediency. His personal integrity and disinterestedness are unquestionable; his morality was strict, to the verge of asceticism; his religious zeal drew him all his life towards puritanism, and in his latter days lifted him alike above the enjoyments and the cares of this world. For some time before his death he seems to have retired from business, and to have spent his time, with little or no society, at his house at Barn-Elms. Here he died on the 6th of April, 1590. 'He was,' says Camden, 'a most steady assertor of the reformed religion, understood well the intrigues of government, and as well how to gain and improve the good affections of the people, so as to serve his own turn; insomuch that his quickness and dispatch of business made him be considered by the queen as a man that ever outdid himself; and the papists found him, to their great mortification, a person of that intelligence and penetration, and so dexterous at finding out their tricks and designs against religion, his prince, and country, that they complained of him as a very subtle and insidious man. Indeed, he watched the practices of these men with so great an expense, that he lessened his estate by that means, and brought himself so far in debt, that he was buried privately by night, in St. Paul's Church, without any manner of funeral solemnity.' Elizabeth, with all her professed appreciation of Walsingham's diligence and important services, seems to have kept him throughout his life on short allowance. Even of honours, if we except his knighthood and the offices to which he was appointed, he had none. Camden says he was a Knight of the Garter, and has been generally followed in that statement; but we believe it is unfounded.

Walsingham was married to a lady of the name of St.

Barbe, and by her he left one daughter, Frances, who became successively the wife of Sir Philip Sydney, of Robert Devereux, the unfortunate Earl of Essex, and of the distinguished soldier Richard Burgh, created by Charles II. Earl of St. Albans in the English peerage, but better known by his inherited Irish title of earl of Clanricarde. She died, after bringing her last husband a son, in 1602.

The history of Walsingham's French embassy of 1570-1573 is contained in Sir Dudley Digges's 'Complete Ambassador; or, Two Treatises of the intended Marriage of Queen Elizabeth, of glorious memory; comprised in letters of negotiation of Sir Francis Walsingham, her resident in France; together with the answers of the Lord Burleigh, &c.,' folio, Lon., 1655. There is a short paper by Walsingham, entitled 'Sir Francis Walsingham's Anatomising of Honesty, Ambition, and Fortitude,' in the 'Cottoni Posthuma; or, Divers and Choice Pieces of Sir Robert Cotton,' London, 4to., 1672. His authorship of the treatise entitled 'Arcana Aulica; or, Walsingham's Manual, or Prudential Maxims,' which has been several times printed, is doubtful.

WALTER, JOHANN GOTTLIEB, a celebrated anatomist, was born at Königsberg in 1739; the 'Biographie Universelle' says 1734. He early evinced a desire to study medicine, but his father was opposed to it, and on his death-bed made his son promise that he would devote himself to the study of jurisprudence. But so strong was his desire to pursue medical science, especially anatomy, that he broke his promise to his father, and commenced the study of medicine in his native city. He afterwards went to Frankfort-on-Oder, where he graduated in 1757. From this place he removed to Berlin for the purpose of studying under the celebrated Meckel, and such was the progress he made in anatomy, that in 1762 he was appointed second professor in the anatomical theatre of the Collegium Medico-chirurgicum of Berlin. On the death of Meckel, in 1774, he was appointed first professor of anatomy, and also professor of midwifery. He died on the 4th of January, 1818. During the whole of his life he was remarkable for the zeal and activity with which he pursued his favourite science of anatomy, and more especially that department which was connected with the branch of practical medicine which he taught. He collected a valuable museum of anatomical and pathological specimens, which was purchased by the king of Prussia for 100,000 dollars in the year 1804, and which still exists at Berlin under the name of Walter's Museum. This museum consisted of nearly 3000 specimens, the result of the dissection of upwards of 8000 dead bodies. He wrote several works on various departments of anatomy and midwifery. In addition to numerous essays and papers, he published the following works:—'A Treatise on the Bones of the Human Body' ('Abhandlung von troknen Knochen'), Berlin, 1762, 8vo.; 'Observationes Anatomicæ,' Berlin, 1775, fol.; A Manual of Myology' ('Myologisches Handbuch'), Berlin, 1777, 8vo.; On Diseases of the Abdomen and on Apoplexy ('Von den Krankheiten des Bauchfelles und der Schlagflusse'), Berlin, 1785, 8vo. Of these the anatomical works have gone through several editions, and his miscellaneous papers are valuable contributions to medical science.

(*Biographie Universelle*; *Neuestes Conversations-Lexicon*; in both of which a list of his numerous works and papers is given.)

WALTHAM ABBEY. [Essex.]

WALTHAM, BISHOP'S. [Bishop's Waltham.]

WALTHAM CROSS. [Hertfordshire.]

WALTHAMSTOW. [Essex.]

WALTHER, CHRISTIAN, was probably born in Hesse, in the beginning of the sixteenth-century. He studied divinity, took orders, and lived a considerable time in a convent in Germany, the name of which is unknown. He afterwards left his convent and adopted the Protestant religion. Having settled at Wittenberg, he became acquainted with several of the great Protestant divines of the sixteenth century, such as Flacius, Rorarius (Rörer), Aurifaber (Goldschmid), and Amsdorf, who esteemed him for his extensive learning. He also became acquainted with the celebrated printer Hans Lufft, in whose office he was employed as corrector of the press for thirty-four years. He was the sub-editor of the Wittenberg edition of the works of Luther, which edition was attacked by the divines assembled at Jena for the purpose of publishing another edition; they charged Walther with having purposely altered several passages so as to make them an instrument in the hands of the Calvinists for their attacks against Luther. The celebrated Amsdorf (the bishop) attacked Walther in a pamphlet entitled 'Dass die zu Wittenberg im andern Theil der Bücher Lutheri im Buch, dass diese Worte, Das ist mein Leib, noch feste stehen, mehr denn ein Blat und 4 gantze Paragraphos vorsetzlich ausgelassen haben.' He was likewise attacked by Flacius. Walther was not the man to pass over such an accusation in silence; he defended himself in a pamphlet, 'Bericht von denen Wittenbergischen Tomis der Bücher des ehrwürdigen Martin Luthers, wider Matthes Flacium Illyricum,' Wittenberg, 4to., 1558. Mayerus, in his work 'De Versione Bibliorum Lutheri' (c. 4. par. 53), says that the accusations directed against Walther were unfounded, though it appeared that the Wittenberg edition was sometimes incorrect, a reproach however to which the Jena edition was likewise liable. Another polemical pamphlet of Walther was, 1, 'Antwort auf die Flacianische Lügen und falschen Bericht wider die Haus-Postill Dr. Luthers.' He also wrote, 2, 'Bericht vom Unterschied der Biblien und anderer Bücher Lutheri;' 3, 'Register aller Bücher und Schrifften Lutheri, welche in die XI. Teutsche Theil und VII. Lateinische zu Wittenberg getruckt sind. Item, welche in dem 12ten Theil getruckt werden sollen, nach diesem Register verzeichnet,' Wittenberg, 1558, 4to. Walther died about 1572, but Zeltner says that the precise date of his death has never been ascertained.

(Zeltnerus, *Theatrum Virorum Eruditorum*, p. 542, &c.; *Correctorum in Typographis Eruditorum Centuria*, p. 542, &c.)

WALTHER, or GUALTE'RUS, RUDOLPH, was born at Zürich in 1519. After having studied Protestant divinity in several schools in Switzerland, he went to Marburg in Hesse, and made himself known as a learned divine and an able negotiator in those politico-theological transactions which, according to the circumstances, either troubled or quieted Germany during the sixteenth century. He accompanied the landgrave, Philip the Magnanimous, of Hesse to the diet of Regensburg in 1541, and, although he was rather young, the landgrave put him at the head of the Hessian divines who were present at the diet. At Regensburg, Walther made the acquaintance of Melanchthon, Bucer, Sturm, and other eminent theologians. He returned to Switzerland in the same year, 1541, and was appointed head master of the Schola Carolina at Zürich: in the following year, 1542, he was chosen minister at St. Peter in this town, where he died in 1586. The principal works of Walther are: 1, 'Apologia Zvinglii.' Walther became soon an adherent of Zwingli, and more than once attacked Luther. 2, 'Monomachia Davidis et Goliathi:' this is a poem written in Latin verse. 3, 'Homiliae in totum Novum Testamentum,' published by Josias Simler, the divine, Zürich, 1594, fol. He has also written, 4, 'Homiliae in Joannis Epistolas; in 12 Prophetas Minores; in Matthaeum; in Marcum; in Lucam; in Acta Apostolorum; in Epistolam ad Romanos; in Epistolam ad Corinthios; in Epistolam ad Galatas;' and a great number more. 5, 'Argumenta omnium tam Veteris quam Novi Testamenti Capitum:' the author has made these arguments the subject of an elegiac poem, written in Latin verse. 6, 'Nabales, Comoedia Sacra ex Samuele, I., c. 25;' and several other Latin poems, among which there is one on the learning of the German nobility. 7, 'Apologia ad Catholicam Ecclesiam pro Ulrico Zvinglio, ejusdemque Operum Editione;' 8, 'Translatio Mosis Pentateuchi, cum Argumentis, Dispositionibus, et Explicationibus;' 9, 'Ulrici Zvinglii Libri XXIV.:' this is a Latin translation of Zwingli's sermons and other writings. 10, 'Wahrhaftig Bekenntniss des Kirchendienstes zu Zürch mit gebührender Antwort auf Lutheri Verdammniss und Schelten,' in German and Latin. Walther's name is mentioned among the most eminent German divines of the sixteenth century. Some say that the Latin version of the Bible by Vatablus (François Watebled, or Gastebled, who died in Paris in 1547, and who translated some books of Aristotle) is made by Walther.

(Verheiden, *Praestantium aliquot Theologorum qui Romanum Antechristum praecipue oppugnarunt, Effigies, Elogia, Opera*, &c., p. 201, &c.; Jöcher, *Allgemeines Gelehrten-Lexicon*.)

WALTHER, BALTHASAR, Latinized *Waltherus* or

Gualterus, born at Allendorf, in Thuringia, studied divinity at Jena, and paid great attention to classical and oriental languages. He was appointed professor of Greek and Hebrew at Jena, and subsequently became superintendent of the Lutheran church in the duchy of Saxe-Gotha, and in the duchy of Brunswick-Wolfenbüttel. He died at Brunswick, on the fifteenth of November, 1640. He is the author of, 1, 'Diatriba elenctica de Constantini Magni Baptismo, Donatione, et Legatione ad Concilium Nicaenum, contra Baroninus;' 2, 'Problemata Hebraica, Chaldaica, Syriaca, Graeca;' 3, 'De Papae Primatu et Anti-Christo;' 4, 'Lutherus natus, denatus, à Papicolarum Calumniis vindicatus;' 5, 'Vierzig Fragen von der Seelen Urstand, Essenz, Wesen, Natur und Eigenschaft, wider Jacob Böhmen.' This work is a refutation of the doctrines of the celebrated theosophist Jacob Böhmen. The Life of Walther is not in Freherus, 'Theatrum Virorum eruditione clarorum,' as Jöcher pretends, in his *Allgemeines Gelehrten-Lexicon*.

(Comp. Zeumerus, *Vitae Professorum Jenensium*.)

WALTHER, MICHAEL, born in 1593, was the son of John Walther, a rich merchant and patrician at Nürnberg, who intended to bring his son up to his business, for which purpose he sent him to a rich merchant at Thas in Bohemia. Young Walther however disliked trade, and his father had him educated for a scholar. In 1610 Walther went to the university of Wittenberg, where he first studied medicine, but he afterwards pursued theological studies at Giessen, Altdorf, and Jena. In 1618, Elizabeth, duchess of Brunswick-Wolfenbüttel, appointed him her chaplain; and in 1622 her son, Duke Julius Frederic, gave him a chair of divinity in the university of Helmstädt. In 1626, Rudolph Christian, sovereign count of Ostfriesland, conferred upon him the dignity of general superintendent of the Lutheran church in his dominions. Several distinguished works on divinity which he published during the course of these years had made his name known in Germany, and the universities of Rostock and Wittenberg both offered him a chair of divinity, which however he declined. However, in 1642 he accepted an invitation of Frederic, Duke of Brunswick-Lüneburg, who appointed him general superintendent of the Lutheran church in his duchy. He died at Zelle, on the 9th of February, 1662. His principal works are:—1, 'Hamus et Laqueus Salomonis,' Emden, 1628, 4to.; 2, 'Officina Biblica,' Nürnberg, 1636, 4to.; 1668, 4to. This book shows the extensive learning of the author, and is of importance with regard to the Apocrypha; it also gives information on several writings attributed to the Apostles which are not contained in the New Testament. 3, 'Harmonia totius Sacrae Scripturae, sive Conciliatio Locorum Veteris et Novi Testamenti apparenter sibi contradicentium,' Nürnberg, 1637, 4to. This book ran through seven editions in the space of seventeen years. 4, 'Tractatus de Manna,' Leiden, 1633, 12mo.; 5, 'Exercitationes Biblicae,' Nürnberg, 1638, 4to.; 6, 'Quadragena Miscellanearum Theologicarum;' this book was the forerunner of—7, 'Centuria Miscellanearum Theologicarum,' Nürnberg, 1646, 4to., in which the author discusses one hundred difficult questions concerning divinity. Similar works are:—8, 'Libér singularis Quaesitorum et Responsorum Theologicorum, per epistolas;' 9, 'Spicilegium Controversiarum illustrium XXII. de Dei Nominibus;' 10, 'Postilla Mosaica, oder Erklärung etlicher Historien, Fürbilder, und Sprüche aus den Fünf Büchern Mosis;' 11, 'Postilla Evangelica,' &c.; 13, 'Der Güldene Schlüssel des Alten, und der süsse Kern des Neuen Testaments, das ist, Gründliche Erklärung der tiefsinnigen Epistel S. Pauli an die Hebraeer;' this book was much esteemed. The learning of Walther was unanimously acknowledged, but the length of his works and his want of taste in the arrangement of his materials were condemned. Walther had a son, called Michael Walther, like his father, who was born at Aurich in 1638, and who became professor of mathematics, and afterwards of divinity, in the university of Wittenberg, where he died in 1692. He published several good works both on mathematics and divinity. The principal are:—1, 'Disquisitio Mathematica de mutuis Siderum Radiationibus quas vulgo Aspectus vocant,' Wittenberg, 1660, 4to.; 2, 'De Harmonia Musica;' 3, 'De Novo Legislatore Christo contra Socinianos et Arminianos; several dissertations on comets, the golden number, the torrid zone, on geographical longitude, &c.

(Freherus, *Theatrum Virorum Eruditione Clarorum*, p. 629, &c.; Jöcher, *Allgemeines Gelehrten-Lexicon; The Catalogues of the Library of the British Museum*.)

WALTHER, GEORG CHRISTOPH, a German jurisconsult, was born in 1601, at Rothenburg, formerly an imperial town on the Tauber in Franconia. In 1620 he went to Strassburg, where he studied law, and in 1628 he took his degrees in law in the university of Altdorf. In 1631 the senate of his native town appointed him president of the chancery of justice, which office he held till his death, in 1656. As Walther was well acquainted with the public law of Germany, several princes and other members of the circle of Franconia employed him as their representative during the different diplomatical transactions which either preceded or followed the peace of Westphalia, in 1648. He wrote: 1, 'Methodus Jura Studendi;' 2, 'Liber de Statu, Juribus et Privilegiis Doctorum;' 3, 'De Metatis et Hospitationibus Militaribus;' 4, 'De Renunciatione Successionum vel Haereditatis;' 5, 'Harmonia Theologico-Juridico-Politico-Philosophica,' which was published after his death.

(Freherus, *Theatrum Virorum Eruditione Clarorum*, ii., p. 1144-5; Jöcher, *Allgemeines Gelehrten-Lexicon*.)

WALTHER, CHRISTIAN, a German divine of considerable merit, was born in 1655, at Norkitten, not far from Königsberg, where he began his academic studies, which he continued at Leipzig, and finished at Jena. He took his degree of M.A. at Jena, in 1677, and returned to his native country, where he held several ecclesiastical offices. In 1701 he was chosen member of the Academy of Science at Berlin, and in 1702 the faculty of Frankfort-on-the-Oder conferred upon him the title of D.D. In 1703 he was appointed ordinary professor of divinity in the university of Königsberg, and in the following year he was invested with the office of inspector of the synagogue of the Jews in that town. During some time he was Rector Magnificus of the university of Königsberg, where he died in 1717. His principal works are, 1, 'Tractatus de Cultu Divino sanctuarii Veteris Testamenti, quem stando fieri oportebat;' 2, 'De Duabus Tabulis Lapideis;' 3, 'De quatuor Poenarum generibus apud Hebraeos;' 4, 'Disputationes VIII. de Pluralitate personarum in Divinis, ex Genesi (i. 26);' 5, 'Disputationes III. de ingressu Sacerdotis summi solenni Expiationis die in Sanctum Sanctorum;' 6, 'Programmata V. de Semine Abrahae in quo benedicuntur Omnes Gentes.' Walther also published the beginning of the work of Moses Maimonides on Circumcision, with notes and a Latin translation.

(Jöcher, *Allgemeines Gelehrten-Lexicon*.)

WALTHER, HEINRICH A'NDREAS, born in 1696, at Königsberg in Hesse, became minister at Worms in 1729, and in 1733 he was appointed minister at St. Catherine at Frankfort-on-the-Main. In 1741 the rank of senior of the Protestant clergy at Frankfort was conferred upon him, and in the same year the faculty of Giessen created him doctor of theology. He died at Frankfort in 1748. His principal works are: 1, 'Disputatio ex Antiquitate Orientali de Zabiis;' 2, 'Dissertatio de Dominio Hominis in Bruta, ex officiis ejus in hujus Dominii exercitio observandis;' 3, 'Finsterniss bey dem vermeinten Lichte der Römisch-Catholischen Lehre, gegen ein von einem Jesuiten heraus gegebenes Büchlein, genannt Licht in der Finsterniss;' 4, 'Exegesis Epistolae Judae;' 5, 'Erste Gründe der Weisheit und Tugend.' This book has been imitated by several later writers, and has given birth to an excellent work for the use of children, entitled 'Lehren der Weisheit und Tugend;' 6, 'Erläuterter Katechismus.' He edited and accompanied with a preface the 'Frankfurter Catechismus.'

WALTHER, CHRISTOPH THEODOSIUS, was born at Schildberg, in Brandenburg, in 1699, and studied divinity at Halle. Frederic IV., king of Denmark, having applied to the faculty of Halle for the purpose of obtaining some young theologians who would go as missionaries to the Danish possessions in East India, Walther accepted the invitation. He went accordingly to Copenhagen in 1705, accompanied by Henry Plütschow and the celebrated Bartholomew Ziegenbalg. They arrived at Tranquebar on the 9th of July, 1706, and until then the Danes had not succeeded in propagating Christianity beyond the narrow limits of that colony. Walther, after having learned Portuguese, with Tamul and several other Indian dialects, visited the whole coast of Coromandel, and his pious zeal was rewarded with great success. He founded the missionary establishment of Majubaram. From 1735 his health suffered much in consequence of an endemic fever. He returned to Europe in 1740. Before he reached Denmark, he died at Dresden on the 27th of April, 1741. Walther published 'Nachrichten von dem Tranquebarischen Missions-Wesen,' 1726; 'The Way of Salvation,' in Tamul, Tranquebar, 1727, 12mo., 1731; this work is sometimes cited under the title of 'Refutation of Mohammedanism;' 'An Abridgment of Ecclesiastical History,' in Tamul, Tranquebar, 1735; 'Observationes Grammaticae quibus Linguae Tamulicae Idioma vulgare illustratur,' Tranquebar, 1739, 8vo.; 'Doctrina Temporum Indica ex Libris Indicis et Brahmarum cum Paralipomenis recentioribus,' in Bayer's 'Historia Regni Bactriani;' 'Ellipses Hebraicae, sive De Vocibus quae in Codici Hebraico per ellipsin supprimuntur,' published by Schöttgen, Dresden, 1740, 8vo. Walther contributed to the Portuguese translation of the Bible, which is used on the coast of Coromandel and in the Portuguese colonies.

(Niecampius, *Historia Missionis Evangelicae in India Orientali*; comp. Schöttgen, *Commentarii de Vita et Agone Christiani Theodosii Waltheri*, Halle, 1743.)

WALTHE'RIA, a genus of plants belonging to the natural order Sterculiaceæ. The name of this genus is intended to commemorate three individuals who have contributed to the advance of botanical science: A. F. Walther, formerly professor of medicine in the university of Leipzig, who published, in 1735, a work containing descriptions of the plants growing in his own garden; Thomas Walter, an English botanist and author of the 'Flora Caroliniana,' published in 1798; and Richard Walter, who accompanied Lord Anson in his voyage round the world in 1740 to 1744.

The genus is known by possessing a 5-cleft calyx, furnished with a lateral 1-3-leaved deciduous involucel; 5 petals; a single style with tuberculated or pencilled stigma; a 1-celled, 2-valved, 1-seeded capsule. The species are small shrubs, with small usually yellow-coloured flowers, disposed in axillary or terminal stalked heads, rarely in panicles, rising in clusters from the branches.

W. Americana has ovate-oblong leaves, plaited, serrated, and tomentose; the heads of the flowers axillary; the calyx very villous, and the petals rather pubescent. This plant is a shrub about 4 feet in height, with yellow flowers. It is a native of the Bahama Islands, of Surinam, and the Caribbee Islands.

W. Durandinha has a suffruticose ascending stem, with ovate or ovato-orbicular leaves, obtuse, and cordate at the base; the lower ones pilose, the upper ones tomentose and glaucous; the heads of the flowers terminal and axillary; the calyx pubescent; the petals bearded above the claw; the tube of the stamens entire. This plant is a native of Brazil on the banks of the river Uruguay, where it is called *Durandinha* or *Douradinha*. This plant, like the whole of the order to which it belongs, contains much mucilaginous matter, and is used in decoction in the Brazils, as a remedy in diseases of the chest, and also in some of the forms of venereal disease. It is also used as an external application to wounds.

There are several other species of Waltheria: they are most of them inhabitants of South America, and are generally inconspicuous shrubs. They are of easy cultivation, and will thrive in a loamy soil or a mixture of loam and peat, and may be readily propagated by cuttings.

WALTON, BRYAN. [POLYGLOTTS.]

WALTON, IZAAK, the 'Father of Angling,' was born at Stafford on the 9th of August, 1593. The register of baptisms and burials supplies the name of his father, one Jervis Walton, who appears to have been of the rank of a yeoman. Nothing more is known of this person, except that he died in the year 1596-7, leaving his son Izaak, it is supposed, an orphan.

From the time of Walton's birth up to the age of twenty, nothing is known of him. It is presumed that he was apprenticed to a relation of the same name who dwelt in Whitechapel, and is described as a sempster, or hosier, but the identity of trades seems to be the sole ground for this conjecture. He must however soon after the age of twenty have been engaged in business on his own account, for in 1624 Sir John Hawkins states, on the authority of a deed in his possession, that 'Walton dwelt on the north side of Fleet Street, in a house two doors west of Chancery Lane, and abutting on a messuage known by the sign of the "Harrow," and that his house was then in the joint occupation of himself and a hosier called John Mason.' About 1623 (a year before the date of this deed) Walton states that he first began 'a happy affinity' with the family of his first wife, Rachel Floud, a descendant of Archbishop Cranmer. He was married to this lady on the 27th of December, 1626.

It was doubtless owing to this marriage that Walton first became interested about Hooker, the author of the 'Laws of Ecclesiastical Polity,' George Cranmer, his wife's uncle, having been Hooker's pupil. Cranmer no doubt orally communicated the materials for the admirable Life of Hooker which Walton wrote during his residence with Dr. Morley in 1662: it was not however published until 1665.

We owe the Life of Dr. Donne to another local connection. Walton's house was situated in the parish of St. Dunstan in the West, of which Donne was vicar. A close intimacy ensued between them, and we find Walton attending, with other friends, on Donne's death-bed in 1631, and also that Walton wrote an elegy on his friend, which was printed at the end of Donne's poems published by his son in 1633. This elegy seems to be Walton's first avowed literary effort, and in it he speaks of Donne's 'powerful preaching' and calls himself his 'convert,' which gives a clue to the intimacy between Walton and Donne. Sir Henry Wotton requested Walton to collect materials for a Life of Donne, which Sir Henry himself had thought of writing, but his death in 1639 put an end to the design. Walton however, hearing that Dr. Donne's sermons were to be published without a prefatory life, determined on writing it himself, and in the introduction to the Life, published with the Sermons in 1640, he fully explains the reasons which induced him to become Donne's biographer.

Previous to this publication Walton had removed into Chancery Lane, a few doors from Fleet Street, where his wife gave birth to two sons, both of whom however died. In August, 1640, soon after the birth of an infant daughter, his wife also died. These heavy afflictions seem to have had a great effect upon Walton, for in 1644 he left Chancery Lane, and up to the year 1651 his residence is wholly uncertain; all his publications during this period were two commendatory copies of verses, and an address to Quarles's 'Eclogues.'

About 1647 he married Anne Ken, half-sister of the non-conformist bishop of that name. In 1648 he had a daughter born, and in 1650 a son, who died after a few months. Walton's fourth and surviving son, Isaac, was born in 1651. In this same year Walton published a collection of Sir Henry Wotton's letters, poems, &c., under the title of 'Reliquiæ Wottonianæ,' to which he prefixed the Life of Wotton.

Walton had by his marriage connections identified himself with the Royalist party, and the strongly expressed approval of Charles I. of the 'Life of Donne,' combined with other circumstances, rendered him very zealous in a difficult and dangerous service which distinguished this period of his life; the 'Lesser George' having been confided to his care after the battle of Worcester, by Charles II., for safe conveyance to London. Ashmole details this service in his 'History of the Order of the Garter,' and declares that Walton was 'well known, and as well beloved of all good men.'

In 1653 the work upon which his fame principally rests appeared—'The Complete Angler, or Contemplative Man's Recreation,' a work which, to use the words of Sir Harris Nicolas, 'whether considered as a treatise on the art of angling, or as a beautiful pastoral, abounding in exquisite descriptions of rural scenery, in sentiments of the purest morality, and in an unaffected love of the Creator and his works, has long been ranked among the most popular compositions in our language.'

In 1654 the second edition of the 'Reliquiæ' and in 1655 the second of the 'Angler' appeared. Between this period and 1658 all trace of Walton is lost. In 1658 Dr. Donne's Life was first published as a separate work. At the Restoration, two years afterwards, Walton testified hi joy by addressing an 'Humble Eclogue' on the subject t Alexander Brome, printed with that writer's poems, a published in 1661.

During the troubled times preceding the Restorati Walton had become intimate with Drs. Morley and S derson, who were now elevated to the respective se Worcester and Lincoln. Another friend of Walton's

King, was also reinstated in the see of Chichester. In 1662, having again become a widower, he left his residence, which appears to have been in Clerkenwell, and went to reside with Dr. Morley, who was just then made Bishop of Winchester. At this time also he took the lease of a house in Paternoster-row, called the Cross Keys, which was burned down in the great fire.

In 1670 the 'Life of George Herbert' was published, for the materials of which he was indebted to Dr. Henchman, Bishop of London. A collected edition of the 'Lives' also appeared at this time.

In 1673 Walton had the happiness of seeing his daughter Anne married to Dr. William Hawkins, a prebendary of Winchester Cathedral. Walton's son is supposed to have been educated by his maternal uncle, Thomas Ken, also a prebendary of the same cathedral, for in 1675 we find them travelling abroad together, a tour on the Continent forming a regular part of the education of those days. Young Walton was soon after admitted at Christ Church, Oxford.

In 1676 Charles Cotton, Walton's well-known coadjutor in the later editions of the 'Complete Angler' (Cotton contributing a treatise on fly-fishing to that work), and a poet of some merit, as his 'Remains' testify, comes into notice. He built the fishing-house on the banks of the Dove, near his own house, Beresford Hall, and there Walton's old age found the ease and retirement which he so well deserved. In the year 1678 his last literary efforts appeared; the Life of his friend Bishop Sanderson, and an introduction to a poem by John Chalkhill, entitled 'Thealma and Clearchus,' concerning which strange mistakes have been made. Many persons attributed it to Walton himself, but Sir Harris Nicolas has proved that the family of Walton's second wife intermarried with a family of this name, and through them the poem came into Walton's hands. An anonymous tract, printed in 1680, entitled 'Love and Truth,' is attributed to Walton, but upon slender authority.

Walton died at the house of his son-in-law, during a severe frost, on the 15th of December, 1683, and lies buried in Winchester Cathedral.

Walton's son became a canon of Salisbury Cathedral, and is said to have contributed largely to Walker's 'Sufferings of the Clergy,' and to have most hospitably received Bishop Ken when deprived of his bishopric. He died in 1720, and Anne Walton in 1715. There are no descendants of the name of Walton living. A good portrait of 'Old Izaak,' by Houseman, was bequeathed by a descendant to the National Gallery.

There are many editions of the 'Complete Angler,' from that of 1653 to that of 1833. This last is a splendid work in two quarto volumes, edited by Sir H. Nicolas, who has written the first good Life of Walton. There was also an edition of all Walton's works by Major, in 1823. Dr. Zouch wrote a poor Life of Walton, prefixed to an edition of his 'Lives.'

WALTON-ON-THAMES. [Surrey.]

WALTZ (from *Walzen*, Germ. *to roll*), a gay dance, in triple time, and executed by two persons, who, almost embracing, rapidly turn round on an axis of their own, while moving quickly in a circle whose radius is from ten to twelve feet, according to the dimensions of the room.

Dr. Burney with much *naïveté* says, 'Having seen the *Waltz* performed by a select party of foreigners, we could not help reflecting how uneasy an English mother would be to see her daughter so familiarly treated; and still more to witness the obliging manner in which the freedom is returned by the females.' It is hardly necessary to add that the remark was made before the waltz had been introduced into the British Isles.

WALWORTH, WILLIAM. [Richard II.]

WANDEROO. [Macacus.]

WANDSWORTH. [Surrey.]

WANGA'RA is a country in Northern Africa, unknown to the antients and also to modern travellers, but mentioned by the Arabian geographers Edrisi, Abulfeda, and Leo Africanus. These authors agree in stating that in Wangara the Niger terminates, and Leo Africanus adds that it terminates in the sea. According to our present knowledge we must suppose that Wangara is the delta of the Quorra, and this supposition is supported by the description which is given of the country. The authors above mentioned describe it as an alluvial tract environed and intersected by the branches of the Niger, and annually overflowed in July, August, and September; they add that several fresh-water lakes are found in it. Leo Africanus says that the low tract is called Genni by the inhabitants, and that it is contiguous to Wangara, which thus would comprehend the mountainous tract about the confluence of the Quorra and the Tshadda. The name of Genni or Ginni appears even at present to be used in Northern Africa for the delta of the Quorra, and from this name seems to be derived that of Guinea, which Europeans have applied to that portion of the coast of Africa which extends from Cape Palmas to the Bight of Biafra. It may be observed that no passage can be pointed out in the Greek and Roman writers by which it can be shown that they thought that the Niger flows from east to west, but this fact is clearly and unanimously stated by the Arabian geographers. The antients had only a faint knowledge of the upper course of the Niger or of the Joliba, and they became acquainted with it by persons who had advanced into the interior of Africa from the shores of the Mediterranean. In its upper course the Niger runs from west to east, and so we find it stated by the Greek and Roman writers. The Arabs arrived in Sudan by the way of Nubia and Abyssinia, and as soon as they had advanced as far as 10° E. long. of Greenwich, they found that all the waters ran westward; and they must soon have been informed that they united in a large river, which farther down in Wangara reached the sea. They were therefore right in stating that the Niger runs westward. When, at a later period, they went so far to the north-west as to reach Timbuctú, they were either ignorant of the identity of the Joliba and the Quorra, or did not think it worth their while to indicate the great change which the river makes in the direction of its course below that town. The Europeans were well aware that the Arabian writers possessed a much more extensive and accurate knowledge of the interior of Africa than the Greek and Roman geographers. Their knowledge of that continent commenced from the shores of the Atlantic; and as they were not aware that the low country between the Bights of Benin and Biafra was the delta of a great river, they thought that the largest river which was found to enter the Atlantic must be the Niger of the Arabian geographers. Thus by a blunder of Europeans it became and continued the general opinion, that the Senegal was the Niger of the Arabians, until the discoveries made within the last fifty years removed this erroneous opinion, and ultimately settled the geography of Northern Africa.

WANLEY, REV. NATHANIEL, is the author or compiler of a work which first appeared in a folio volume in 1678, and has been often reprinted in various forms, entitled 'Wonders of the Little World.' The little world is the microcosm, man, and the work consists of a large collection of remarkable stories illustrative of human nature. They are selected however with no judgment; incredibilities and exploded fictions are as welcome to the omnivorous collector as the best established facts; and the book in truth is of little or no value. Wanley was born at Leicester in 1633, studied at Trinity College, Oxford, took his degree of B.A. in 1653, that of M.A. in 1657; seems then to have been appointed minister at Beeby in Leicestershire, which he was when he published at London, in 1658, a tract entitled 'Vox Dei, or the Great Duty of Self-Reflection upon a Man's own Ways;' afterwards became vicar of Trinity Church in Coventry; and died in 1680. He was the father of Humphrey Wanley.

WANLEY, HUMPHREY, was the son of the Rev. Nathaniel Wanley, and was born at Coventry, 21st March, 1672. He is said to have been first intended for a limner, and afterwards to have been put to some trade; but he had been early smitten with a taste for the study of old books and other antiquities; and besides, he had evidently a constitutional dislike or incapacity for any sort of regular occupation. Having however acquired a great skill in old handwriting (in the cultivation of which he may have been assisted by what he had learned of the art of limning), this accomplishment recommended him to the notice of Dr. William Lloyd, then Bishop of Lichfield and Coventry (afterwards of Worcester), and that prelate sent him to Edmund Hall, Oxford. Here he proved of great service to Dr. Mill, the principal, by the assistance he gave him in making his collation of the various readings of the Greek

New Testament (published in 1707). After this he was taken into the service of Dr. Charlett, master of University College, who kept him at his own lodgings, and seems to have employed him in transcribing, compiling, abridging, and other such work. Charlett also got him appointed one of the under-keepers of the Bodleian Library; and he took a principal part in drawing up the Indexes to the Catalogue of MSS., the Latin preface to which is of his composition. He then left Oxford, and removing to London, became secretary to the Society for Promoting Christian Knowledge. His next employment was as assistant to Dr. Hickes, the eminent Anglo-Saxon scholar, for whom he travelled over the kingdom in search of manuscripts in that language, and drew up in English the descriptive catalogue of those contained in the public and private libraries and other depositories visited by him, which, after it had been translated into Latin by another hand, was printed in Hickes's 'Thesaurus Linguarum Veterum Septentrionalium,' 3 tom., fol., Oxon., 1705, and forms the third volume of that great work. This is Wanley's principal performance; and it is admitted to be done, all circumstances considered, with diligence, care, and competent learning. His last employment was as librarian to Harley, Earl of Oxford, the founder of the famous Harleian collection of printed books and manuscripts, and to his son, the second earl, both of whom were highly satisfied with his services in that capacity. He compiled the Catalogue of the MSS., which was first printed in 1762, as far as to No. 2407. Among the Lansdowne MSS., in the British Museum, is a very curious Diary, kept by Wanley, from March, 1715, till within a fortnight of his death, mostly of proceedings connected with the Harleian library. Several extracts from it are printed in Nichols's 'Literary Anecdotes of the Eighteenth Century.' The only separate work published by Wanley is a translation (from the French) of Ostervald's 'Grounds and Principles of the Christian Religion,' which appeared at London in an 8vo. volume, in 1704.

Wanley was twice married; first to a widow with several children; the second time, only a fortnight before his death, to a very young woman. He was carried off by a dropsy, 6th July, 1726, when it was found that he had left all he had, which amounted to something considerable, to his widow.

There are many letters relating to Wanley, principally from his contemporary and fellow antiquary Hearne, in the 'Letters of eminent Persons of the Seventeenth and Eighteenth Centuries, from MSS. in the Bodleian,' published (by Dr. Bliss) in 3 vols. 8vo., in 1813. And there are several of Wanley's own letters in the volume lately printed for the Camden Society, entitled 'Original Letters of eminent Literary Men of the Sixteenth, Seventeenth, and Eighteenth Centuries, with Notes and Illustrations by Sir Henry Ellis, K.H., F.R.S., &c.,' 4to., 1843.

WANSDIKE. [SOMERSETSHIRE.]

WANSLEBEN, JOHANN MICHAEL, son of a Lutheran clergyman, was born at Erfurt in 1635.

After studying philosophy and theology at Königsberg, he was successively private tutor, soldier, and vagabond; at last he attached himself, for the purpose of studying the Ethiopic, to Ludolf, at whose request he undertook a journey to London. The object of this excursion was to superintend the printing of Ludolf's 'Lexicon Ethiopicum,' which was published at London in 1661. Wansleben was also employed, during his residence in England, by Edmund Castell, as an assistant in compiling his 'Lexicon Heptaglottum.'

Wansleben, on his return to Erfurt, was sent by Duke Ernst of Gotha, at Ludolf's suggestion, to examine into the condition of the Christians in Egypt and Abyssinia. He performed the Egyptian part of the undertaking, but returned to Europe without attempting to penetrate into Abyssinia.

He landed at Leghorn, in February, 1665, and proceeded to Rome, where he declared himself a convert to the Romish church, and soon after entered the Dominican order. In 1670 he visited Paris, and was sent to Egypt by Colbert, for the purpose of collecting information respecting the state of the country and purchasing manuscripts. He landed at Damietta in March, 1671, and left Cairo for Constantinople in September, 1673. He visited in succession the Coptic convents of the Delta, the Faïum, the deserts of St. Macarius and St. Anthony, in search of manuscripts, and ascended the Nile as far as Esneh. He made several excursions from Constantinople into Asia Minor, and was preparing to return to Egypt when he was recalled to France.

He reached Paris in April, 1676; but instead of obtaining the objects of his ambition, a bishopric or professorship of Oriental languages, he was called to account for the moneys entrusted to his disposal, and disgraced for misapplying them. After soliciting in vain a grant of public money to enable him to print the Ethiopic works he had collected, his necessities obliged him to accept, in 1678, the office of vicar in a village near Fontainebleau, where he died, on the 12th of June, 1679.

Ludolf, in the preface to his commentary on the 'History of Ethiopia,' speaks slightingly of Wansleben, but his opinion may have been biassed by the conduct of his former scholar; he must have entertained some respect for Wansleben's acquirements when he sent him to London to carry his Ethiopic Grammar and Lexicon through the press. The published works of Wansleben are:—1, 'Index Latinus in Jobi Ludolfi Lexicon Æthiopico-Latinum; Appendix Æthiopico-Latina, Liturgia S. Dioscori, Patriarchae Alexandrini, Æthiop. et Lat.,' Londini, 1661, 4to.; 2, 'Conspectus Operum Æthiopicorum quae ad excudendum parata habebat Wanslebius,' Paris, 1671, 4to.; 3, 'Relazione dello stato presente dell' Egitto,' Paris, 1671, 12mo.; 4, 'Nouvelle Relation, en forme de Journal, d'un Voyage fait en Egypte en 1672 et 1673,' Paris, 1677. This edition enters much more into detail than the Italian version; an English translation from the French was published at London in 1678. 5, 'Histoire de l'Eglise d'Alexandrie fondée par St. Marc, que nous appelons celle des Jacobites Coptes d'Egypte, écrite au Caire même en 1672 et 1673,' Paris, 1677, 12mo. This work professes to be a compilation from Coptic writers. Besides these a MS. account of Wansleben's first expedition to Egypt was transmitted to Gotha. Possibly the pamphlet published in London in 1679, entitled 'A brief account of the Rebellions and Bloodshed occasioned by the anti-Christian practices of the Jesuits and other Popish Emissaries in the Empire of Æthiopia: collected out of a MS. history written in Latin, by J. Michael Wansleben, a learned Papist,' may have been compiled from his narrative. A MS. entitled 'Diarium conscriptum à J. M. Wanslebio, Sommerdano Thuring. ab anno 1654,' is said to be preserved in the Ducal library at Weimar.

(*Biographie Universelle*; Jöcher's *Allgemeines Gelehrten-Lexicon*; Prefaces to Castell's *Lexicon Heptaglottum*, and Ludolf's second edition of his *Æthiopic Grammar and Lexicon*; *Nouvelle Relation d'un Voyage fait en Egypte*, Paris, 1698.)

WANSTEAD. [ESSEX.]

WANTAGE, a market-town in the hundred of Wantage in Berkshire, 63 miles from the General Post-office, London, by the coach-road through Maidenhead, Henley-on-Thames, and Wallingford.

Wantage was a place of some importance in the time of the Saxons, when it formed, with the neighbouring lands, part of the patrimony of the West Saxon kings, who had a residence here. It was the birthplace of King Alfred the Great.

The parish of Wantage has an area of 7530 acres, and comprehends the town of Wantage and the hamlets of Charlton and Grove. It contained, in 1831, 729 inhabited houses, 36 uninhabited, and 6 building; together 771 houses, with 748 families, and 3282 persons: rather less than a third of the population was agricultural. The town stands at the intersection of the London and Cheltenham road, with a cross-road from Oxford to Hungerford: the streets are irregularly built, and contain but few good houses. The parish church, dedicated to St. Peter and St. Paul, is an antient cross church, with a square embattled tower rising from the intersection: it contains some antient tombs and monumental brasses, partly of the Fitzwarren family. There is an antient building of Norman architecture, called by Leland a church, now or lately used as a school-house; and an antient market-cross, with the inscription, 'Pray for the good Earl of Bath, and the Master William Burnabe, the builder hereof, 1580, and for William Lord Fitzwarren.' The manufacture of sacking and twine is carried on: also some malting and trade in corn, flour, malt, and coal. A branch of the Wilts and Berks Canal comes up to the town. The market is on Saturday for pigs, cattle, and corn; there are a monthly cheese fair, and in the year two fairs for cattle and cheese, one for cherries, and a statute-fair. There are two banking-houses.

The living is a vicarage, of the clear yearly value of 503*l.*, with a glebe-house; in the rural deanery of Abingdon, in the archdeanery of Berks, and diocese of Oxford. The perpetual curacy of Grove in the parish, of the clear yearly value of 75*l.*, with a glebe-house, is in the gift of the vicar. There are places of worship for Independents, Baptists, and Wesleyan Methodists.

There were in the parish, in 1833, nine day-schools, with 231 children, namely, 106 boys, 56 girls, and 69 children of sex not stated; making about one in fourteen of the total population under daily instruction. One of the day-schools, with 44 boys, was partly supported by endowment. There was at the same time one Sunday-school with 80 boys and 90 girls. Bishop Butler, author of 'The Analogy of Religion,' and Isaac Kimber, a dissenting minister and an historical and biographical writer of some reputation, were natives of Wantage.

(Lysons's *Magna Britannia; Beauties of England and Wales; Parliamentary Papers.*)

WAPENTAKE (from the Saxon *waepen*, arms, and *tac*, touch, or *betach*, yield) is a term which prevails in Yorkshire, and indicates a territorial division like the hundred of other counties. [Shire.] The word is derived from the habit which our Saxon ancestors had of attending with their weapons the meetings of their tribes, whether convened for the administration of justice or to decide on peace or war. This circumstance, inseparable from the assembly, gave a name to the meeting and to the district whose inhabitants were convened. Various explanations, all however connected with this habit, are given to the last syllable. By some it is supposed to mean the *touch* or rustling of their arms, by which the assembly was wont to signify its opinion of the matters submitted to it; by others the *acceptance* by the lord of his tenants' arms in token of their submission to him. These are the two solutions quoted by Spelman. Others however say that the word denotes the custom which the vassals had of *touching* the spear of the lord as a mark of homage; and this seems to be the explanation most usually adopted. (Spelman, *Wapentachium et Wæpengetachium*; Cowell.)

WAPITI. [Deer, vol. viii., p. 359.]

WAPPING. [London.]

WARASDIN, one of the three counties (Warasdin, Kreuz, and Agram) into which the Austrian kingdom of Croatia is divided, is bounded on the west and north-west by Styria, on the north-east by Szalad (a county of Hungary), on the east by Kreuz, and on the south by Agram. Its area is 720 square miles, and the number of the inhabitants 136,000, who are Roman Catholic Croatians.

The face of the country is an undulating plain, traversed by a branch of the Styrian chain from west to east, which divides it into two nearly equal parts. The principal rivers are the Drave, which runs along the northern frontier, separating the country from Hungary; the Szutla, which separates Croatia from Styria; and the Krapena, which forms the frontier between the cantons of Warasdin and Agram. More than a third of the country is covered with forests. The plain near the Drave produces more than sufficient corn for the consumption of the inhabitants, but the mountainous and larger portion seldom yields enough. The natural productions are corn (especially maize), millet, tobacco, fruit of different kinds, especially plums, and timber. There is a very good breed of horned cattle, and great numbers of swine, fish, bees, and game. The minerals are, besides marbles of different kinds, a very thick stratum of native sulphur at Radoboi, and gold, which is obtained by washing from the sand of the Drave, to the value of 1200 to 1800 ducats annually. Blumenbach however says that the gold-washing in the Drave has ceased. The climate is pleasant and healthy.

Warasdin, the capital, or county town, is situated on the right bank of the Drave, over which there is a remarkable wooden bridge. It lies in 46° 18′ N. lat. and 16° 25′ E. long., in a plain which is enclosed on the east and west by mountains. It is a well-built but not very lively town, and contains several large and handsome edifices, among which are several fine churches, a Jewish synagogue, the county-hall, the senate-house, the residence of the bishop and chapter, and some convents. There are likewise a Roman Catholic gymnasium, a convent of Ursuline nuns, with a girls' school and hospital, and, within these few years, a philharmonic society. Good wine is produced in the environs. Some tobacco is manufactured in the town, and there are some vinegar-breweries. The suburbs are extensive, and contain some good buildings. Warasdin was formerly fortified, but the fortifications have fallen into decay.

(Blumenbach, *Neuestes Gemälde der Oesterreichischen Monarchie*; Jenny, *Handbuch*; Hassel, *Handbuch*; *Die Oesterreichische National Encyclopädie.*)

WARBECK, PERKIN. [Henry VII.]

WARBERG. [Sweden.] §

WARBLERS. [Sylviadæ.] The true Warblers were arranged by Linnæus under his genus *Motacilla*. They comprise the smaller singing birds.

Mr. Nuttall gives a concise but comprehensive general account of this interesting group.

The *bill*, he remarks, is slender, straight, awl-shaped, higher than it is wide at the base, and furnished with scattered bristles; the lower mandible straight. *Nostrils* basal, lateral, oval, half-closed by a membrane. *Tongue* lacerated at the tip. *Tarsus* longer than the middle toe; inner toe free; posterior nail shorter than the toe. *Wings* moderate or short; spurious feather generally short; first and second primaries, second and third, or third and fourth longest; scapulars considerably shorter than the quill feathers.

Female generally distinguished by a less vivid plumage.

Young usually assuming the adult plumage after the first moult. Some species moult twice in the year.

Mr. Nuttall further observes that species of this numerous race are spread over the whole globe. 'They are,' says he, 'generally small, sprightly, and endowed with an incessant activity, in accordance with the subtleness of their flying insect prey; they therefore approach both in habit and character the Flycatchers, Vireos, Thrushes, Saxicolas, and Wrens so nearly, that it is rendered at times doubtful to which of these several genera they ought to be referred. They principally inhabit forests or thickets, and some affect watery situations or reed-marshes. Many are remarkable for the melody of their song and the sprightliness of their airs, which in the period of incubation they almost incessantly pour forth. The Nightingale, so celebrated for his powerful, varied, and pathetic lay, as well as the humble but tuneful Robin Redbreast, belong to this highly vocal genus (*Sylvia*, Lath.); and though many species seek out the arctic solitudes in which to waste their melody or soothe alone their mates, yet other species may be numbered among the more familiar tenants of our gardens, groves, and orchards. Living almost exclusively on the winged insects of summer, which they dexterously catch in the air or pick from off the leaves, they migrate to the south in autumn, and pass their winter in the warm or tropical regions. Some exist more or less generally on berries in the latter end of the year, and consequently find means thus to winter in the milder climates which are exempt from severe extremes. Among many of the species the more active and vigorous male, intent on the object of his migration, precedes the arrival of the female.'

European Warblers.

The following are figured and described in Mr. Gould's 'Birds of Europe:'—

Wheatears.

Saxicola cachinnans. The Black Wheatear.

Geographical Distribution.—Southern Europe and Africa.

Saxicola leucomela. The Pied Wheatear.

Geographical Distribution.—North of Europe, and probably Northern Asia.

Saxicola œnanthe. The Wheatear.

Saxicola stapazina. The Russet Wheatear.

Geographical Distribution.—South of Italy, Dalmatia, and Grecian Archipelago; rare in the north of Italy, not recorded from the central European districts.

Saxicola aurita. Black-eared Wheatear.

Geographical Distribution.—Hilly districts of south of Europe; more common in the north of Italy than the *Russet Wheatear*. Frequent in the Neapolitan States and Sardinia.

Whinchats.

The WHINCHAT.

Stonechats.

Saxicola rubicola.

Description.—Old Male.—Summer Plumage.—Head, throat, back, and small coverts of the wings perfect black; but each feather very finely bordered with ruddy brown; a great white spot on the sides of the neck, on the upper part of the wings, and on the rump. Breast deep ruddy, lower parts very bright ruddy; wings brown bordered with brighter brown; base of all the tail-feathers white, the rest of a blackish brown. Length four inches four or five lines.

Male after the Autumnal Moult.—Wider ruddy borders at the end of the feathers on the throat; those of the nape and the back fringed with large borders of that colour; breast bright ruddy, the rest of the lower part of the body clear Isabella colour; wider borders on the quills, and the end of the tail ruddyish.

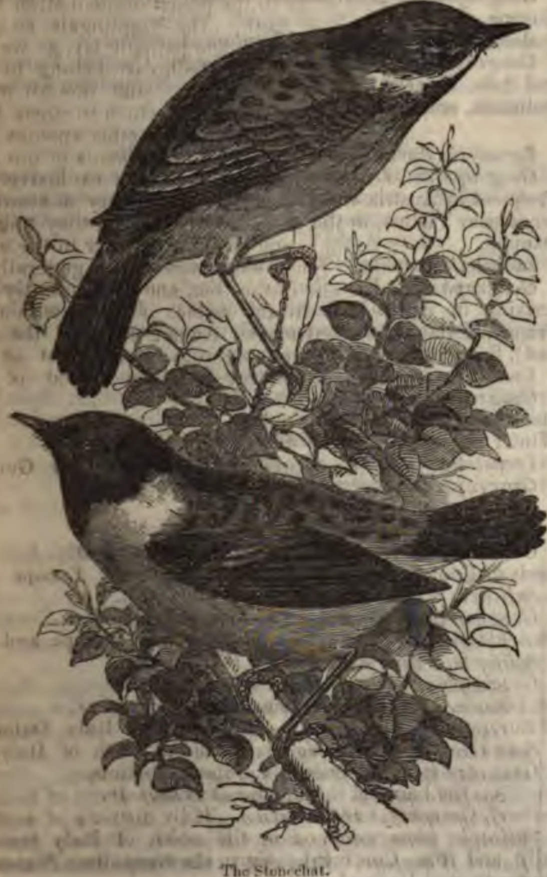
Female.—Upper parts blackish brown with borders of yellowish ruddy; wings and tail-feathers brown bordered with yellowish ruddy; throat black, with small whitish and ruddyish spots; the white space on the sides of the neck and of the upper part of the wing less extended; ruddy colour of the breast less vivid.

Young Males before their Second Moult like the old female.

Young at their Departure from the Nest.—Feathers of the upper parts greyish brown; all terminated by a small whitish spot.

After the autumnal moult all the individuals have brown ash-colour on the head and the back; this colour occupying solely the fine points of the barbs, they by exposure and friction cause in the spring the black colour of the middle of the feathers to appear. (Temm.)

This is the *Traquet rubicole* and *Moteux Traquet* of the French; *Saltabastone*, *Zompa-cardi*, and *Saltinpalo* of the Italians; *Schwarzkehliger Steinschmatzer* of the Germans; *Clochder y cerrig* of the antient British; and *Stonechat*, *Stonechatter*, *Stonesmith*, *Stonesmich*, *Stoneclink*, and *Moor-titling* of the modern British.



The Stonechat.

Lower figure, male; upper figure, female, in perfect plumage.

Geographical Distribution.—Russia, Germany, France, Provence, Italy, Smyrna, Japan, the Deccan, the banks of the Ganges, the mountain-chain of Upper Hindustan, Senegal, and South Africa (Cape). England, Ireland, and Scotland.

Habits, &c.—Though several of this species remain through the winter months, the general body quit the British Islands in autumn, nor do they return till the spring is forward, seldom appearing on our heaths and commons, dappled with furze and bushes, before the end of March: but March is often bleak; and when the winds blow roughly, they quit these open spots for the shelter of the snug lanes and groves. Still however the open tracts are their favourite haunts, and, wind and weather permitting, there they are to be seen almost ever in motion, now on a stone, now on a bush, from which they dart to seize the passing insect and then return. Although their song, which is given on the wing, is short, it is pleasing; and they are in a degree mocking birds, being no bad imitators of the song of others. Besides insects, worms are acceptable food to them; and for these they may be frequently seen foraging on the ground.

The nest, which is of considerable size in proportion to the bird, is framed in the beginning of April on the ground or some dwarf bush. Externally it is fabricated of moss and grass; and a few fine bents, hairs, and feathers form the lining. The eggs, which are laid from the middle of April to the third week in that month, are pale blue with somewhat of a greyish tint, finely dotted with obscure reddish brown at the large end.

When the young are hatched—that is, about the middle of May—the old Stonechats become very bold. They make a constant clamour, and put in practice many a *ruse* to deceive the schoolboy and draw him from their nest.

Redstarts.

Phœnicura ruticilla. *The Redstart.*

Phœnicura tithys. *The Black Redstart.* Rare in Britain.

We select the Common Redstart, *Motacilla phœnicurus*, Linn., as an example.

Description.—Old Male.—Forehead and eyebrows pure white; a small band on the root of the bill, space between that and the eye, throat, and upper part of the neck deep black; head and upper part of the back bluish ash; breast, sides, rump, and lateral tail-feathers brilliant ruddy; abdomen whitish, lower coverts of the tail deep ruddy, two middle feathers brown.

The Female (which may easily be confounded with that of *Phœnicura suecica*, the Blue-throated Warbler) with the upper parts grey strongly shaded with rusty; great wing-coverts bordered with ruddyish yellow; throat white, breast and sides rusty, belly whitish, under tail-coverts pale rusty. *The very old* have the throat blackish, spotted with rusty.

Young Males of the Year.—No white on the forehead; black of the throat broken with whitish lines; ruddy colour of the breast varied with white; upper parts rusty ash, tail coverts and feathers bordered with rusty.

Young Females.—These may be distinguished from the nightingale by the black bill and feet, and the two middle tail-feathers, which are always blackish-brown.

Belon is of opinion that this is the *φοινίκουρος* of Aristotle (*Hist. Anim.*, ix. 49). It is the *Corossolo*, *Codirosso*, *Culo ranzo*, and *Culo rosso* of the Italians; *Rossignol de mur ou de murailles* of the French; *Schwarzkehliger Sanger*, *Schwarzkehlein*, and *Garten-Rothschwänzchen* of the Germans; *Gekraagde Roodstart* of the Netherlanders; *Rodstjert* of the Swedes; *Roedstiert* of the Danes; *Blodfugl* of the Norwegians; *Rhonell goch* of the antient British; *Redtail*, *Brantail*, and *Firetail* of the modern British.

Geographical Distribution.—Denmark, Norway, Sweden, Russia, Europe generally, particularly Holland, France, Provence, Spain, and Italy. Trebizond, and to the south-east of that locality, Erzerum, and Japan.

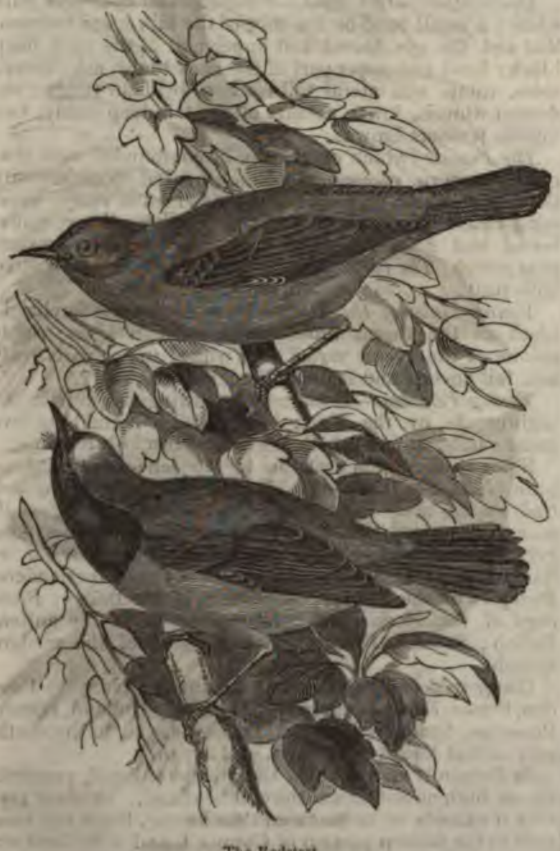
In Britain it arrives about the middle of April, penetrating as high as Sutherlandshire in Scotland. Pennant says that it extends no farther west than Exeter, but it has been seen in the eastern portion of Cornwall, and is far from uncommon in the western part. The antient British name above given, from Pennant, indicates that the bird must have been formerly known in Wales: it certainly is now, and has even been found near Belfast in Ireland; but this appears to be a singular instance. They quit England, generally, at the commencement of September.

Habits, &c.—This is a sweet and indefatigable singer, and has been heard in a wild state as late as ten o'clock at night, and as early as three o'clock in the morning. The skirts of woods, lane and meadow hedge-rows, orchards, gardens, the old ivied-wall of a ruin, are all favourite haunts. The male shows himself, as if proud of his pretty plumage, whilst he is uttering his soft, sweet song, vibrating his tail the while, on some low branch of a not high tree or weather-beaten stone, nor does his music cease as he flies to another station to continue his strain.

A crevice in a wall, a hollow tree, a nook in a building sheltered behind a limb of antient ivy, or even of an old fruit-tree trained against it, sometimes a hole in the ground, receives the nest, the outside of which is rough and rich with moss, and lined with hair and feathers. Four, six, and even eight greenish-blue eggs are deposited, and the first brood, for there are generally two in a season, are frequently fledged by the second week in June. The food consists of worms and insects, fruit, and berries.

Bechstein speaks highly of its attractive qualities in plumage, gesture, and song; and says it will add to its natural notes parts of the songs of other birds. He tells us that those which built under his roof imitated tolerably the chaffinch that hung in a cage at his window; and his neighbour had one in his garden that repeated the strains of a black-cap which had its nest near.

In captivity Redstarts become so tame that they will take a meal-worm from the hand. Sweet says that, when kept in confinement, he considers this bird the most sensible and, if brought up from the nest, the most attached of all small birds; but he adds that it may be deemed the most tender of all the tribe. It is, he observes, a real mocker, and, if bred up from the young state, will learn the note or call of almost any other bird: it will also learn a tune, and will sing by night as well as by day, as long as a light is kept burning. He had one that whistled the Copenhagen Waltz.



The Redstart.

Lower figure, male. Upper figure, female.

The *Portraits des Oyseaux* has the following quatrain under the cut of this Wall Nightingale :—

'Ce Rossignol est nommé de muraille,
Pource qu'es murs il bastit sa maison,
Fait ses petits: mais en comparaison
Au Rossignol, il ne dit rien qui vaille.'

Notwithstanding the censure involved in the last line and a half, however, the Redstart is a very charming songster. In comparison with the nightingale, every other bird's song must fade.

Phœnicura suecica, the Blue-throated Warbler. [Blue-Breast.]

Robins.

Erythaca rubecula. The Redbreast.

Though the subject be very tempting, we should not be justified in occupying space in this work by a detailed description of this familiar bird, dear to infancy and old age. Belon makes it the 'Εριθακος of Aristotle (ix. 49), and not without reason.

Geographical Distribution.—Norway, Denmark, Sweden, Shetland (rare), Orkney, Scotland, England, Ireland, and Wales (where it is called *Yr Hobi goch* and *Brongoch*), the temperate and warm parts of Europe, plentiful in Spain and Italy, North Africa, Smyrna, Trebizond. The following quatrain appears under the figure of this species in the *Portraits* above cited :—

'Au Rossignol de muraille ressemble
La Gorge-rouge, en chant armonieuse.
Elle en hyver apparoist fort ioyeuse,
Luy en esté auprès de nous s'assemble.'

Accentors.

Accentor alpinus. The Alpine Accentor.

Geographical Distribution.—The Alpine districts and mountainous parts of the continent of Europe. Switzerland and the Tyrol have it in abundance. In Britain its appearance is comparatively rare.

Accentor modularis.—Common Hedge Accentor, or *Hedge Warbler. Hedge Sparrow* of many districts; *Llwyd y gwrych* of the antient British. This poor little songster's nest is generally the first that the urchin takes; the eggs are azure, and are generally laid very early, and before the leaf is sufficiently out in the hedge-row, one of its most frequent localities, to hide the nest.

Geographical Distribution.—Great Britain. Central Europe.

Accentor montanellus. Mountain Accentor.

Geographical Distribution.—Eastern Central Europe and Asia, Eastern Siberia, the Crimea, Neapolitan States, Dalmatia, and Central Hungary.

Locustelles.

Locustella fluviatilis.—The Reed Locustelle.

Geographical Distribution.—Rare in Western Europe. Frequent in Austria and Hungary, and of common occurrence near Vienna, in the gardens of the little isles in the Danube.

Locustella avicula. The Brake Locustelle.

Geographical Distribution.—England and Ireland, arriving in April. Austria, Hungary, Italy, South of France, Holland (not common), Germany (north and north-east), Saxe (rarely, as a passenger).

Locustella luscinoïdes. Willow Locustelle.

Geographical Distribution.—South of Europe. Specimens have been taken in England (Cambridgeshire fens). Winter retreat Africa, probably.

Locustella certhiola. Creeping Locustelle.

Geographical Distribution.—South Russia.

Salicarias.

Salicaria turdoïdes. Great Sedge Warbler.

Geographical Distribution.—Holland abundantly. Lowlands of France, even near Calais.

Salicaria olivetorum. Olive-tree Salicaria.

Geographical Distribution.—Ionian Islands; Zante. (Strickland.)

Salicaria arundinacea. Reed Wren.

Geographical Distribution.—Temperate Europe. British Islands. Holland, Germany, France, rare in the south of Europe.

Salicaria palustris. Marsh Warbler.

Geographical Distribution.—Central Europe. Frequent on the banks of the Po and Danube. Parts of Switzerland, Germany, and Holland.

Salicaria phragmitis. Sedge Warbler. Britain generally and the Continent. Very abundant in France, Germany, and Holland.

Salicaria melanopogon. Moustached Warbler.

Geographical Distribution.—Italy. The states of Ragusa; those of Rome; Provence, probably.

Salicaria aquatica. Aquatic Warbler.

Geographical Distribution.—Common in Italy and Piedmont. France and Germany occasionally. Holland very rarely.

Salicaria galactotes. Rufous Sedge Warbler.

Geographical Distribution.—South of Spain. Gibraltar. Opposite shores of Africa, probably.

Salicaria cisticola. Fantail Warbler.

Geographical Distribution.—Southern and Eastern Europe, and the neighbouring tracts of Asia and Africa. Along the Mediterranean shore from Gibraltar to Constantinople. Italy and Sicily. Greek Islands and adjacent mainlands (common).

Salicaria? cetti. Cetti Warbler.

Geographical Distribution.—Southern and Eastern Europe. Marshes of Ostia and neighbourhood of Rome. Sicily (common). North Africa. Has been killed in England, according to M. Temminck; but Mr. Gould doubts this.

Salicaria? sericea. Silky Warbler.

Locality.—Near Santa Anna upon the Brenta, two miles from Chioggia, on low bushes bordering the ditches between the vineyards. Song loud and tolerably long.

Nightingales.

Philomela luscinia. The Nightingale.

Philomela turdoïdes. The Thrush Nightingale. [NIGHTINGALE.]

Calliope.

Calliope Lathamii. Gorget Warbler.

Geographical Distribution.—Rare in Europe. North-east of Asia; Siberia, Kamtchatka; Japan.

Currucas.

Curruca orphea. The Orpheus Warbler.

Geographical Distribution.—Southern Europe. Very abundant in Italy, especially in Piedmont and Lombardy, and in the south of France. India.

Curruca atracapilla. The BLACK-CAP.

Curruca hortensis. Garden Warbler.

Geographical Distribution.—Southern and temperate Europe. England (where it arrives in April).

Curruca Rüppellii. Rüppell's Warbler.

Geographical Distribution.—Eastern Europe (rare). North and East Africa.

Curruca melanocephala. Sardinian Warbler.

Geographical Distribution.—Central Spain. Sardinia. The Neapolitan States.

Curruca leucopogon. Subalpine Warbler.

Geographical Distribution.—Southern Europe; Italy and Sardinia especially. North Africa. Abundant on the banks of the Nile as far as Abyssinia.

Curruca cinerea. Common White-throat.

Curruca garrula. Lesser White-throat. [WHITE-THROAT.]

Curruca conspicillata. Spectacle Warbler.

Geographical Distribution.—Southern Europe. Spain (Andalusia). Sardinia.

Curruca sarda. Marmora's Warbler.

Geographical Distribution.—Sardinia and Eastern Europe.

Curruca nisoria. Barred Warbler.

Geographical Distribution.—Northern Europe. Sweden and Northern Germany, and Hungary. Lombardy. Rare in Austria.

Melizophilus.

Melizophilus provincialis. Dartford Warbler.

Description.—Old Male.—All the upper parts, with the exception of the tail, fine deep grey; throat, breast, and sides purple-reddish or the colour of wine-lees; middle of the belly white; tail very long, blackish brown, the external feather only terminated with white; quills ash-coloured externally, but black on the internal barbs; wings very short; feet yellowish; bill black, but yellowish white at its base; iris brown. Length five inches.

Female.—The tints generally less vivid than those of the male; on the throat a greater number of fine whitish striæ than in the male, which, when very old, presents hardly any traces of them.

Young of the Year.—A great number of small stripes on the throat, the lower parts varied with whitish feathers. (Temm.)

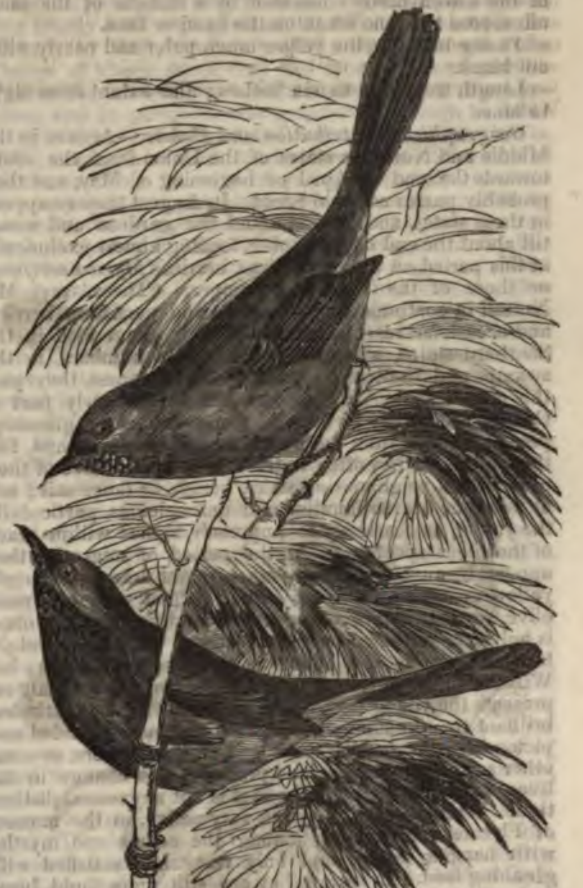
This is the *Pitte-chou de Provence* of the French; the *Magnanina* of Savi; and *Provenser Sänger* of Meyer.

Geographical Distribution.—Southern Europe; the countries that border the Mediterranean, Spain and the south of Italy, but the Prince of Canino and Musignano notes it as rare, and as found in summer in mountainous situations. It is comparatively scarce in Germany and Holland. Permanent in England, but not generally diffused. Frequent in the neighbourhood of London, and also at Bagshot, Chobham, and their vicinities. Devonshire, Cornwall, and Berkshire possess it also.

Habits, &c.—This pretty warbler is a very hermit in its love of retirement and seclusion. The furze-brake and tangled heath are its favourite haunts, and well it knows every labyrinth of every bush on the breezy common where it takes up its abode. Mr. Gould observes, that its form closely allies it to the Superb Warblers (*Malurus*) of New Holland, while its relationship to the Common Whitethroat is strikingly apparent. With reference to its secluded habits, the same author well remarks that in the spring it becomes more lively and more frequently visible, 'rising on quivering wing above the tops of the furze, and uttering a hurried babbling song, much after the manner of the Whitethroat; at these times it erects the feathers of the head into a crest, and distends the throat, exhibiting many attitudes and gesticulations.'

Dry stalks and grass intertwined with fibres of plants and roots form the nest, which is generally snugly hid in the very heart of a thick furze-bush not far from the ground. Eggs greenish-white, with brown speckles and ashy spots, and thus resembling those of the Whitethroat.

The Dartford Warbler is, generally speaking, insectivorous, but fruits do not come amiss to it, that is, such berries as it may find near its retreats.



The Dartford Warbler.

Upper figure, male; lower, female.

ASIATIC WARBLERS.

Some of the European species, as we have seen, extend to Asia, but the Warblers generally are not abundant in that quarter of the globe.

African Warblers.

Many of the warblers of Europe make Africa, especially the north, their winter-quarters. The *Stonechat*, as we have seen, extends to that continent, and Mr. Swainson, in his 'Birds of Africa,' records another, *Saxicola frontalis, the White-fronted Stonechat*, which is entirely uniform black, with the front of the head snowy. Whether this spot is a sexual distinction peculiar to the male, or whether it is common also to the female, is yet, according to Mr. Swainson, to be discovered.

American Warblers.

Although the American Warblers are not gifted generally with much power of song, the species are very numerous. The Prince of Canino and Musignano, in his 'Specchio Comparativo,' enumerates thirty-four American species of *Sylvia*, four belonging to the subgenus *Dacnis*, and one of *Saxicola* (*sialis*). In his 'Birds of Europe and North America,' the same noble author records forty-five American species of *Sylvicolinæ*, belonging to the genera *Parula, Trichas, Vermivora, Seiurus, Sylvicola, Wilsonia*, and *Culicivora*. The bulk of these species are *Sylvicolæ*. He also notices three species of *Sialia* (American).

We select, as an example, *Sylvicola coronata*. The *Yellow-crowned Warbler*, or *Myrtle-bird*.

Description.—Summer Plumage.—Blackish slate-colour, streaked with black; beneath white; breast spotted with black; crown, sides of the breast, and rump yellow; wings bifasciated with white; tail black; three lateral tail-feathers spotted with white.

Winter Plumage edged with brownish olive, the yellow of the crown partly concealed by a margin of the same olivaceous hue; no black on the head or face.

Young browner, the yellow much paler and nearly without black.

Length from five to six inches; alar extent from eight to nine.

Geographical Distribution and Habits.—Arrives in the Middle and Northern states of the Union from the south towards the end of April or beginning of May, and then probably passes north to breed. In August they re-appear in those states, and remain about the gardens and woods till about the end of November, feeding almost exclusively at this period on the myrtle-wax berries (*Myrica cerifera*) or those of the Virginian Juniper. 'These,' says Mr. Nuttall in continuation, 'other late and persisting berries, and occasional insects, constitute their winter food in the Southern states, where, in considerable numbers, in the swamps and sheltered groves of the sea-coast, they pass the cold season. In fine weather, in the early part of October, they may be seen at times collecting grasshoppers and moths from the meadows and pastures, and, like the Blue-Bird, they often watch for the appearance of their prey from a neighbouring stake, bough, or fence-rail; and at this time are so familiar and unsuspicious, particularly the young, as fearlessly to approach almost within reach of the silent spectator. At the period of migration they appear in an altered and less brilliant dress; the bright yellow spot on the crown is now edged with brownish-olive, so that the prevailing colour of this beautiful mark is only seen on shedding the feathers with the hand; a brownish tint is also added to the whole plumage; but Wilson's figure of this supposed autumnal change only represents the young bird. The old is, in fact, but little less brilliant than in summer, and I have a well-founded suspicion that the wearing the edges of the feathers, or some other secondary cause, alone produces this change in the livery of spring, particularly as it is not any sexual distinction. While feeding, they are very active, in the manner of Flycatchers, hovering among the cedars and myrtles with hanging wings, and only rest when satisfied with gleaning food. In spring they are still more timid, busy, and restless. Of their nest we are wholly ignorant. When approached, or while feeding, they only utter a feeble plaintive *tship* of alarm. This beautiful species arrives here about the 7th or 8th of May, and now chiefly frequents the orchards, uttering, at short intervals, in the morning, a sweet and varied, rather plaintive warble, resembling in part the song of the Summer Yellow-bird, but much more the farewell, solitary, autumnal notes of the Robin Red-breast of Europe. The tones at times are also so ventriloqual and variable in elevation, that it is not always easy to ascertain the spot from whence they proceed. While thus engaged in quest of small caterpillars, it seems almost insensible to obtrusion, and familiarly searches for its prey, however near we may approach.' (*Manual.*)

Yellow-crowned Warbler.

The *Summer Yellow-bird, Sylvicola æstiva*, above noticed, is remarkable for its skilful prevention of the designs of the Cow Troopial. [Molothrus.] 'It is amusing,' says Nuttall, 'to observe the sagacity of this little bird in disposing of the eggs of the vagrant and parasitic Cow Troopial. The egg, deposited before the laying of the rightful tenant, too large for ejectment, is ingeniously incarcerated in the bottom of the nest, and a new lining placed above it, so that it is never hatched to prove the dragon of the brood. Two instances of this kind occurred to the observation of my friend Mr. Charles Pickering, and last summer I obtained a nest with the adventitious egg about two-thirds buried, the upper edge only being visible, so that in many instances it is probable that this species escapes from the unpleasant imposition of becoming a nurse to the sable orphan of the Cow-bird. She however acts faithfully the part of a foster-parent when the egg is laid after her own.

Australian Warblers.

The New Holland Wrens (*Malurus*) may be considered as the Warblers of that fifth quarter of the world [Wrens]; but there are also some Saxicoline forms which should be here noticed. Such are the *Epthianuræ*, of which the reader will find an interesting account under the titles of *Epthianura albifrons, Epth. aurifrons*, and *Epth. tricolor*, in Mr. Gould's grand work on the 'Birds of Australia,' now in course of publication.

We select, as an example, *Epthianura albifrons, White-fronted Epthianura.*

Description.—Male.—Forehead, face, throat, and all the under surface, pure white; occiput black; chest crossed by a broad crescent of deep black, the points of which run up the sides of the neck and join the black of the occiput; upper surface dark grey with a patch of dark brown in the centre of each feather; wings dark brown; upper tail-coverts black; two centre tail-feathers dark brown, the remainder dark brown, with a large oblong patch of white on the inner web at the tip; irides in some beautiful reddish buff, in others yellow with a slight tinge of red on the outer edge of the pupil; bill and feet black.

Female.—Crown of the head, all the upper surface, wings and tail, greyish brown, with a slight indication of the oblong white spot on the inner webs of the latter; throat and under surface buffy-white; a slight crescent of black on the chest. (Gould.)

Locality and Habits.—Mr. Gould first met with this species in a state of nature on the small islands in Bass's Strait, where, he says, it had evidently been breeding, as he observed several old nests in the Barilla and other stunted bushes which clothe other isolated spots, particularly chalky and green islands immediately contiguous to it in Flinders. He did not observe it in Van Diemen's Land or to the southward of the localities above mentioned. He thinks however that it extends over the whole of the southern portion of the Australian continent, for he has specimens which were killed at Swan River, in South Australia, and in New South Wales. The extent of its range northwards is not, he remarks, known. He had never seen examples from the north coast.

'It is,' observes Mr. Gould, 'a most sprightly and active little bird, particularly the male, whose white throat and banded chest render him much more conspicuous than the sombre-coloured female. As the structure of its toes and lengthened tertiaries would lead us to expect, its natural province is the ground, to which it habitually resorts, and decidedly evinces a preference to spots of a sterile and barren character. The male, like many of the Saxicoline birds, frequently perches either on the summit of a stone or on the extremity of a dead and leafless branch. It is rather shy in its disposition, and when disturbed flies off with considerable rapidity to the distance of two or three hundred yards before it alights again. I observed it in small companies on the plains near Adelaide, over the hard clayey surface of which it tripped with amazing quickness, with a motion that can neither be described as a hop nor a run, but something between the two, accompanied by a bobbing action of the tail.'

Mr. Gould adds that nothing is known of the nidification of this species. As little seems to be known of the rare *Tri-coloured Epthianura*, the brilliant scarlet of whose plumage renders it a most striking object.

Epthianura albifrons. Male. (Gould.)

WARBURG, the chief town of a circle of the government of Minden, in the Prussian province of Westphalia, is situated on the river Dymel, in a very fertile plain. It is divided into the old and the new town, has six gates, two market-places, two churches, one chapel, one Dominican convent, and a Roman Catholic gymnasium. There are 3200 inhabitants, who have manufactories of linen and tobacco, some breweries, and a brisk trade, especially in corn, cattle, and iron. There are frequent pilgrimages to the chapel of St. Erasmus. Near the town are the ruins of the Deesenberg, which are worthy of notice as a remarkable monument of the times of chivalry.

(J. C. Müller, *Geographisch-statistisch-topographisches Wörterbuch des Preussischen Staates.*)

WARBURTON, WILLIAM, a very distinguished English prelate, was born at Newark, 24th December, 1698, and was the elder of the two sons of Mr. George Warburton, an attorney of that place, who held the office of town-clerk, and of Elizabeth, daughter of Mr. William Hobman, one of the aldermen of the borough. The family was originally from the county of Chester. Warburton's grandfather, also an attorney, who had taken the royalist side in the civil war, was the first of them that settled in Newark.

Warburton lost his father when he was only eight years old; so that the care of his education fell upon his mother, who was left with the charge of three daughters besides her two sons, and who survived her husband many years. Being designed for the profession of his father and grandfather, he received the usual grammar education, first at the school of Okeham in Rutlandshire, under Mr. Wright, who afterwards became vicar of Cambden in Gloucestershire, then at that of his native town, which was taught by a cousin of his own of the same names. On leaving school, in 1715, he was placed in the office of Mr. Kirke, an attorney, at East Markham in Nottinghamshire, with whom he continued till April, 1719, when he set up in business for himself at Newark. But a love of reading and study had early taken possession of him: his professional success, probably impeded by these tastes, is supposed not to have been considerable; and at length, having made up his mind to enter the church, he received deacon's orders from Dawes, Archbishop of York, in 1723.

He now also published his first literary performance, a 12mo. volume of 'Miscellaneous Translations, in prose and verse, from Roman Poets, Orators, and Historians.' In 1726 he received priest's orders from Gibson, Bishop of London, and by the interest of Sir Robert Sutton, to whom he had dedicated his book, was instituted to his first preferment, the small vicarage of Gryesly in his native county. It was in the end of this same year also that he came to London, and formed what we may call his first literary connexion, which was with Theobald, Concanen, and others, then chiefly held together and banded into a sort of confederacy by their common hostility to Pope, under the scourge of whose satire they had most of them smarted. Warburton entered into all the animosities of his associates, and in particular was unfortunate enough to indite an epistle to Concanen, dated January 2nd, 1726 (that is, 1727), in which he said that Dryden borrowed for want of leisure, and Pope for want of genius, and which, much to his annoyance, was published long afterwards, in 1766, by Akenside the poet, whom he had offended, from the original, discovered in 1750, by Dr. Gavin Knight of the British Museum, in fitting up a house in Crane Court, Fleet Street, where it is supposed Concanen had lodged. (See Akenside's 'Ode to Thomas Edwards, Esq.,' and Bucke's 'Life of Akenside,' pp. 149-171.) Warburton's connexion with Theobald at this time also led him to furnish some notes to that gentleman's edition of Shakspere, which appeared in 1733.

In 1727 Warburton published, in 12mo., his 'Critical and Philosophical Enquiry into the Causes of Prodigies and Miracles;' and the same year his only contribution to the literature of his original profession, a treatise entitled 'The Legal Judicature in Chancery stated.' The latter work appeared anonymously, and is stated to have been undertaken at the particular request of Samuel Burroughs, Esq., afterwards a master in chancery, who put the materials into Warburton's hands. In Reed's 'Law Catalogue,' London, 1809, it is described as 'said to be written by Master Spicer, but generally ascribed to Lord King.'

In April, 1728, Warburton, by the interest of Sir Robert Sutton, was placed in the king's list of masters of arts for creation at Cambridge, on his majesty's visit to the university; and in June the same year he was presented by the same friend and patron to the rectory of Burnt or Brant Broughton, near Newark. His next publication of any importance, and the first which made him generally known, did not appear till 1736—his famous treatise entitled 'The Alliance between Church and State; or, the Necessity and Equity of an Established Religion and a Test Law demonstrated from the Essence and End of Civil Society, upon the Fundamental Principles of the Law of Nature and Nations.' This work equally startled and offended one party by its conclusions and their opponents by its mode of arriving at them; but it has come, we believe, to be very generally accepted by moderate churchmen as the soundest vindication of national religious establishments. It was described by Bishop Horsley, half a century after its appearance, as 'one of the finest specimens that are to be found, perhaps, in any language, of scientific reasoning applied to a political subject.'

In January of the following year, 1738, Warburton published the first volume, containing the first three books, of his great work, 'The Divine Legation of Moses demonstrated on the Principles of a Religious Deist, from the Omission of the Doctrine of a Future State of Rewards and Punishments in the Jewish Dispensation.' It immediately, as was to be expected, raised a storm of controversy, which lasted for many years, and in the course of which the author had to defend himself against Drs. Stebbing, Sykes, Pococke, R. Grey, Middleton, and other assailants, in some respects agreeing as little among themselves as with the common object of their attacks. Warburton treated them all, Middleton alone excepted, much as a schoolmaster might treat so many of his pupils who should have ventured to enter into a dispute with him or to clamour against his authority.

The leading idea of the 'Divine Legation' is, that so important a doctrine as that of a future state, which must be regarded as the chief natural cement and bond of human society, could not possibly have been dispensed with in any scheme of mere human legislation, and that hence the Mosaic dispensation, in which, according to Warburton's view, it is omitted, must have come from heaven, and must also have been maintained in a peculiar manner by a divine or miraculous influence. Whatever other merit it had, or had not, this view was at least undeniably a new one; and it was developed by its author with an ingenuity, a fulness and variety of learning, and an unflagging animation, such as certainly never had been combined before, and perhaps have not been exhibited together since, in any English theological work. But in truth mere theological discussion forms only a small portion of the book; the author is continually making excursions from the straight path of his argument, and in this way the reader is conducted, in the course of their journey together, over some of the most interesting fields of literature and philosophy.

A second edition of the first volume of the 'Divine Legation' was called for before the end of the year in which it first came out. The second volume, containing the fourth, fifth, and sixth books, appeared in 1741. The first volume, enlarged and divided into two volumes, was published for the fourth time in 1755; and a new edition of the second, similarly extended, appeared in 1758. In a third edition, which appeared in 1765, this second part of the work was extended to three volumes; so that the whole now consisted of five volumes.

Meanwhile the author had also been engaged in a variety of other labours, and had moreover improved his fortunes in more ways than one. Shortly after the appearance of his first volume, in 1738, he was appointed chaplain to the Prince of Wales. The following year six letters which he published in 'The Works of the Learned,' in defence of the orthodoxy of Pope's 'Essay on Man,' against the attacks of M. de Crousaz, introduced him to the acquaintance of Pope, who proved, for the few years that he lived after this, the steady and zealous friend of his voluntary champion. A seventh letter, 'by the author of the "Divine Legation,"' completed the vindication of the poem, in June, 1740; and when Pope died, in May, 1744, it was found that he had left Warburton half his library, with the property of all such of his works already printed as he had not otherwise disposed of, and all the profits which should arise from any edition to be printed after his death. In 1749, upon Lord Bolingbroke, in the preface to his 'Idea of a Patriot King,' having charged his late friend Pope with having clandestinely printed an edition of that work some years before without his, the author's, leave or knowledge, Warburton is believed to have been the writer of 'A Letter' addressed to Bolingbroke, which immediately appeared in vindication of the deceased poet, and which Bolingbroke soon afterwards replied to in what he called 'A Familiar Epistle to the most Impudent Man living.' Warburton and Bolingbroke had once been introduced to each other by Pope, but parted with feelings of mutual disgust; and it is probable that Pope's intimacy with Warburton in his last days mainly contributed to alienate him from his older friend.

One of the most important services which Warburton owed to Pope, was his introduction to the house of Ralph Allen, Esq., of Prior Park, near Bath. This led to his marriage, in September, 1745, with Allen's niece, Miss Gertrude Tucker, in whose right, on Allen's death, in 1764, he became proprietor of Prior Park.

Sundry single sermons which he published from time to time must be passed over without notice. It may be mentioned, however, as illustrating the versatility of his powers, that one of his productions in 1742 was a 'Dissertation on the Origin of Books of Chivalry,' which appeared at the end of the Preface to Jarvis's translation of 'Don Quixote,' and which Pope soon after told him he had immediately recognised to be his, exclaiming, before he had got over two paragraphs of it, 'Aut Erasmus, aut Diabolus.' The same year he published 'A Critical and Philosophical Commentary on Mr. Pope's Essay on Man.' He also persuaded Pope to substitute Colley Cibber for Theobald as the hero of the 'Dunciad,' and to complete that poem by the addition of a fourth book.

In April, 1746, Warburton, whose literary reputation was now very great, was unanimously elected preacher of Lincoln's Inn. Besides many controversial tracts and other minor pieces, the following eight or nine years produced his edition of Shakspere, in 8 vols. 8vo., Lond., 1747 (a performance which did him little credit); his 'Julian, or a Discourse concerning the Earthquake and Fiery Eruption which defeated the Emperor's Attempt to rebuild the Temple at Jerusalem,' 8vo., 1750 (a treatise of remarkable ability, occasioned by Middleton's 'Enquiry concerning the Miraculous Powers'); his edition of Pope's Works, with Notes, in 9 vols. 8vo., 1751; two volumes of Sermons preached at Lincoln's Inn, under the title of 'The Principles of Natural and Revealed Religion occasionally opened and explained,' 8vo., 1753 and 1754; and 'A View of Lord Bolingbroke's Philosophy, in Four Letters to a Friend,' published, in two parts, in 1754 and 1755.

In September, 1754, Warburton was appointed one of his majesty's chaplains in ordinary; and the next year he was presented to one of the rich prebends of Durham. About the same time the degree of D.D. was conferred upon him by Archbishop Herring. In October, 1757, he was admitted to the deanery of Bristol; and in the end of the year 1759 he was made Bishop of Gloucester.

His principal literary productions after this date were a little work against Methodism, in 2 vols. 12mo., entitled 'The Doctrine of Grace, or the Office and Operations of the Holy Spirit vindicated from the Insults of Infidelity and the Abuses of Fanaticism,' 1762; several tracts published in the course of a controversy in which he became involved with Dr. Lowth in consequence of some reflections he had made on the character of Lowth's father in the 1765 edition of the second part of his 'Divine Legation;' and a third volume of Sermons in 1767. His last publication was a 'A Sermon preached at St. Lawrence Jewry, on Thursday, April 30th, 1767, before his Royal Highness Edward Duke of York, president, and the governors of the London Hospital,' 4to., 1767. Not long after this his energetic and fervent faculties began gradually to lose their tone, till he sank at last into a state of intellectual slumber or torpor; not however, it is said, unrelieved by occasional though rare and brief returns of his former cheerfulness and even mental vigour. His death took place on the 7th of June, 1779, not long after the death of his only son, who was carried off by consumption in early manhood. He left no other child, and his widow, in 1781, married the Rev. John Stafford Smith, who had been her first husband's chaplain, and who thus became owner of Prior Park.

A complete edition of the works of Bishop Warburton was published in 1788, by his friend Bishop Hurd, in 7 vols. 4to., at the expense of Mrs. Smith; and in 1794 Hurd added what he called 'A Discourse, by way of general Preface' to this edition, 'containing some Account of the Life, Writings, and Character of the Author.' Meanwhile the late Dr. Parr, with no friendly purpose, had supplied the deficiencies of Hurd's collection by the publication, in 1789, of an 8vo. volume of 'Tracts, by Warburton, and a Warburtonian (Hurd himself), not admitted in their works.' An 8vo. volume of 'Letters from Warburton to one of his Friends' (Hurd), appeared in 1809; and in 1841 another 8vo. volume was published by Mr. Kilvert, entitled 'Literary Remains of Bishop Warburton.' But many letters of Warburton's, and also anecdotes of his life, which have not been collected, are to be found scattered over various publications. A portion of his correspondence which is not much known is contained in the 'Account of the Life and

Writings of John Erskine, D.D., late one of the ministers of Edinburgh,' by Sir Henry Moncrieff Welwood, Bart., D.D., 8vo., Edinb., 1818, pp. 42-64 and 164-186.

WARD, WARDEN, that is, 'guard' and 'guardian.' Ward is the name used in the counties of Durham, Westmoreland, and Cumberland, instead of the hundred of the midland counties or the wapentake of Yorkshire, to denote a subdivision of those shires. The neighbourhood of those border counties to the Scots rendered it essential that the military preparation of the inhabitants should be constant; nd hence the subdivision of the county took the warlike ppellation of ward, rather than the more peaceful one of undred. The great officers whose duty it was to defend he northern borders from the Scots, and the north-western om the Welsh, were called lord-wardens of the marches MARCHES]; and we still have the lord-warden of the Cinque Ports, the lord-warden of the Stannaries. To decend to a lower class of functionaries, a castle or tower as heretofore often called a ward; and it served as a lace not only of defence, but also for the safe keeping of malefactors: hence the keepers of some gaols are called ardens, *e. g.* the keeper of the Fleet prison, until it was bolished, was called warden.

Forests were divided into wards.

WARD; WARDMOTE. [LONDON, vol. xiv., p. 117.]

WARD, SETH, an English divine and astronomer of he seventeenth century, was born at Buntingford in Hertfordshire, in 1617, and there received the rudiments of his education. He was sent from thence to Sydney Sussex College, Cambridge, where he applied himself particularly to the study of mathematics, and of that college he subsequently became a fellow. Eight years after his admission he incurred the censure of the vice-chancellor for having, in his character of prævaricator, or public jester, exercised too much freedom in his language: the censure was however reversed on the following day.

On the breaking out of the civil war, Mr. Ward, having refused to subscribe the 'solemn league and covenant' for he abolition of episcopacy, &c., and being engaged with other persons in drawing up a treatise against the covenant, was deprived of his fellowship: he continued however to eside at the college till 1643, when he removed to the neighbourhood of London. He spent some time at Aldbury in Surrey, in company with Mr. Oughtred, and the wo mathematicians prosecuted together their favourite study: he afterwards accepted the offer of his friend Mr. Ralph Freeman to become the tutor of his sons, and he lived in the house of that gentleman at Aspenden in Hertfordshire till the year 1649, when he became domestic chaplain to Thomas Lord Wenman, who resided at Thame n Oxfordshire.

In the same year the parliamentary commissioners, at heir visitation of the University of Oxford, removed from heir posts the Savilian professors both of astronomy and geometry; when Mr. Greaves, who had held the chair of astronomy, recommended Mr. Ward to be his successor; he recommendation was attended to, and at the same ime Dr. Wallis was appointed to the chair of geometry. On this occasion Mr. Ward took the oath of allegiance to he commonwealth, a step for which, on the restoration f the monarchy, he incurred considerable obloquy: he exerted himself however to revive the astronomical lectures, which had been for some time neglected; and by is industry and talents he brought them into great repute. n 1654 he took the degree of doctor in divinity, and, five years afterwards he was made principal of Jesus College: e was subsequently chosen president of Trinity College, ut these posts he was obliged to resign at the Restoration. While Dr. Ward resided at Oxford he associated himself with the eminent men of the time, and particularly with is friend Dr. Wilkins, at the apartments of the latter in Wadham College: from these meetings arose the Royal Society, of which he became a fellow in 1661.

Though Dr. Ward had held appointments under the government of Cromwell, it was well known that his sentiments were always in favour of monarchy; and accordingly, through the interest of the Duke of Albemarle and the Earl of Clarendon, he was appointed, in 1660, to the rectory of St. Lawrence, Old Jewry. In the same year he was made precentor of the cathedral of Exeter; in the year following he was appointed dean; and in 1662, bishop of the diocese. Five years afterwards he was translated to the see of Salisbury; and in 1671 he was made chancellor of the Order of the Garter: through his representations this honour was permanently attached to the see.

In the year 1660 Dr. Ward had a violent fever, which seems to have undermined his constitution: he however recovered from its immediate effects, and, by using frequent exercise on horseback, he for some years gained strength; but from neglecting this practice as he advanced in life the weakness returned, and he gradually lost the use of his faculties. He died in January, 1689, in the seventy-second year of his age.

Bishop Ward was a man of great benevolence: in 1682 he founded at Salisbury a college for ten females, widows of orthodox clergymen; and at Buntingford, where he was born, he founded an hospital for the poor. He is accused of having been in some respects a time-serving man; and, though his disposition was humane, he lent himself readily to an order from court, by which he was enjoined to suppress the religious services of the non-conformist ministers in his diocese. In the House of Lords he was distinguished alike for the soundness of his arguments and his power as an orator.

His theological works are, 'An Essay on the Being and Attributes of God; on the Immortality of the Soul,' &c., Oxford, 1652, in 8vo.; and a volume of Sermons, which was published in London in 1674; but he is chiefly distinguished by his works on astronomy. The first of these is entitled 'Prælectio de Cometis; ubi de Cometarum naturâ disseritur, nova Cometarum Theoria,' &c., with a tract designated 'Inquisitio in Ismaelis Bulialdi Astronomiæ Philolaicæ fundamenta,' Oxoniæ, 1653, in 4to. In this work Ward criticises the hypothesis of Bulialdus, that the elliptical movement of a planet results from the path of the latter being on an epicycle whose centre is in motion, in a contrary direction, on an excentric deferent. In the following year were published also at Oxford, 'Idea Trigonometriæ Demonstratæ in usum Juventutis;' and a reply to John Webster, under the title 'Vindiciæ Academiarum,' 4to. In 1656 were published his 'Exercitatio Epistolica in Thomæ Hobbesii Philosophiam ad D. J. Wilkins,' and also his work entitled 'Astronomia Geometrica, ubi Methodus proponitur quâ Primariorum Planetarum Astronomia, sive Elliptica, sive circularis, possit Geometricè absolvi,' Londini, 8vo. In the latter the author assumes the truth of an hypothesis which had also been proposed by Bulialdus, that each planet moves about the sun in an elliptical orbit, and that the revolving radii describe angles with a uniform motion, not about the focus which is occupied by the sun, but about that which was called the upper focus, being that through which was supposed to pass the axis of the cone, of which the ellipse is the section; and he founds on the hypothesis methods of calculation which he conceives to be more precise and simple than those of Bulialdus. The hypothesis just mentioned was the last of those in which it was attempted to retain a uniform motion in some part of the system of a planet; and being capable of affording facilities in the determination of the true from the mean anomaly, it was adopted by other astronomers in that century: it has however no foundation in fact, and has been long since abandoned by astronomers.

WARD, JOHN, LL.D., was born in London, in 1679, and was one of the fourteen children of a dissenting minister of the same names, who was originally from Tysoe in Warwickshire, and died in 1717, leaving of his numerous family only this son and a daughter. Ward held the situation of clerk in the navy-office till 1710, when he opened a classical school in Tenter Alley, Moorfields. His first publication was a small 8vo. tract in Latin, on the elegant and graceful arrangement of words in sentences, which appeared in 1712. He appears to have continued to teach his school till September, 1720, when he was elected professor of rhetoric in Gresham College. This appointment he held till his death, 31st October, 1758.

Ward was from the beginning a leading member of a society of gentlemen, mostly divines and lawyers, who, with occasional interruptions, met once a week from 1712 to 1742, to discuss in written discourses questions of civil law and the law of nature and nations. In 1723 he was elected a Fellow of the Royal Society, and in 1736 a member of the Society of Antiquaries. In 1750 the degree of LL.D. was conferred upon him by the University of Edinburgh. In 1753, on the establishment of the British Museum, he was elected one of the trustees.

His principal publications, besides the tract already mentioned, were, a Latin translation of Dr. Mead's 'Discourse of the Plague,' which appeared in 1723; a treatise, in Latin, on the principles of Punctuation, appended to an edition of the 'Elementa Rhetorica' of Vossius, printed at London in 1724; a new and very correct edition, with a learned preface, of Lily's Latin Grammar, in 1732; an edition of Maximus Tyrius, published in 4to., in 1740, by the Society for the Encouragement of Learning, of which he became a member in 1736; 'Lives of the Professors of Gresham College,' folio, London, 1740; a new edition of Camden's Greek Grammar, 1754; and 'Four Essays upon the English Language,' 1758. After his death appeared his 'System of Oratory, delivered in a course of Lectures publicly read at Gresham College,' 2 vols. 8vo., 1758; and his 'Dissertations upon several passages of the Sacred Scriptures,' 8vo., vol. i., 1761, vol. ii., 1774. He is also the author of many papers in the 'Philosophical Transactions,' and of some in the 'Archaeologia.' And his literary assistance was liberally contributed to the publications of several of his contemporaries; such as to Ainsworth's 'Monumenta Kempiana,' 1720, for which he supplied an elaborate dissertation on the Roman As and its parts, an essay on the vases, lamps, rings, and clasps of the antients, &c.: to Horsley's 'Britannia Romana,' 1732, for which he wrote an 'Essay on Peutinger's Table, so far as it relates to Britain;' to Buckley's edition of De Thou, 1733, for which he translated Buckley's three epistles to Dr. Mead into Latin; to Ainsworth's Latin Dictionary, both the first and subsequent editions; to the edition of Aelian's 'History of Animals,' published by Abraham Gronovius, in 1744; to the edition of Volusenus 'De Animi Tranquillitate,' published by Principal Wishart, of Edinburgh, in 1751; to Pine's engraved Horace, 1733-37; &c. There are several letters to and from Dr. Ward in the 'Original Letters of Eminent Literary Men, with notes by Sir H. Ellis,' printed by the Camden Society, 4to., Lon., 1843.

WARDS, COURT OF. The Court of Wards and Liveries was established by the statute 32 Henry VIII., c. 46, to superintend the inquests which were held after the death of any of the king's tenants by knight's service, for the purpose of ascertaining what lands the tenant died seised of, who was his heir, whether the heir was an infant; and thus what rights accrued to the king in the shape of relief, primer seisin, wardship, or marriage.

By the famous statute passed in the first Parliament of Charles II. (12 Charles II., c. 24), the Court of Wards was abolished, together with the feudal rights out of which that court arose. The preamble of the statute states that it had been intermitted since Feb. 24, 1645. [GUARDIAN.]

WARE. [HERTFORDSHIRE.]

WARE, SIR JAMES, an Irish antiquarian. His father, Sir James Ware, a native of Yorkshire, went to Ireland in the time of Elizabeth as secretary to Sir William Fitz-William, lord deputy in 1588, was subsequently appointed auditor-general for the kingdom, and purchased considerable property in and near Dublin.

James, his eldest son, was born in Dublin on the 26th of November, 1594. In his sixteenth year he was entered at Trinity College, Dublin, and prosecuted his studies there for six years. Immediately after leaving college he married Mary, daughter of John Newman, Esq., of Dublin. By the advice of Usher he devoted himself to the study of Irish antiquities. During a residence of some years in England (1626-29), he contracted an intimacy with Selden and Sir Robert Cotton, by whose assistance he considerably increased his collection of manuscripts.

On his return to Ireland in 1629, he was knighted by the lords justices; and in 1632, his father dying suddenly, he succeeded both to his estate and the office of auditor-general. He applied himself assiduously to public business; obtained, in 1633, the confidence of Lord Wentworth (afterwards Earl of Strafford), and was by his advice created a member of the Irish Privy-Council. In 1639 Sir James Ware was elected a member of the Irish House of Commons. When the rebellion broke out in 1641, he assisted the government not only by his personal services, but also by becoming surety for sums of money advanced to it. His character for superiority to the partisan prejudices either of the Popish or Protestant party, occasioned his being sent, in December, 1644, to inform the king, then at Oxford, of the real state of affairs in Ireland. He employed his leisure hours at Oxford in the prosecution of his antiquarian researches, and had the honorary degree of Doctor of Laws conferred upon him by the University.

The vessel in which Sir James Ware returned to Ireland was taken by one of the Parliament's ships. He underwent an imprisonment of ten months in the Tower of London, and was released by an exchange of prisoners. In 1647 he was one of the hostages for the performance of the treaty by which the Earl of Ormond surrendered Dublin to the Parliament. He was deprived of his office of auditor-general, but allowed to reside in Ireland, till Michael Jones, governor of Dublin, taking umbrage at him, ordered him to transport himself beyond seas into any country he pleased except England.

He made choice of France, where he landed early in 1649, and continued to reside till 1651, when he obtained a licence from the Parliament to visit London on business. He resided two years in the vicinity of the metropolis. At the close of that period he was allowed to visit his estates in Ireland. He continued to lead a strictly private life till the Restoration, when he was reinstated in his office of auditor-general.

In 1661 the university of Dublin elected Sir James Ware one of its representatives. He was offered the title of baronet or viscount, but declined both. The Marquis of Ormond created him first commissioner of excise. He died in Dublin, on the 1st of December, 1666. He left two sons and two daughters, the only survivors of ten children.

Sir James Ware's more important works are:—1, 'De Praesulibus Hiberniae Commentarius,' Dublin, 1665, fol. He has incorporated into this work two of his Latin treatises; the one containing the lives of the Archbishops of Cassel and Tuam, published originally in 1626; the other the lives of the bishops of Dublin, published in 1628. 2, 'De Hibernia et Antiquitatibus ejus Disquisitiones,' London, 1654-8. Into this work is incorporated his history of the Cistercian monasteries of Ireland. 3, 'De Scriptoribus Hiberniae Libri Duo,' Dublin, 1639-40. 4, 'Rerum Hibernicarum Annales, regnantibus Henrici VII., Henrici VIII., Edvardo VI., et Maria,' Dublin, 1662, fol. The annals of the reign of Henry VII. were first published in 1658, as an appendix to the second edition of his Antiquities of Ireland; and the annals of the reign of Henry VIII. as a separate work in 1664-5. In 1633 he published, in one volume, Spenser's 'Dialogue on the State of Ireland,' Campian's 'History of Ireland,' and Meredith's 'Chronicle of Ireland.' 6 and 7, In 1656 he published, at London, 'Opuscula Sancto Patricio adscripta;' and in 1664, at Dublin, two letters ascribed to the venerable Bede and the 'Lives of the Abbots of Wiremouth and Jarrow.' A translation of Sir James Ware's works into English was published in 1705, by his second surviving son Robert; a more complete edition, with additions, in 1739-46, by Walter Harris, who married a granddaughter of Sir James.

(*Biographia Britannica.*)

WAREHAM, a market-town and parliamentary borough, in the south division of the hundred of Winfrith Blandford in Dorsetshire, 10 miles from Poole, 18 from Dorchester, and 112 from London. It is within three miles of an arm of the sea, which forms a part of the bay called Poole Harbour. A town existed here in the time of the Britons, and it was subsequently occupied by the Romans. Two Saxon kings were buried here, Brithric, king of the West Saxons, and Edward the Martyr, whose remains were afterwards removed to Shaftesbury. The town is nearly surrounded by an earthwork formed by the Danes in the time of Alfred. A priory was founded at Wareham in the ninth century, and there are some traces of an antient castle. The town was once much larger, and the entire area enclosed by the antient earthwork, it is said, was at one time occupied by dwellings, but much of it is now covered with market-gardens. The two decayed parishes of St. Michael and St. Peter are now annexed to the parish of Lady St. Mary, and their two churches were taken down almost within the memory of persons still living. The three other parishes, Lady St. Mary's, Trinity, and St. Martin's, are now united, and form but one parish for ecclesiastical purposes. The church of Trinity parish is used for the national school, and in that of St. Martin's only the burial service is read. Lady St. Mary's church is a large and very antient edifice, and belonged to the priory. The value of the living is not returned in the Reports of the Ecclesiastical Commissioners. The parish is in the diocese of Bristol.

Wareham is said to be a borough by prescription, but this is doubtful. Hutchins, the historian of Dorsetshire, states that there was a mayor of Wareham in the reign of Richard II. In the reign of Queen Elizabeth a charter was granted, constituting a corporation. Another charter was granted in the reign of Queen Anne, which defined the constitution of the municipal body as consisting of a mayor, burgesses, and assistant burgesses. The borough Court of Record has fallen into disuse since 1747. The boundary of the municipal borough comprises portions of the three parishes beyond the town and these parts are denominated the out-parishes. The town is not affected by 5 & 6 Wm. IV., c. 76, for the reform of municipal boroughs. Wareham returned two members to parliament from the reign of Edward I. to the passing of the Reform Act, under which it now returns one member: the adjacent borough of Corfe Castle, which returned two members, was disfranchised. The parliamentary borough now comprises both the in- and out-parishes, and part of the chapelry of Arne in Trinity parish; the parishes of Corfe Castle and Bere, and parts of the parishes of East Stoke and East Morden. The population in 1831 was 5774, including 1676 for the old borough. The number of electors on the register in 1835-6 was 372, and 428 in 1839-40.

The neighbourhood of Wareham is flat and marshy, but the town is situated on an eminence between the rivers Frome and Piddle, over which there are bridges, one having five arches. Small vessels of 20 or 30 tons come up to the town-quay from the sea, and those of 60 tons can approach within half a mile; three miles from the town, at the confluence of the Frome and Piddle, vessels of the largest size can anchor. Wareham is a member of the port of Poole. The principal trade consists in the export of a peculiar kind of clay found in the parish of Corfe Castle and in the neighbourhood, which is in demand for the manufacture of common earthenware in Staffordshire. The market-day is Saturday, and there are fairs for cattle, cheese, and hogs, in April, June, and September, and six cattle-fairs in the spring. The town is compactly built, with two wide main streets lying at right angles, and several smaller streets. In 1834 it was neither lighted nor watched. There are two small endowments for schools, but one of 20*l.* a year had been withheld for two or three years, according to the 'Education Returns' of 1833.

(*Reports* of Corporation Commissioners, Boundary Commissioners, &c.)

WAREHOUSING SYSTEM is a customs' regulation, by which articles of import may be lodged in public warehouses at a moderate rent, not being chargeable with duty until they are taken out for home consumption, and being exempt from duty if re-exported. It affords valuable facilities to trade, is beneficial to the consumer, and ultimately to the public revenue. Where no such system exists, the merchant must either pay the duty on every article immediately it is landed, or must enter into a bond with sureties for payment at a future time. If he pays at once, he is obliged to advance a large capital, on which interest must be charged to the consumer until the goods be sold; or he must effect an immediate sale, perhaps at an inadequate profit, or even at a loss, in order to raise the funds necessary to pay the duty. If he wishes to defer the payment until the market shall offer an advantageous sale, he may find it difficult to induce persons to become his sureties, and, when he has succeeded, he may involve them in ruin. The natural result of these difficulties is, that none but wealthy capitalists can import articles on which heavy duties are charged, and a monopoly is thus established, to the great injury of the consumer. The immediate payment of customs' duties also obstructs the carrying trade of a country, by making the re-exportation of articles more troublesome as well as expensive.

The first British statesman who proposed a remedy for these evils was Sir Robert Walpole, in his celebrated Excise scheme, in 1733. His object was to unite the Excise laws with those of the customs as regarded wines and tobacco, and to charge a small duty immediately on importation, and the remainder on being removed from the Excise warehouses for home consumption. Speaking of tobacco, he thus explained his proposal:—'If the merchant's market be for exportation, he may apply to his warehouse-keeper, and take out as much for that purpose as he has occasion for, which, when weighed at the custom-house, shall be discharged of the three farthings per pound with which it was charged upon importation; so that the merchant may then export it without any further trouble. But if his market be for home consumption, that he shall then pay the three farthings charged upon it at the custom-house upon importation; and that then, upon calling his warehouse-keeper, he may deliver it to the buyer, on paying an inland duty of 4*d.* per pound to the proper officer appointed to receive the same.' Walpole clearly foresaw the advantages of his scheme to the carrying trade. 'I am certain,' he said, 'that it will be of great benefit to the revenue, and will tend to make London a free port, and, by consequence, the market of the world.' This wise plan, unfortunately for English commerce, was not permitted to be carried into effect. [WALPOLE, SIR ROBERT.]

The advantages of the warehousing system were most forcibly pointed out by Dean Tucker in 1748, in his 'Essay on the Advantages and Disadvantages which respectively attend Great Britain and France with respect to Trade,' and afterwards by Adam Smith, in his 'Wealth of Nations;' but it was not established before 1803 (43 Geo. III., c. 132). The Acts by which warehousing is now regulated are the 3 and 4 Will. IV., c. 57; 4 and 5 Will. IV., c. 89; and 6 and 7 Will. IV., c. 60. The lords commissioners of the treasury are empowered to determine the ports at which goods may be warehoused, and the warehouses in which particular descriptions of merchandize may be deposited. The various regulations and restrictions under which warehousing is conducted, and the ports to which the privilege is extended, are fully explained in Ellis's 'Customs, Laws, and Regulations,' vol. ii., pp. 240-377, edition 1841; and 'Yearly Journal of Trade,' for 1843, by Charles Pope, pp. 396-420.

The main objection to Sir Robert Walpole's scheme was that the warehousing was compulsory, but, under the existing law, it is at the option of the importer. Amongst other privileges enjoyed by the merchant, he may remove any merchandize from one port to another, either by sea or inland carriage, to be warehoused again. The revenue is said to have sustained little or no loss in these removals, and it naturally becomes a question, Why should warehousing be confined to sea-ports? It is obvious that the power of warehousing on the spot must be a great convenience to the merchants and traders of inland towns, and no reason can be assigned for not conceding it, except insecurity to the revenue. But if goods may be removed with safety from London to Hull, they could be removed with equal safety from Liverpool to Manchester, or from Hull to York. Government would incur no expense in erecting warehouses, as they would be provided by private capitalists, in the same manner as the docks and warehouses in London, Liverpool, and other ports. A committee of the House of Commons reported, in 1840, 'that the privilege of having bonding warehouses may be conceded to inland towns, under due restrictions and regulations, with advantage to trade and safety to the revenue;' but since that time no measure has been promoted for carrying the scheme into effect.

The advantages of warehousing have been understood in various foreign countries as well as in England. So long since as 1664, M. Turgot established it in France; but it was discontinued in 1668, except for merchandize imported from the East and West Indies and Guinea, or exported thereto. In 1805 the system was re-established in a more extensive manner, but was confined to certain sea-ports, until 1832, when it was extended to several of the principal cities in the interior. Warehousing both at the ports and at certain inland towns is permitted in Holland. In Belgium, Denmark, and other commercial countries the system has also been adopted. It has recently been proposed for adoption in the United States of America, and recommended not only on account of its importance to trade, but for a novel reason—its republican tendency. The president, in his message of December, 1842, said that, without such a system of paying the duties, 'the rich capitalist, abroad as well as at home, would possess, after a short time, an almost exclusive monopoly of the import trade, and laws designed for the benefit of all would thus operate for the benefit of the few—a result wholly uncongenial with the spirit of our institutions and anti-republican in all its tendencies.'

WARGENTIN, PETER WILLIAM, a distinguished Swedish astronomer, was born at Stockholm, September 22, 1717. When he was only twelve years of age occurred a total eclipse of the moon, and the observance of this phenomenon is said to have inspired him with a taste for astronomical pursuits. He was intimately connected with Klingenstierna and Celsius, by whom he was recommended to study the motions of Jupiter's satellites; and in 1741, on taking his degree of master in arts, he maintained a thesis on the subject of those motions. Wargentin spent, in fact, the greater part of his life in efforts to correct the theory of the satellites; and, confining himself almost wholly to this branch of the science, the improvements which he made in it obtained for him the reputation of being one of the first astronomers of his age.

On the death of Celsius, in 1744, he was chosen corresponding member of the Academie of Paris, and five years afterwards he succeeded Elvius as perpetual secretary of the Academy of Stockholm. In 1759 he was made a knight of the Polar Star, and 1764 he was elected a fellow of the Royal Society of London. He was also a member of the academies of St. Petersburg, Göttingen, Copenhagen, Drontheim, &c., and his communications to these societies are very numerous. When he was a candidate for the professorship at Upsal, he delivered a discourse on the progress of astronomy since the commencement of the century; and in the 'Memoirs of the Academy of Stockholm' there are several papers by him on the population of Sweden. He also wrote dissertations on the transits of Venus which took place in 1761 and 1769.

In order to determine the parallax of the moon, Wargentin made, at Stockholm, observations on that luminary simultaneously with the corresponding observations which were made by La Caille at the Cape of Good Hope, conformably to an agreement made between the two astronomers previously to the voyage of the latter to the southern hemisphere; and from the observations so made the value of the parallax was correctly ascertained.

Wargentin married in 1753, and became the father of six children, three of whom survived him. He died December 13, 1783, leaving the reputation of having been a man of amiable manners and disinterested character. His devotion to science prevented him from paying due attention to his private affairs, and it is said that, near the close of his life, he was in part indebted to his friends for the means of being extricated from some embarrassments into which he had fallen. The Academy aided him from its funds, and struck a medal with an inscription denoting its sense of his merit. It also procured for his family a pension from the government.

An interval of time in which the inequalities of the two first satellites of Jupiter are compensated, had been noticed in 1726, by Dr. Bradley, who however made no practical use of the period; and Wargentin, apparently without any knowledge of Bradley's discovery, both found the values of the inequalities and the time of the compensation. With respect to the first satellite, the Swedish astronomer introduced in the tables of its movements an empirical equation amounting to 3′ 40″, which he subsequently reduced to 3′ 30″, and whose period he found to be 437 da. 19 ho. 41 min.; and, with respect to the second, he introduced an equation amounting to 16′ 30″, whose period is also about 437 days: these empirical equations have been confirmed by the researches of La Place, who has proved that they constitute in reality two equations of the centre for those satellites. Wargentin also rectified the equation of Bradley respecting the aberration of light, and that which depends on the excentricity of Jupiter's orbit. His first tables of the movements of the satellites were published in the 'Acta Societatis Regiæ Upsaliensis, ad an. 1741;' and an improved edition was published by La Lande, in 1759, at the end of Halley's tables for the planets and comets. Pound's tables of the first satellite, though they generally gave the time of an immersion or emersion within a minute of the truth, were sometimes erroneous to the amount of five or six minutes; but those of Wargentin always agreed with the observations within one minute, and thus they became of great importance by affording the means of determining the longitudes of stations.

It is to be remarked that these tables were formed without any aid from physical astronomy. Wargentin determined the motions of the satellites from a combination of all the observations of their eclipses which he could procure, and during the whole of his life he laboured to correct the errors which he discovered. He sent new tables of the third satellite to Dr. Maskelyne, who published them in the 'Nautical Almanac' for 1771; anc Almanac for 1779 contains an improved edition of tables of the second satellite.

WARHAM, WILLIAM, an eminent English pre was born at Okeley in Hampshire, in the latter part o fifteenth century, and after receiving his school educ at Winchester, was admitted a fellow of New Col Oxford, in 1475. Here he remained, having in due taken his degree of LL.D., till 1488, when he is unders to have been collated to some living in the church. after however he is found to be practising as an adv in the Court of Arches, and to be holding the offic Principal or Moderator of the Civil Law School in parish of St. Edward's, Oxford. His first public em ment, as far as is known, was the mission upon whic was sent, along with Sir Edward Poynings, by Henry in 1493, to Philip, Duke of Burgundy, to persuade hi exercise his influence to put an end to the support encouragement given to Perkin Warbeck by Mar duchess-dowager of Burgundy. Bacon, who, in his ' tory of King Henry VII.,' gives a speech addressed by upon this occasion to the archduke, calls him Sir Wi Warham, doctor of the canon law. Although his deavours in this affair were attended with little o success, he continued to rise in the good opinion of H who esteemed men of ability and knew how to disting them; and he was made master of the rolls this same keeper of the great seal in 1502, and lord chancello the 1st of January, 1503. In 1503 he was also made Bi of London; and in 1504 he attained the summit o promotion by being raised to the archbishopric of Ca bury.

Warham opposed the marriage of Catherine, the w of Prince Arthur, with his brother Henry, both wh was first proposed in the time of Henry VII., and wards when it was carried into effect in the beginnin the next reign. This brought him into collision with bishop of Winchester, whose rivalry and hostility afterwards inherited by his protégé the famous Wo The latter, now become the chief favourite of Henry was substituted for Warham as chancellor in 1516. before and after this, there were many contests as to diction between the archbishop and the cardinal Warham lived to see the fall of Wolsey, and even that event, in 1529, to have the great seal again offer him, although his advanced years induced him to de it. He died at St. Stephens, near Canterbury, 23rd Au 1532, leaving the primacy open to the new faith and politics of Cranmer.

Warham's character is drawn as follows, not pe without some natural party prejudice, by Burnet: 'H a great canonist, an able statesman, a dexterous cou and a favourer of learned men. He always hated Ca Wolsey, and would never stoop to him, esteeming it the dignity of his see. He was not so peevishly eng to the learning of the schools as others were, but s and encouraged a more generous way of knowledge he was a severe persecutor of those whom he thought tics, and inclined to believe idle and fanatical people.' last remark is founded on the part the archbishop to the affair of the Maid of Kent, to whose impostures, from credulity or party spirit, he showed some inclin to listen.

Warham was a great friend and patron of Erasmus, dedicated to him his edition of St. Jerome, and i letters speaks in the highest terms both of the learnin abilities and of the virtues of the archbishop.

WARING, EDWARD, the son of a wealthy farmer resided near Shrewsbury, was born in 1736. Having s at an early age a decided taste for geometry and alg he was sent, in 1753, to Magdalen College, Cambr where he made great progress in mathematical ana He attained the rank of senior wrangler, and took th gree of bachelor in arts, in 1757. Three years afterw the Lucasian professorship of mathematics being v by the death of Mr. Colson, Waring became a cand for, and succeeded in obtaining, that honourable post was opposed by Mr. Maseres, afterwards Baron Mas and having, in order that he might prove himself qualified, published a portion of a mathematical which he had commenced, a war of pamphlets on the ject of the work was, before the election, carried on bet the two rival candidates and their friends. Waring having taken the degree which was required by the statutes, a licence from the crown was obtained for the purpose of enabling him to hold the appointment.

In 1763, being then master in arts, Mr. Waring was elected a Fellow of the Royal Society; and in several of the volumes of the 'Philosophical Transactions' there are papers by him on subjects connected with the theory of equations, centripetal forces, &c. In the volume for 1779 is one on the method which he proposed for the general resolution of equations. This consists in assuming for the root of an equation the sum of a series of radical terms, the exponent of each being the reciprocal of the exponent of the highest power of the unknown quantity, and the number of terms in the series being less by one than that exponent; on substituting that sum in the equation, and eliminating the radicals, the resulting equation, being compared with that which is given, will afford the means of obtaining one of the values of the unknown quantity. It is observed, however, that the process may sometimes lead to an equation of a higher degree than that which it is proposed to resolve.

Mr. Waring also studied medicine, and in 1767 he took the degree of M.D.; but he has written nothing concerning the science, and it does not appear that he had much practice. His life was spent chiefly at the University, where he constantly performed the duties of his professorship; and he died August 15th, 1798.

He was considered the most learned analyst of his age, and he is said to have been a man of simple manners, as well as of inflexible integrity; but so diffident of his powers for conversation, as to be greatly embarrassed when in the company of strangers. His mathematical works appear to be very defective in method, and they abound with typographical errors. Independently of the papers above alluded to, he published at Cambridge the following treatises:—1, 'Miscellanea Analytica de Æquationibus Algebraicis et Curvarum proprietatibus,' 4to., 1762; 2, 'Meditationes Algebraicæ,' 4to., 1770; 3, 'Proprietates Algebraicarum Curvarum,' 4to., 1772; and, 4, 'Meditationes Analyticæ,' 4to., 1776. The third in the above enumeration is the most esteemed of all his works, and it contains a description of certain properties, at that time new, of algebraic curves, with the rectifications, radii of curvature, &c. of the lines: it treats also of the figures produced by the revolutions of the curves about given lines or axes, and contains investigations relating to the greatest and least values of lines drawn within and about them.

Dr. Waring also published a tract on morals and metaphysics; and a pamphlet on probabilities, on the values of lives, on survivorships, &c.

WARKWORTH. [Northumberland.]

WARMING AND VENTILATION. References having been made from Stove and Ventilation to the present article, it will be necessary here to glance rapidly at the principal modes employed for warming and ventilating buildings generally; and to facilitate this object we shall adopt a subdivision into parts under distinct headings.

Open Fire-places.—A 'cheerful English fire' is associated with so many ideas of comfort and social enjoyment, that we are apt to forget how dearly we pay for it. Franklin and Count Rumford did something to call attention to the subject; but Dr. Arnott has done more. In order to understand this matter, it will be necessary to bear in mind that, while some fire-places or stoves give out heat by *conduction* chiefly, others do so mainly by *radiation*. Open fire-places are of the latter kind, and a serious loss of heating-power results from the arrangement. The burning coals radiate heat into the room, and another portion of heat is reflected from the metallic portions of the grate; but the heated air, which ought to contribute to the desired effect, is mainly allowed to escape up the chimney with the smoke and other results of combustion.

Dr. Arnott enumerates about a dozen evils which are more or less inseparable from the familiar open fires of our apartments. Among these are: *Waste of fuel.*—There is first the heat which escapes with the smoke; then the current of warmed air from the room, which ascends the chimney; and lastly the valuable fuel contained in the smoke itself. From all these causes Dr. Arnott estimates a loss of seven-eighths of the whole heating-power, while Rumford estimated it as high as fourteen-fifteenths. *Unequal heating.*—In a cold wintry day, when seated near a large fire, we may frequently hear persons complain of being nearly 'scorched' on one side and 'frozen' on the other. This arises from the circumstance that, as most of the heat received from an open fire is radiated from the burning fuel, instead of being conducted by the air, this heat, diminishing in intensity as the square of the distance increases, is very unequal, being too great at a small distance, and too weak at a greater; while the 'draught,' or current of cold air which feeds the fire with oxygen, acts like a chilling blast against the side of each person or object which is turned away from the fire. *Strata of air unequally heated.*—Besides the inequality just alluded to, there is another, arising from this circumstance—that the entering current, being colder and specifically heavier than the air previously in the room, occupies the lowest stratum, and subjects the feet to a 'cold bath,' which is frequently attended with bad consequences. Other objections are—the *smoke* and *dust* arising from the use of open fires; the *loss of time* attendant on the care which they demand; the *danger to property and to person* which accrues from them; the necessity (until lately supposed to be indispensable) of employing climbing-boys; and many others.

Many contrivances have from time to time been brought forward to obviate one or other of these inconveniences. Count Rumford suggested the 'register-stove,' the peculiarity of which consists in narrowing the entrance or throat of the chimney by a plate which can be moved to vary the size of the aperture; by this means, particularly if the opening be near the fire, the very hot air directly from the fire enters before it can mix with much colder air from the room, and thus the draught is increased so as to lessen the chance of smoking. But the very circumstance which constitutes the excellence of this stove, viz. the rapid ascent of heated air up the chimney, illustrates the waste of the method generally by showing how much of the heating agent is lost. The almost interminable variety of open fire-places, both in the form of the grate itself and in that of the opening in which it is placed, have been introduced either for an ornamental purpose or for the prevention of 'smoking;' for the other evils enumerated are almost inseparable from the system. These defects have led to the more extended use of

Close Stoves.—The common Dutch stove is one of the simplest examples of a close stove. It generally consists of a cylindrical case of sheet iron, within and near the bottom of which is a grating for containing the fuel. There is an ash-pit beneath the grating, and three openings to the interior—one to the ash-pit, one for introducing the fuel above, and one leading to a flue or chimney. When the fuel-door is closed and the ash-door open, there is then one aperture by which cold air can enter to feed the combustion, and another by which the smoke can escape. In this form of stove the heated iron case warms the air of the room by *conduction* rather than *radiation*, and all this air becomes much more nearly equalized in temperature than by a common fire. There is also great economy of fuel, and an absence of smoke and dust. On the other hand an inconvenience arises from the highly heated iron, the temperature of which is so great as to decompose—not the air itself, as is sometimes, but erroneously stated—but many of the heterogeneous particles always floating in the air. The air acquires a burnt and sulphureous odour; it exercises a dry and shrivelling effect on objects in the room; and it often gives headache and giddiness to those who are exposed to it. In Germany the stoves are made on this principle, but are often more ornamental in their character.

The Russians contrive their close stoves on a different principle. Earthenware and brickwork are largely used, instead of metal, as a means of making the heat less intense near the stove, and of keeping up a reservoir of heat after the fire is extinguished. The stove is built in a massive style, and consists of a series of chambers, of which the lowest serves as the fire-place, and the upper ones as flues; and being composed almost entirely of brick and porcelain, the outer surface remains at a moderate temperature for a very long period. A recent writer ('Residence on the Shores of the Baltic,' 1841), while speaking of the better kind of houses in Russia, says:—'Within these great houses not a breath of cold is experienced. The rooms are heated by stoves, frequently ornamental rather than otherwise; being built in tower-like shapes, story occurred a total eclipse of the moon, and the observance of this phenomenon is said to have inspired him with a taste for astronomical pursuits. He was intimately connected with Klingenstierna and Celsius, by whom he was recommended to study the motions of Jupiter's satellites; and in 1741, on taking his degree of master in arts, he maintained a thesis on the subject of those motions. Wargentin spent, in fact, the greater part of his life in efforts to correct the theory of the satellites; and, confining himself almost wholly to this branch of the science, the improvements which he made in it obtained for him the reputation of being one of the first astronomers of his age.

On the death of Celsius, in 1744, he was chosen corresponding member of the Academie of Paris, and five years afterwards he succeeded Elvius as perpetual secretary of the Academy of Stockholm. In 1759 he was made a knight of the Polar Star, and 1764 he was elected a fellow of the Royal Society of London. He was also a member of the academies of St. Petersburg, Göttingen, Copenhagen, Drontheim, &c., and his communications to these societies are very numerous. When he was a candidate for t
professorship at Upsal, he delivered a discourse on
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century; and in the 'Memoirs of the Academy c
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The problem which Dr. Arnott sought
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much above 200°, as a means of warming
He first caused a kind of water-stove or tank
constructed, having a fire-box in its centre; and by
arrangements for the admission of air and the
of smoke, be kept the water always nearly at the
boiling temperature. This apparatus being however both
expensive and difficult to manage, he dispensed with the
water, and surrounded the fire merely with a body of air.
In the new form of stove, the fuel is put into a small fire-box, enclosed within a larger case of sheet-iron; the only openings in the outer case being a door at which the fuel is introduced, an air-hole beneath the grate, and a chimney for the exit of smoke, which chimney, being merely a metallic tube three or four inches in diameter, can be easily arranged in position. The interior of the outer case is nearly divided into two parts by a partition so adjusted as to cause a continued circulation of the heated air within, and hence an equable heating of the outer case. The air-vent leading to the fire is provided with a valve, by which the admission of air is rendered more or less abundant according as the fire within is less or more intense. It was one point in Dr. Arnott's system to make the stove a 'self-regulating' one, by providing apparatus whereby the valve would open and shut at the proper times to maintain any required temperature; and he suggests six or eight different modes of arrangement, from which the maker of the stove may make a selection. Dr. A. states: 'During the winter 1836-7, which was very long and severe, my library was warmed by the thermometer-stove alone. The fire was never extinguished, except for experiment, or to allow the removal of pieces of stone which had been in the coal; and this might have been prevented by making the grate with a moveable or shifting bar. The temperature was uniformly from 60° to 63°. I might have made it as much lower or higher as I liked. The quantity of coal used (Welsh stone-coal) was, for several of the colder months, six pounds a day; less than a pennyworth, or at the rate of half a ton in the six winter months.'

This kind of stove possesses many advantages; but it is not free from objections. Dr. Fyfe (*Encyc. Brit.*, art. 'Stove') remarks: 'Though the Arnott stove answers well the purpose for which it is intended, that is, economy of fuel (for most undoubtedly a room may be kept warm at a very moderate expense), yet it is liable to the objection already stated with regard to the unpleasant feeling con-

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s can be raked from the grate into an ash-
new fuel thrown into the grate, with-
dust rising into the room, or any air enter-
the stove except through the customary air-vent.
In the different forms of 'kitchen-ranges' the open fire-place is combined with what may be deemed a close stove; for the 'oven' and 'hot-closet' are representatives of the heated space within the outer case of a close stove. The 'gas stoves' and 'steam-kitchens' of modern inventors may in like manner be included in the same category; for they are in effect close stoves heated by agents different from common coal. The stoves often employed in shops, halls, &c. are adjusted not so much for the economising of fuel as for the consumption of their own smoke—an important feature, for many details concerning which see SMOKE.

Any suggestions as to the exact form, dimensions, and construction of a stove possessing economical and useful properties, ought to be the result of a long period of careful observation and experience; otherwise they would be much worse than useless. The author of this article cannot, from his own experience, venture to give any precise suggestions. Even at the present day, men like Arnott, Scott, Russell, and Fyfe differ much in opinions on these points.

Warming by Heated Air.—In all the arrangements yet described, the stove or fire-place is in the room which is to be warmed, and its heating effects are calculated with respect to that room alone. A notable advance, carried to a great extent in the present day, is to have the fire in an outer or lower apartment, and to carry the heated air from thence in a pipe to the apartment to be heated. The Chinese have been beforehand with us in this matter. In the better class of Chinese houses there are hollow flues extending beneath the floors, and connected with a fire-place constructed either against the exterior wall of the apartment to be heated, or else in an inferior room adjoining. The flues are perforated with numerous holes, through which they give out the heated air and smoke to the whole of the under side of the flooring. This flooring consists of flat tiles or flag-stones nicely imbedded in cement, so as to prevent the escape of the smoke or heated air from the flues beneath into the room. After circulating beneath the tiled floor, the smoke escapes by a chimney into the open air. In this arrangement it is obvious that the apartment is warmed by the conduction of caloric from the warmed tiled floor to the air of the room; and as this conduction proceeds slowly, the tiles retain heat enough to warm the room many hours after the fire has been extinguished.

Before the improved methods of warming factories came into use, Mr. Strutt, of Derby, devised a form of stove which, under various modifications, was called the 'cockle stove,' the 'Derby stove,' and the 'Belper stove,' for warming his cotton-factories. In these stoves the fire was contained in an iron receptacle, shaped sometimes cylindrically, sometimes rectangularly; and at a certain distance from it, encompassing it on every side, was a brick casing or envelope, so that a body of air existed between it and the fire-box. The fire-box had three openings to the exterior, one to introduce the fuel, one for an ash-pit

and one for a chimney; the exterior en-
two openings, wholly distinct from the
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out a stream of hot
air of the building. The
or five o'clock on the Sunday
earlier part of the cold season, but as
ances it is usual to light them earlier. From
till the congregation assembles the fires are con-
antly supplied with fuel, and a supply of heat is thus kept up sufficient to warm the whole interior of the church during the time of divine service.

A stove such as the one just described is as likely to give a tainted and offensive character to the air as the common German stoves, unless a rapid current be kept up. Hence a change has been occasionally introduced, by having the outer casing made of brickwork, instead of metal, and by making its dimensions much larger, an arrangement which heats the outer case less intensely, and provides a larger body of air heated to a lower temperature.

Warming by Steam.—The employment of steam-boilers in large establishments where steam-engines are worked, is one of the circumstances which have led to the very extensive adoption of the method of warming by steam. A marked difference is observable in the principle of this method, as compared with that of hot-air warming. The heated agent, *i. e.* the steam, is not permitted to mingle with the air of the room which is to be warmed, but acts through the medium of the metallic tube which confines it, and which it raises to a temperature sufficient to warm the room, without imparting a burnt quality to the air.

The general arrangements of a steam-heating apparatus, as suggested by Mr. Scott Russell, are somewhat as follows: At a convenient part of the building, and as low as possible, there is to be placed a close steam-boiler of the ordinary construction. From this boiler a small steam-pipe is to be carried to the part of the building which is to be warmed. This small pipe should be pretty thick, and carefully rolled round with a bandage of flannel to the thickness of a quarter of an inch, and the boiler should be wholly covered with bricks and plastered over to keep in the heat. This smaller steam-pipe should have an area of one square inch for every six gallons of water that the boiler can boil off in an hour. Pipes of a larger size are to be laid round the room above the floor; or under the floor, if apertures be left to allow a free circulation of warmed air to enter the room. Into these larger pipes the steam is to be conducted, and in them the steam will be condensed into water, giving out its heat to the colder air of the room which is in contact with the outside of these pipes. Small leaden or tin pipes must be provided, for the purpose of bringing back this condensed water into the boiler, for which movement a gentle slope is given to the pipes. The water thus returned, being again heated in the boiler and converted into steam, is again made to ascend and give out its caloric to the room which is to be warmed.

The efficacy of this mode of heating depends on the great capacity for heat which steam possesses, a capacity equal to 1000°; that is, a pound of water at 212° will absorb a thousand degrees of heat in becoming a pound of steam. Steam will thus communicate as much heat as a mass of red-hot iron; and it will have this advantage over the iron, that it can carry this heat to a distance without a similar loss, because the heat, being latent, will not be given out until it arrive at its destination and become condensed, when the whole of its 1000° will be usefully applied.

Tredgold, Mr. Scott Russell, Dr. Arnott, and other writers on this subject have given the results of their calculations as to the quantity of steam and steam-pipe thus required. Dr. Arnott, after taking into account the loss of heat through the thin glass of windows, through the thick walls of buildings, and through various openings and crevices, arrives at the following result:—In a winter day, with the external temperature at 10° below freezing, to maintain in an ordinary apartment the agreeable and healthful temperature of 60°, there must be of surface of steam-pipe, or other steam-vessel, heated to 200° (which is the average surface-temperature of vessels filled with steam of 212°), about one foot square for every six feet of single-glass window of usual thickness; as much for every 120 feet of wall, roof, and ceiling of ordinary material and thickness; and as much for every six cubic feet of hot air escaping per minute as ventilation, and replaced by cold air. A window with the usual accuracy of fitting is held to allow about eight feet of air to pass by it in a minute; and there should be for ventilation at least three feet of air a minute for each person in the room. According to this view, the quantity of steam-pipe or vessel needed, under the temperatures supposed, for a room sixteen feet square by twelve feet high, with two windows, each seven feet by three, and with ventilation by them or otherwise at the rate of sixteen cubic feet per minute, would be—

For 42 square feet of glass, requiring 1 foot for 6 = 7
„ 1238 feet of wall, ceiling, &c., „ 1 foot for 120 = 10⅓
„ 16 feet per minute ventilation „ 1 foot for 6 = 2⅔
—
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that is, twenty feet of pipe four inches in diameter, or any other vessel having the same extent of surface.

Mr. Scott Russell's calculations had relation to the quantity of water and of fuel required, as well as that of the steam-pipe; and he arrives at the conclusion that a room containing 500 cubic feet of air, and exposing 400 feet of surface, may be maintained at a temperature of 20° above that of the air without—that is to say, at 60° in the inside of the room when the atmosphere is at 40° without—for a space of twelve hours, by the evaporation of 2 gallons of water, and at the expense of about three pounds of coal. This calculation rests on the maintenance of the required temperature so far as the room and its contents are concerned; but the change of the air requisite for a person living in the room disturbs the formula, and brings into it many new elements.

This mode of heating buildings is adopted to a very large extent in Lancashire, Yorkshire, and Cheshire, in the steam-power factories. In the cotton-mills, the flax-mills, the power-loom factories, the dye-works, bleach-works, print-works, &c., the facilities for producing an uninterrupted supply of steam are so great, that the steam-heating system becomes by far the most economical that can be employed. Orrell's cotton-mill at Stockport may be taken as an exemplification of a large class of such buildings. This mill is situated on the banks of the Mersey, and occupies a ground area of 280 feet by 200. It is six stories in height, and has several distinct apartments 280 feet in length each. All the preparatory processes are effected in the upper stories; while the weaving and finishing are conducted below; but all the rooms and galleries are alike heated by large steam-pipes, running the whole length of the rooms, and conveying steam from one end of the building, where the boilers are situated, which furnish not only this supply of steam, but also that required by four steam-engines employed in the mill. The steam is admitted to the heating-pipes in quantity proportionate to the coldness of the weather.

Warming by Hot Water.—When Mr. Tredgold wrote his treatise on 'Warming and Ventilating,' about twenty years ago, the method of warming by steam promised to be that most extensively adopted; and he accordingly directed the chief part of his attention to the exposition of the principles on which that method rests. But the 'hot-water' method has been since adopted very largely, and may at the present day be deemed the favourite one for public buildings, halls, and large apartments where steam-boilers have not been previously employed for other purposes.

The principle on which the hot-water method is founded over story, of pure white porcelain, in various graceful architectural mouldings; sometimes surmounted with classic figures of great beauty, and opening with brass doors kept as bright as if they were of gold. In houses of less display, these stoves are merely a projection in the wall, coloured and corniced in the same style as the apartment. In adjoining rooms they are generally placed back to back, so that the same fire suffices for both. These are heated but once in the twenty-four hours, by an old Caliban, whose business during the winter it is to do little else. Each stove will hold a heavy armful of billet, which blazes, snaps, and cracks most merrily; and when the ashes have been carefully turned and raked with what is termed an "ofen gabel," or stove-fork, so that no unburnt morsel remains, the chimney aperture is closed over the glowing embers, the brass doors firmly shut, and in about six hours after this the stove is at the hottest—indeed it never cools.'

Modern English Close Stoves.—Within the last few years many forms of stove have been devised, with the view of obviating some of the objections urged against those used on the Continent. Where, as in a common German or Dutch stove, the burning fuel comes in contact with the metal of which the stove is formed, this metal becomes so highly heated as to produce upon the surrounding air the deleterious effects before alluded to. Dr. Arnott has the merit of having drawn attention in a particular manner to this subject. Having devised a new form of stove, he fully described it in a work published in 1838; but before publishing the book, he detailed the nature of the apparatus in a lecture before the Royal Institution, in order 'that,' to use his own words, 'as I had decided not to reserve for myself any patent right in the new apparatus, I might, by having numerous competent witnesses of what I had proposed and accomplished, prevent other parties who might hear of my processes from appropriating them by patents, and thus coming between me and the public.' The problem which Dr. Arnott sought to solve was, to obtain a considerable extent of surface heated not much above 200°, as a means of warming apartments. He first caused a kind of water-stove or tank to be constructed, having a fire-box in its centre; and by certain arrangements for the admission of air and the emission of smoke, he kept the water always nearly at the boiling temperature. This apparatus being however both expensive and difficult to manage, he dispensed with the water, and surrounded the fire merely with a body of air. In the new form of stove, the fuel is put into a small fire-box, enclosed within a larger case of sheet-iron; the only openings in the outer case being a door at which the fuel is introduced, an air-hole beneath the grate, and a chimney for the exit of smoke, which chimney, being merely a metallic tube three or four inches in diameter, can be easily arranged in position. The interior of the outer case is nearly divided into two parts by a partition so adjusted as to cause a continued circulation of the heated air within, and hence an equable heating of the outer case. The air-vent leading to the fire is provided with a valve, by which the admission of air is rendered more or less abundant according as the fire within is less or more intense. It was one point in Dr. Arnott's system to make the stove a 'self-regulating' one, by providing apparatus whereby the valve would open and shut at the proper times to maintain any required temperature; and he suggests six or eight different modes of arrangement, from which the maker of the stove may make a selection. Dr. A. states: 'During the winter 1836-7, which was very long and severe, my library was warmed by the thermometer-stove alone. The fire was never extinguished, except for experiment, or to allow the removal of pieces of stone which had been in the coal; and this might have been prevented by making the grate with a moveable or shifting bar. The temperature was uniformly from 60° to 63°. I might have made it as much lower or higher as I liked. The quantity of coal used (Welsh stone-coal) was, for several of the colder months, six pounds a day; less than a pennyworth, or at the rate of half a ton in the six winter months.'

This kind of stove possesses many advantages; but it is not free from objections. Dr. Fyfe (*Encyc. Brit.*, art. 'Stove') remarks: 'Though the Arnott stove answers well the purpose for which it is intended, that is, economy of fuel (for most undoubtedly a room may be kept warm at a very moderate expense), yet it is liable to the objection already stated with regard to the unpleasant feeling consequent on the use of all stoves of the kind, and indeed with it more than others; for owing to the very slight expenditure of fuel, there is little or no change in the atmosphere.' Dr. Fyfe then enters into some calculations to show that if such a stove, burning six pounds of coal per diem, be placed in an apartment fifteen feet long, twelve wide, and eleven high, the atmosphere of the room could not be completely changed in an entire day by the direct action of the fire itself; and hence the reason both of the speedy warming of the room and of the unpleasant state of the air.

Numerous varieties of the close stove, bearing more or less on the above construction, have been brought forward since the publication of Dr. Arnott's book. Each professes to possess some peculiar merit; but all present these features in common—that the air-hole, by which the combustion is fed, is very small, and capable of adjustment; that there is a body of air to be warmed, external to the grate or fire-box itself, but confined within an outer case; that the consumption of fuel is much smaller than in any variety of open fire-places; and that the flue for carrying off the smoke and gases is small in diameter, and capable of being carried in any direction. In one variety, called the 'Vesta stove,' there is a very ingenious arrangement whereby the ashes can be raked from the grate into an ash-receiver, and new fuel thrown into the grate, without any dust rising into the room, or any air entering the stove except through the customary air-vent. In the different forms of 'kitchen-ranges' the open fire-place is combined with what may be deemed a close stove; for the 'oven' and 'hot-closet' are representatives of the heated space within the outer case of a close stove. The 'gas stoves' and 'steam-kitchens' of modern inventors may in like manner be included in the same category; for they are in effect close stoves heated by agents different from common coal. The stoves often employed in shops, halls, &c. are adjusted not so much for the economising of fuel as for the consumption of their own smoke—an important feature, for many details concerning which see SMOKE.

Any suggestions as to the exact form, dimensions, and construction of a stove possessing economical and useful properties, ought to be the result of a long period of careful observation and experience; otherwise they would be much worse than useless. The author of this article cannot, from his own experience, venture to give any precise suggestions. Even at the present day, men like Arnott, Scott, Russell, and Fyfe differ much in opinions on these points.

Warming by Heated Air.—In all the arrangements yet described, the stove or fire-place is in the room which is to be warmed, and its heating effects are calculated with respect to that room alone. A notable advance, carried to a great extent in the present day, is to have the fire in an outer or lower apartment, and to carry the heated air from thence in a pipe to the apartment to be heated. The Chinese have been beforehand with us in this matter. In the better class of Chinese houses there are hollow flues extending beneath the floors, and connected with a fire-place constructed either against the exterior wall of the apartment to be heated, or else in an inferior room adjoining. The flues are perforated with numerous holes, through which they give out the heated air and smoke to the whole of the under side of the flooring. This flooring consists of flat tiles or flag-stones nicely imbedded in cement, so as to prevent the escape of the smoke or heated air from the flues beneath into the room. After circulating beneath the tiled floor, the smoke escapes by a chimney into the open air. In this arrangement it is obvious that the apartment is warmed by the conduction of caloric from the warmed tiled floor to the air of the room; and as this conduction proceeds slowly, the tiles retain heat enough to warm the room many hours after the fire has been extinguished.

Before the improved methods of warming factories came into use, Mr. Strutt, of Derby, devised a form of stove which, under various modifications, was called the 'cockle stove,' the 'Derby stove,' and the 'Belper stove,' for warming his cotton-factories. In these stoves the fire was contained in an iron receptacle, shaped sometimes cylindrically, sometimes rectangularly; and at a certain distance from it, encompassing it on every side, was a brick casing or envelope, so that a body of air existed between it and the fire-box. The fire-box had three openings to the exterior, one to introduce the fuel, one for an ash-pit and air-vent, and one for a chimney; the exterior envelope too had two openings, wholly distinct from the others, one to carry off heated air to the various rooms of the factory, and another to admit a renewed supply of fresh air. This form of stove under various modifications has been extensively employed, but it is now probably nearly superseded.

Dr. Fyfe describes an arrangement adopted in a church, which may perhaps be taken as a fair example of a numerous class of instances. The length of the body of the church is about sixty feet, and the breadth forty-five. This is warmed by two stoves about four feet high, made of cast-metal, and shaped nearly like a bell. A square ash-pit, about a foot high, rests on four balls, and supports a fire-box or furnace. Concentric with this fire-place is an outer case; the space between the two containing the air which is to be warmed. The usual adjustments are provided for the introduction of fuel and of air to feed it, for the exit of smoke, for the entrance of fresh air to the air-chamber, and for the exit of the heated air to perform its wonted office. The air-tubes, communicating with the air-chamber of the stove, are conveyed along the lower edge of the gallery of the church; and small branch pipes opening from them at regular intervals give out a stream of hot air which mingles with the cold air of the building. The fires are lighted about four or five o'clock on the Sunday morning during the earlier part of the cold season, but as the season advances it is usual to light them earlier. From this time till the congregation assembles the fires are constantly supplied with fuel, and a supply of heat is thus kept up sufficient to warm the whole interior of the church during the time of divine service.

A stove such as the one just described is as likely to give a tainted and offensive character to the air as the common German stoves, unless a rapid current be kept up. Hence a change has been occasionally introduced, by having the outer casing made of brickwork, instead of metal, and by making its dimensions much larger, an arrangement which heats the outer case less intensely, and provides a larger body of air heated to a lower temperature.

Warming by Steam.—The employment of steam-boilers in large establishments where steam-engines are worked, is one of the circumstances which have led to the very extensive adoption of the method of warming by steam. A marked difference is observable in the principle of this method, as compared with that of hot-air warming. The heated agent, *i. e.* the steam, is not permitted to mingle with the air of the room which is to be warmed, but acts through the medium of the metallic tube which confines it, and which it raises to a temperature sufficient to warm the room, without imparting a burnt quality to the air.

The general arrangements of a steam-heating apparatus, as suggested by Mr. Scott Russell, are somewhat as follows: At a convenient part of the building, and as low as possible, there is to be placed a close steam-boiler of the ordinary construction. From this boiler a small steam-pipe is to be carried to the part of the building which is to be warmed. This small pipe should be pretty thick, and carefully rolled round with a bandage of flannel to the thickness of a quarter of an inch, and the boiler should be wholly covered with bricks and plastered over to keep in the heat. This smaller steam-pipe should have an area of one square inch for every six gallons of water that the boiler can boil off in an hour. Pipes of a larger size are to be laid round the room above the floor; or under the floor, if apertures be left to allow a free circulation of warmed air to enter the room. Into these larger pipes the steam is to be conducted, and in them the steam will be condensed into water, giving out its heat to the colder air of the room which is in contact with the outside of these pipes. Small leaden or tin pipes must be provided, for the purpose of bringing back this condensed water into the boiler, for which movement a gentle slope is given to the pipes. The water thus returned, being again heated in the boiler and converted into steam, is again made to ascend and give out its caloric to the room which is to be warmed.

The efficacy of this mode of heating depends on the great capacity for heat which steam possesses, a capacity equal to 1000°; that is, a pound of water at 212° will absorb a thousand degrees of heat in becoming a pound of steam. Steam will thus communicate as much heat as a mass of red-hot iron; and it will have this advantage over the iron, that it can carry this heat to a distance without a similar loss, because the heat, being latent, will not be given out until it arrive at its destination and become condensed, when the whole of its 1000° will be usefully applied.

Tredgold, Mr. Scott Russell, Dr. Arnott, and other writers on this subject have given the results of their calculations as to the quantity of steam and steam-pipe thus required. Dr. Arnott, after taking into account the loss of heat through the thin glass of windows, through the thick walls of buildings, and through various openings and crevices, arrives at the following result:—In a winter day, with the external temperature at 10° below freezing, to maintain in an ordinary apartment the agreeable and healthful temperature of 60°, there must be of surface of steam-pipe, or other steam-vessel, heated to 200° (which is the average surface-temperature of vessels filled with steam of 212°), about one foot square for every six feet of single-glass window of usual thickness; as much for every 120 feet of wall, roof, and ceiling of ordinary material and thickness; and as much for every six cubic feet of hot air escaping per minute as ventilation, and replaced by cold air. A window with the usual accuracy of fitting is held to allow about eight feet of air to pass by it in a minute; and there should be for ventilation at least three feet of air a minute for each person in the room. According to this view, the quantity of steam-pipe or vessel needed, under the temperatures supposed, for a room sixteen feet square by twelve feet high, with two windows, each seven feet by three, and with ventilation by them or otherwise at the rate of sixteen cubic feet per minute, would be—

For	42 square feet of glass, requiring	1 foot for	6	= 7
,,	1238 feet of wall, ceiling, &c., ,,	1 foot for	120	= 10⅓
,,	16 feet per minute ventilation ,,	1 foot for	6	= 2⅔
				20

that is, twenty feet of pipe four inches in diameter, or any other vessel having the same extent of surface.

Mr. Scott Russell's calculations had relation to the quantity of water and of fuel required, as well as that of the steam-pipe; and he arrives at the conclusion that a room containing 500 cubic feet of air, and exposing 400 feet of surface, may be maintained at a temperature of 20° above that of the air without—that is to say, at 60° in the inside of the room when the atmosphere is at 40° without—for a space of twelve hours, by the evaporation of 2 gallons of water, and at the expense of about three pounds of coal. This calculation rests on the maintenance of the required temperature so far as the room and its contents are concerned; but the change of the air requisite for a person living in the room disturbs the formula, and brings into it many new elements.

This mode of heating buildings is adopted to a very large extent in Lancashire, Yorkshire, and Cheshire, in the steam-power factories. In the cotton-mills, the flax-mills, the power-loom factories, the dye-works, bleach-works, print-works, &c., the facilities for producing an uninterrupted supply of steam are so great, that the steam-heating system becomes by far the most economical that can be employed. Orrell's cotton-mill at Stockport may be taken as an exemplification of a large class of such buildings. This mill is situated on the banks of the Mersey, and occupies a ground area of 280 feet by 200. It is six stories in height, and has several distinct apartments 280 feet in length each. All the preparatory processes are effected in the upper stories; while the weaving and finishing are conducted below; but all the rooms and galleries are alike heated by large steam-pipes, running the whole length of the rooms, and conveying steam from one end of the building, where the boilers are situated, which furnish not only this supply of steam, but also that required by four steam-engines employed in the mill. The steam is admitted to the heating-pipes in quantity proportionate to the coldness of the weather.

Warming by Hot Water.—When Mr. Tredgold wrote his treatise on 'Warming and Ventilating,' about twenty years ago, the method of warming by steam promised to be that most extensively adopted; and he accordingly directed the chief part of his attention to the exposition of the principles on which that method rests. But the 'hot-water' method has been since adopted very largely, and may at the present day be deemed the favourite one for public buildings, halls, and large apartments where steam-boilers have not been previously employed for other purposes.

The principle on which the hot-water method is founded is different from all the others which have passed under our notice. When a vessel of water is heated, the water does not become hot by the *conduction* of caloric from particle to particle, but from the ascent of heated particles from the bottom, where we suppose the heating agent to be applied, to the upper strata. This is proved from the circumstance that if heat be applied only to the surface of the water in a vessel, it is by extremely slow degrees that the lower strata become heated. Heat being applied to the bottom of a vessel, the lower strata of particles, becoming specifically lighter than before, ascend, while the colder particles at the surface descend to supply their place; and hence a series of ascending and descending currents is formed. Now, if, instead of having the heated water only in a vessel, it ramify also through closed tubes connected with the vessel, the ascending and descending currents may be passed through different parts of a building, besides the room where the vessel itself may be placed. The heated water, rising to 212°, or to any temperature depending on the fire to which it is exposed, gives out heat to the metallic pipe through which it passes, and this pipe again communicates heat to the air of the room. Hence the operation of this method of warming depends on the circulating, or ascensive and descensive property of heated water, by which the portions of pipe farthest removed from the fire become as much heated as those in its immediate vicinity.

Where all the apartments to be warmed are on one level, an open boiler may be used; but where it is necessary to carry the pipes to different floors of a building, some of them much above the level of the boiler, the boiler must in that case of necessity be closed. When an open boiler is employed, a pipe branches out from the upper part of the side, extends horizontally through the rooms to be warmed (without in any case rising above the level of the water in the boiler), and returns again to the boiler, which it enters at a lower level than the other. Under this arrangement a current of heated water will flow from the boiler at the upper orifice, and, after traversing the tube, return to the lower orifice.

The closed boiler is however more extensively useful, since it enables all the stories of a building to be warmed by one apparatus. The whole system, including both tubes and boiler, is filled with water at a valve at the highest point; and when heat is applied to the boiler, a circulation ensues which speedily causes the whole length of tubing to become hot. In this form of the apparatus the temperature of the water is kept down to a moderate pitch, in order to avoid danger; but in a modification of it, called the 'high-pressure' method, the boiler consists of a coil of pipe forming part of the circulating pipe, and is capable of being safely heated to such a degree that the pressure of the water within equals 1000lbs. on the square inch. The whole system of water circulation is brought to so high a temperature, that the metal of the pipes warms the air of a large building very speedily.

As an exemplification of this mode of heating, we may adduce the instance of the Reading-room at the British Museum. This room is warmed by the hot-water apparatus of Mr. Perkins. In the basement of the building is a furnace, with a boiler on the coil-tube principle. From this boiler tubes branch out, till they arrive immediately under the centre of the room; then turning upwards, they open into horizontal tubing extending along the middle of the room directly under the slate pavement of the passage or aisle. From this horizontal tubing, lateral branches spring, leading to eight pedestals filled with coils of pipe. All the eight coils, as well as the straight tubes, form one unbroken series through which the heated water from the boiler circulates, imparting its heat to the metal tubes, which in their turn impart it to the air of the room.

Another example is that furnished by Dr. Reid's arrangements in the temporary House of Commons. Slight changes have been made since the apparatus was first planned; but Mr. Richardson's description, published in 1837, will be sufficiently near for our purpose. Beneath the house is a vacant space occupied as an air-chamber, and beneath this again is a basement story in which the apparatus is placed. A warm-water pedestal contains the necessary arrangements for imparting heat to the room in which the pedestal stands. The heated air passes into a passage extending nearly the whole length of the house, and thence ascends through about twenty apertures into the air-chamber, which becomes completely filled with warm air. In order that this air may ascend to the body of the house, three hundred thousand holes have been drilled in the floor which separates the house from the air-chamber beneath; each hole being about one-sixth of an inch in diameter at the top, but expanding to a larger diameter downwards. In order to diffuse the air thus ascending, it is made to pass through a thick horse-hair matting, the meshes of which are rather large. The collateral arrangement we may briefly notice after considering the

Principles of Ventilation.—There is an important, but often neglected circumstance attending the artificial warming of buildings, viz. that the amount of fresh air, requisite under any condition for animal respiration, must be more and more increased in proportion to the fuel burned in the room; or, more correctly, there must be one portion of air to feed combustion, and another portion to aid respiration. Now, under the common arrangements of an English apartment, the open fire-place and the tall chimney draw air so rapidly in that direction, that the whole body of air in the room becomes speedily changed, provided there be an average amount of open doors, windows, crevices, &c. to yield the supply. Until modern inquirers set themselves to solve these two questions, or others analogous to them—'How many cubic feet of air are requisite for the combustion of a pound of coal?' and, 'How many cubic feet of air are respired by an average man in an hour?'—there were no means of determining the proper amount of air necessary to be supplied in a building where *close* stoves are used, or where the methods of warming by heated air, by steam, or by hot water are adopted.

Dr. Arnott places the matter under the following form, so far as respiration alone is concerned:—'In respiration or breathing a man draws into his chest at one time about twenty cubic inches of air, and of that air a fifth part is oxygen, of which again there is converted into carbonic acid gas nearly a half. The carbonic acid, if afterwards inhaled, would be noxious to the individual. About fifteen inspirations are made in the minute, vitiating therefore three hundred cubic inches, or nearly one-sixth of a cubic foot, of atmospheric air, but which, mixing as it escapes with several times as much, renders unfit for respiration at least two cubic feet under common circumstances.' Tredgold makes a very different estimate of the quantity of air respired in a minute, and introduces other items in his calculations. In the first place he reckons the average number of respirations per minute twenty, and the number of cubic inches of air inspired each time forty; so that the air directly vitiated amounts to eight hundred cubic inches per minute. He next takes into consideration the vapour mixed with the respired air, and the insensible perspiration always going on from the skin, and assumes that three cubic feet of air per minute will be requisite to remove these causes of impurity. Lastly, he supposes a room to contain individuals in the evening, when candles, lamps, &c. are lighted, and in lieu of the air vitiated by this combustion he assumes (on what data does not clearly appear) that one-fourth of a cubic foot of fresh air per minute for every individual will be necessary to purify the atmosphere of the room on this ground. Taking all these results together, Tredgold comes to the conclusion, that when a room containing several persons is lighted to the average and customary degree, it will be necessary to supply four times as many cubic feet of fresh air per minute, as there are persons in the room; that is, four feet for each person.

This supposition, of four cubic feet of fresh air per minute for each individual in a room artificially lighted, of course involves the condition that an equal quantity of vitiated air per minute must be allowed to escape, and the inquiry naturally follows, How does this escape take place? Carbonic acid gas is heavier than atmospheric air; but there are three circumstances which render respired air rather lighter than the general air of a room, viz. the existence in it of nitrogen and vapour, both of less specific gravity than air, and the higher temperature of the respired air than the air of the room. From all these circumstences combined, it is found that respired air ascends to the upper part of the room; and it follows that the ceiling or some neighbouring part is the proper place for an outlet.

Practice of Ventilation.—In nineteen-twentieths of all the buildings constructed, there is no account whatever taken of the means for insuring ventilation. The fire-places are constructed, the windows fixed, and the doors hung without a thought being paid to the means of effecting a constant change of the air contained within the apartments. But it is probable that in most English rooms, provided as they are with tolerably large open fire-places, and with doors which are frequently opened, the ventilation is sufficiently complete. The fresh air enters the room by the open window, the lower part of the open door, and any crevices which may exist at a small height from the floor; while the vitiated and specifically lighter air escapes partly up the open fire-place and chimney, partly near the upper extremity of the open doors, and partly by crevices around doors and windows generally.

In crowded rooms however, where the amount of vitiated breath bears a much larger ratio to the cubical contents, and where the doors are generally small compared with the height of the room, the impure air cannot escape by these means, and some arrangements must be made near the ceiling for the removal of the air. These methods are chiefly of two different kinds; the one by the use of a *revolving wheel* or *fan*, and the other by the action of a *chimney* or *tube*.

We sometimes see one of the upper panes of glass removed from a window, and its place supplied by a revolving fan, as a means of ventilating the apartment. This fan or wheel is provided with radii formed like the sails of a windmill, or the blades of a screw-propeller, so that any force which sets the wheel in motion will cause a current of air to pass obliquely between them. But in this case the fan is made to revolve merely by the impulse of the air itself, and is not under the control of the inmates of a building. A more complete exemplification is presented by the arrangement of the large cotton-mills of the North. The observation has been correctly made, that 'the first accomplishment of perfect ventilation for a crowded place was not, as might have been anticipated, in the houses of the great and learned, and therefore in our houses of parliament, or in the churches of the wealthy, or in fashionable assemblies of any kind, but in the cotton-factories.' The same cause, which goes far to explain the general adoption of steam-warming in factories, will probably be available in tracing the use of the fan-ventilators; for while the boilers of a steam-engine furnish the requisite steam in the one case, the power engendered is applicable to the fan in the other.

A fan-wheel, fan-ventilator, or wind-fan (for by all these names the contrivance is known), being placed in any convenient position, is set in motion by the steam-engine of a factory, and by its rotation draws out the vitiated air from a series of rooms with great rapidity. Dr. Ure ('Philosophy of Manufactures') gives the following description of one variety of wind-fan used in the factories. It consists of two cast-iron end-plates, A A, having a central circular opening, *c c c*, from the circumference of which the outline of each plate enlarges spirally, the point nearest the centre being near *d*, and that farthest off being under E (*Fig.* 1). These two parallel plates are connected by bolts, *a a a*; a mantle of sheet-iron being previously inserted into grooves cast in the edges of the end-plates so as to enclose a cavity with an elongated outlet at B, to which a pipe is attached for carrying off the wafted air in any direction. Within this cavity a shaft C revolves, in bearings *b b*, placed centrally in the frame-plates A A, and cast in the same piece. On this shaft a boss is wedged fast, bearing five flat arms, *c c c*, to which are riveted five flat plates, or wires, of the shape shown between *a* and *a* (*Fig.* 2), having a semi-circular piece cut out of them on each side, about the size of the end opening. On one end of the shaft C, beyond the box-bearing, the loose-and-fast pulleys D are fitted for receiving the driving-band, and for turning the wings in the direction shown by the arrow. Thus the air is driven before them out of the end orifice B, while it enters by the side openings at *c c c* (*Fig.* 1). By the centrifugal force of the revolving wings, the air is condensed towards their extremities, and makes its escape from the pressure through the orifice B, while it is continually drawn in at the sides by its tendency to restore the equilibrium. Dr. Ure says that 'when such a fan, placed at the one end of an apartment about two hundred feet long, is in full action, it throws the air so powerfully out of it as to create a draught at the other end of the apartment, capable of keeping a weighted door six inches a-jar.'

Fig. 1.

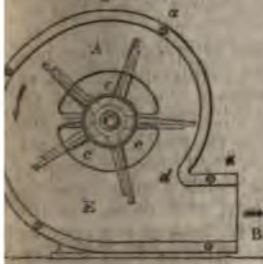
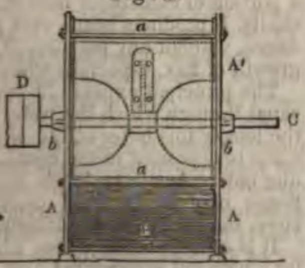


Fig. 2.



An account was given in the 'London Journal of Arts,' 1842, of the method adopted in warming and ventilating the Reform Club-house, which illustrates our present subject. A steam-engine works a revolving fan, capable of throwing eleven thousand cubic feet of air per minute into a subterranean tunnel under the basement story; and the steam of condensation, from the small steam-engine which works the fan, supplies three cast-iron chests with the requisite heat for warming the whole building.

The second mode of effecting ventilation, viz. by the use of a tube or chimney opening into the air from the upper part of an apartment, depends for its action on the ascensive power possessed by a lofty aërial column. As the 'draught' of a furnace-chimney carries up the smoke, &c. more rapidly if the chimney be very lofty, so does a lofty chimney exceed a low one in carrying off vitiated air: and for the same reason, even if no chimney, properly so called, be provided, a lofty room, furnished with appropriate openings in its ceiling, will furnish a draught to carry off impure air more rapidly than a low room; and in many of our public buildings this arrangement is deemed sufficient. In the Reading-room at the British Museum, for example, the arrangements for the supply of fresh air, and the removal of that which has been vitiated, independent of the operation of doors and windows, are these:—A current of cool air sets in from the stone vaults or passages beneath, through a hole or holes in the floor of the room immediately beneath the slate pavement, from whence it finds entrance into the room through the eight coil-tube pedestals. If the weather be cold, and the pipes be filled with hot water, the air, passing thus around and between the pipes, becomes warmed, and enters the room at a temperature sufficient to warm the whole contents; but if the weather be warm, and the pipes contain no hot water, the air passes by the pipes without being affected by them, and enters the room at its natural temperature. The air, after being vitiated by breath, escapes by means of concealed apertures round the circular ornaments in the ceiling into a horizontal tube between the room and the apartments above, and finally escapes into the open air.

The temporary House of Commons is an example of ventilation by an artificial draught caused by a lofty chimney. By the side of the building has been constructed a large circular chimney, 120 feet high, 11 feet wide at the bottom, and 8 feet at the top, with a fire-grate near the bottom having 25 square feet of bars or surface. This chimney is connected, by a tunnel leading from its base, with the interior of the house, and is intended solely to remove the air from the house. Beneath the air-chamber and in connection with the room containing the hot-water apparatus for warming the house, is a perforated wall through which fresh air enters from Old Palace Yard. Three sets of folding-doors are so arranged that the air thus admitted can be wholly or in part allowed to pass through the hot-water room, or kept wholly free from it, according to the season of the year; so that it can be made to enter the body of the house at any required temperature. The air thus admitted, after passing through the air-chamber into the house, and becoming vitiated by respiration and combustion, escapes through apertures in the ceiling into a receptacle above, where it might be made to discharge itself into the open air. But in order to render the ascent of the air certain at all times, the upper receptacle is connected by a descending tube with the short tunnel leading to the chimney; and a large fire being made in the chimney, the high column of heated and rarified air engenders such a powerful draught as to draw out the whole of the air from the body of the house. There were some parliamentary papers presented to the House of

Commons in the year 1837, in which Dr. Reid detailed experiments tending to show that by reversing the action of certain valves, and bringing the chimney in connection with the air-chamber beneath, instead of the air-receptacle above, he could draw out all the air from the house in a *descending* current, from ceiling to floor, instead of in an *ascending* current, if it should ever be deemed desirable so to do. This served to illustrate the powerful nature of the draught produced by the heated chimney. We may here remark that Dr. Reid, who contributed the article 'Ventilation' to the new edition of the 'Encyclopædia Britannica,' has in that article stated his opinion that instead of three or four cubic feet of fresh air per minute for each person in a room, as usually advocated, he thinks the quantity provided ought not to be less than ten feet; and he also states that in the present Houses of Parliament from 36,000 to 50,000 cubic feet per minute have occasionally been given in warm weather to one apartment alone, or about sixty feet per minute to each individual in a crowded house.

Dr. Arnott expresses his opinion that a kind of pump, with an easy-working piston, would often be an efficacious ventilator; and indeed some such contrivance has frequently been employed in ships.

(Hales; Leslie; Tredgold; Richardson; Hood; Arnott; Perkins; Reid. For 'Ventilation of Mines,' see MINES, vol. xv., p. 244.)

WARMINSTER. [WILTSHIRE.]

WARNER, FERDINANDO, LL.D., a voluminous compiler and theological and miscellaneous writer of the last century, is said to have been born, where is not known, in 1703, and to have studied at Jesus College, Cambridge, but the latter fact is doubtful. Having taken holy orders, he became vicar of Ronde in Wiltshire, in 1730, and rector of St. Michael Queenhithe, London, in 1746, to which last preferment was added the rectory of Barnes in Surrey, in 1758. He died of gout in or soon after 1767. His degree of LL.D. he is supposed to have obtained from some Scotch university.

Of Dr. Warner's various publications the following are the most important:—'A System of Divinity and Morality, compiled from the works of the most eminent divines of the Church of England,' 5 vols. 12mo., 1750, and second edition, 4 vols. 8vo., 1756; 'An Illustration of the Book of Common Prayer,' &c., folio, 1754; 'The Ecclesiastical History of the Eighteenth Century,' 2 vols. folio, 1756-7; 'Memoirs of the Life of Sir Thomas More,' 8vo., 1758; 'The History of Ireland,' vol. i., 4to., 1763; 'The History of the Rebellion and Civil War in Ireland,' 4to., 1767. He was also the author of the scheme for the Middlesex Clerical Widows' and Orphans Fund, in relation to which he published one pamphlet in 1753, and another in 1765. He left a son, the Rev. John Warner, D.D., born in 1736, who was of Trinity College, Cambridge, and who, after having long preached at a chapel of his own in Long Acre, London, was presented to the united rectories of Hockliffe and Chalgrave in Bedfordshire, and subsequently to the rectory of Stourton in Wilts. He died in 1800. Dr. John Warner was an ardent republican, and expounded the principles of his political philosophy in a work which he called 'Metronariston,' which was his principal literary performance.

WARNER, RICHARD, of Woodford-row, in Essex, was the author of the 'Plantæ Woodfordienses,' which was published in 1771. He was born in 1711, and was educated at Oxford. He was from early life much attached to the study of botany, and, having a fortune at his command, he bestowed much pains in collecting and cultivating exotic plants. He was celebrated for his critical knowledge of Shakspere, and at one time contemplated publishing an edition of his works. He died on the 11th of April, 1775. He possessed a valuable library, which he bequeathed to Wadham College, Oxford. He also left a stipend for the purpose of establishing a botanical lecture in the university of Oxford. He was a man of literary tastes and habits, and was rather a patron of those who cultivated botany than a great botanist himself. 'Additions to Warner's Plantæ Woodfordienses' were published by Mr. Forster in 1784. Miller dedicated a genus of plants to him under the name *Warneria*. Warner also translated some of the comedies of Plautus. [THORNTON, BONNEL.]

WARNE'RIA, a genus of plants named by Miller in honour of Mr. Warner. This genus, which is now called *Hydrastis*, has but a single species. It belongs to the natural order Ranunculaceæ. The calyx is composed of 3 ovate sepals. The petals are wanting. The stamens and ovaries are numerous. The fruit is baccate, numerous, collected into a head, 1-celled, 2-seeded. The only species is called *H. Canadensis*. It is a small perennial herb, with tuberous roots. It is a native of North America, in watery places in tracts along the Alleghany Mountains, from Canada to Carolina. The head of its fruits very much resembles that of the raspberry. The root of this plant has been used both for dyeing and in medicine. It gives a beautiful yellow colour, and on that account has been called *yellow-root*. It is bitter, and acts on the system as a tonic, and for this purpose is recommended by Professor Barton. It has had also a great reputation for the cure of cancer, but, like all other vaunted remedies for the cure of this disease, it cannot be relied on.

This plant was introduced into Great Britain in 1759, but being difficult of cultivation, it is seldom seen. It may be propagated by dividing the roots in spring or by sowing the seed, and must always be grown in a moist shady situation, as exposure to the sun will destroy it.

WARPING, a mode of producing a deposition of the earthy matter which is suspended in rivers of which the current is frequently changed by the rising and falling of the tide. This causes a stirring of the water, which prevents the finer particles from being deposited. It is only necessary to produce a stagnation of the water for a few hours to have a copious deposit, leaving the water clean over it.

On the low flats which border the mouths of rivers, occasional inundations often cause a deposit which is highly fertilizing. Thus the polders in Holland and Flanders have been formed of the mud of large rivers, and, being drained and kept dry by dykes and sluices, have formed the most fertile soils.

Warping is an imitation of this natural process:—A bank of earth is raised along the course of the river, so high that the floods cannot pass over it. In some part of this dyke is a sluice for the double purpose of letting in the water and letting it out at pleasure. When the tide is setting in and counteracting the natural current of the river, the sluice is opened and the water flows in by one or more channels made for the purpose of conveying it over the lower land, and covers it to the depth of high-water. The sluice is now shut, and the imprisoned water, becoming stagnant, deposits all the mud which it held suspended before. The sluice is opened at low-water, and the water is allowed to run out slowly; it leaves a coating of mud or sediment, which hardens and dries rapidly. This operation is repeated until a thickness of several inches of new soil has thus been warped, when it is allowed to dry, and then ploughed and cultivated like any other field. It takes some time before any corn will grow on the new warp: at first it looks like barren mud; but it soon dries to a better texture, and ultimately produces very extraordinary crops. If its fertility decrease, and its surface is still below high-water mark, a slight warping, like the inundations of the Nile, immediately restores the fertility. What is curious, is the almost total absence of organic matter in the warp-soils, or rather, its intimate combination with the earths, so that it is not readily separated from them. It is neither like clay nor sand, but something between the two, soft to the touch, but not hardening into lumps when dry; neither very porous nor very retentive of moisture. The principal earth is silica in a very fine state. It generally contains a portion of calcareous matter, probably from comminuted shells. It produces beans, oats, potatoes, and wheat in abundance, without any manure. It is admirably adapted to the growth of flax, especially when the warp is of a good depth.

The principal expense in warping is the sluice, and the canal through which the water is conducted over the land; the longer this latter is, the slower the process; as much warp is deposited in the canal, which has sometimes to be dug out. Accurate levels must be taken, or much expense may be incurred uselessly, if the water will not cover the surface to a sufficient depth.

It is of little consequence what the soil was originally; for a new soil is deposited over it. It should however not be too wet nor marshy: a porous soil is best, as this becomes the subsoil. All the inequalities which existed before, are obliterated by the warping, which fills up all cavities, and leaves a perfectly level surface. At an outlay of 2000*l*. a surface of 300 acres has been warped, increasing the value of the land more than 10,000*l*. in the course of four years—a very profitable speculation. The fertility of warped land naturally leads to the conclusion that silica, in a very comminuted state, becomes best adapted for the roots of plants to shoot in and to supply them regularly with the moisture necessary to their vegetation, and that their chief nourishment is derived from the atmosphere, since very little organic matter can be detected in warp, and few mineral substances besides the earths.

WARRANT. A warrant is a delegation by A, who has power or authority to do some act, of that power or authority to B. Thus a man having, of course, power to act in and manage his own concerns, may give a warrant of attorney to another to act or manage on his behalf. A sheriff who has power to arrest, &c., may give a warrant to his bailiff to act for him. A landlord who has power to make a distress upon his tenant may give a warrant of distress to another for that purpose: A magistrate who has authority to bring before him persons who are within his jurisdiction, and reasonably suspected of having committed certain offences, may make a warrant to others to do that act. A warrant, which should be in writing, ought to show the authority of the person who makes it, the act which is authorized to be done, the name or distinct description of the party authorized to execute it, and of the party against whom it is made; and in criminal cases the grounds upon which it is made. The sense in which the word warrant is more generally known relates to criminal matters. A justice of the peace has power within his own jurisdiction to apprehend a person whom he has seen commit an offence over which he has jurisdiction. He may also verbally direct, that is, give a verbal warrant to others to arrest such person in his own presence. He may also give a warrant in writing to apprehend in his absence such person, or any person against whom he has reasonable cause of suspicion from the information of others. The warrant should always be under the hand and seal of the justice. It should be addressed to the constable or constables, or to some private person by name, and the constable or the private person acting within the justice's jurisdiction will not be liable for any of the consequences of obeying a proper warrant. The warrant should name the person against whom it is directed. A warrant to apprehend all persons suspected, or all persons guilty, &c., is illegal; for the discretion as to pointing out the individual person to be apprehended is vested in the justice, not in the officer. The law as to this was expressly laid down by Lord Mansfield in the case of Money *v.* Leach, 3 Bur. 1742, where the warrant, being of the form called a general warrant, and which had been in use since the Revolution down to that time, directing the officers to apprehend the 'authors, printers, and publishers' of the famous No. 45 of the 'North Briton,' was held to be illegal and void. The warrant should also set forth the time and place of making it, and the cause for which it is made. A warrant may be to bring the party before the justice granting it, or before any justice of the same county. A warrant of a justice of one county cannot be executed in another until it has been backed, that is, signed by some justice in that other county, and the same provision has been also enacted with respect to warrants granted in any one of the three kingdoms, and requiring to be executed in any other. But a warrant granted by one of the judges of the Court of Queen's Bench is tested England, and may be executed in any part of the kingdom. A warrant is in force until it has been executed, if the justice granting it be still alive. An officer to whom it is addressed is indictable if he neglects or refuses to act upon it. He is justified in apprehending the party at any time, and in breaking open the doors of a house, but he ought first to make known to those within the cause of his coming, his authority, and to request their assistance. After the party is apprehended, the officer ought forthwith to carry him wherever he is directed by the warrant authorizing the apprehension. Much of what has been said as to a warrant of apprehension is equally applicable to a Warrant of Commitment, which is the document by which a justice authorizes a commitment of a party to prison, either to suffer a summary punishment or to await his trial. The same matters are essential as to showing the authority, the parties, the cause, and the purpose of the warrant, and these latter should appear distinctly, be lawful, and not be in the disjunctive. A Search Warrant is a document which authorizes a search to be made for stolen goods. (Burn's *Justice*.)

A Warrant of Attorney is an authority by which a man authorizes another to do an act for him, on his behalf, or as his agent or deputy. [LETTER OR POWER OF ATTORNEY.] But the term is most commonly applied to cases where a party executes an instrument of that name, authorizing another to confess judgment against him in an action for a certain amount named in the warrant of attorney. It is generally given as a security by one who is, or is about to become, the debtor of another. The advantage of it is, that, by putting it into effect, the creditor obtains a judgment against his debtor at once, and has all the advantages of a judgment creditor, without the risk, delay, and expense of an action. There is frequently a condition attached, that it shall be defeated and become void upon the making of certain payments, or the doing of certain acts. In all such cases it is necessary that the defeasance, or condition, shall be written on the same paper or parchment as the warrant of attorney, and a copy of the whole filed in the Court of Queen's Bench within twenty-one days after the execution. Otherwise, in case of bankruptcy or insolvency of the party making the warrant of attorney, it will be void as against his assignees. If a warrant of attorney is more than one year old, and less than ten, leave must be obtained by a motion during term, or from a judge during vacation, to enter up judgment upon it; if ten years old or more, by a rule to show cause. Many other regulations and restrictions exist respecting the operation of this kind of instrument, but they are of too technical a nature to be introduced here. (Archbold's *Practice.*) [ARREST.]

WARRANTY. 1. The doctrine of *warranty of lands* was formerly one of the most important parts of legal learning, but the effect of warranties having been gradually reduced within very small compass, the subject has now become of little practical use; still it is necessary for those who would properly understand the English law of real property to pay some attention to this difficult subject.

Warranty existed in the civil law, and was defined to be the obligation of the seller to put a stop to the eviction and other troubles which the buyer may sustain in the property purchased. By eviction is meant the loss of either the whole or a part of the property by reason of the right which another has to it. The other troubles referred to are those which, without affecting the property of the thing sold, diminish the beneficial interest of the purchaser, such as a claim to a usufruct, or a rent issuing out of the lands. This warranty was either *in law*, being that security which every seller is bound to give to a purchaser for the maintenance of his title to the property sold, though no stipulation to that effect was made at the time of the sale; or *in deed*, being that kind of particular warranty on which the seller and buyer agree. (Domat., l. 1, t. 2, s. 10.)

Warranty of lands in the English law is of feudal origin, and is derived from the obligation of the lord to defend his tenant's title against all claimants. If the tenant was evicted, the lord was bound to make him a recompense by giving him other lands of equal value. Every tenant holding of his lord time out of mind, by what was termed *homage ancestral*, was entitled to this warranty. The statute of the 18th of Edward I., commonly called the statute of Quia Emptores, which prohibited the practice of subinfeudation, and authorized the free alienation of property, put an end to the homage ancestral, and consequently to the implied warranty annexed to it. To avoid the effect of this, when the lord aliened, the tenants, before they attorned to the new lord, required a new warranty from him; and when the tenant aliened, it was with an express clause of warranty from himself. These express warranties were introduced even prior to the statute of Quia Emptores, in order to evade the strictness of the feudal law as to non-alienation without the consent of the heir; for though he might, on the death of his ancestor, have entered upon any lands aliened without his consent, the covenant of warranty descending upon the heir operated as a confirmation of the title of the grantee by obliging the heir who evicted him to yield the grantee a recompense in lands of equal value. This doctrine, it is said, was founded on the supposition that the ancestor would not wantonly disinherit his heir, who therefore was presumed to have received a recompense either in land or money which had purchased land, and that this equivalent descended to the heir, together with the ancestor's warranty.

Warranties are of two kinds: first, warranties in deed, or express warranties; and secondly, warranties in law, or implied warranties. A warranty in deed, or express warranty, can be properly created only by the use of the word *warrantizo*, or warrant. Warranties in law were so called because they were legal warranties without the use of the word warrant. If, after a partition or exchange of lands of inheritance, either party or his heirs be evicted of his share, the other party is bound by warranty in law, and upon a gift in tail, or lease for life, rendering rent, the donor, or lessor and his heirs, are bound in law to warrant the title. Warranty in deed was either *lineal* or *collateral*. Lineal warranty was where the heir derived, or might be supposed by possibility to have derived, his title to the land warranted either from or through the ancestor who made the warranty: thus if a grandfather were disseised, and the father released to the disseisor and died before the grandfather, this would be a lineal warranty to the son. Collateral warranty was where the title of the heir to the land neither was nor could have been derived from the ancestor who made the warranty; for instance, where a younger brother released with warranty to the disseisor of his father, and then died without issue: this was a collateral warranty to the elder brother. But where the conveyance to which the warranty was annexed followed immediately upon a disseisin, or operated in itself as such, as where a man who had no right entered upon lands and made a feoffment of them with warranty, or where a father, being tenant for years with remainder to his son in fee, made a feoffment in fee with warranty; this, which was in its commencement founded on the wrong of the warrantor himself, was called a *warranty commencing by disseisin*, and was not held binding on the heir of the tortious warrantor.

The obligation of the heir in both lineal and collateral warranty was founded on the supposition of his having other sufficient lands or assets descending to him from the warranting ancestor. The heir was not bound, when he had no assets, to insure the title of the alienee; yet in the case of estates in fee simple, the heir was barred by lineal warranty from claiming the estate, whether he had assets or not, on the ground that, by establishing his claim to the estate, he would gain assets if he had them not before, and would thereupon become bound to fulfil his ancestor's warranty. But the rule did not extend to estates tail, the right to which was not barred by warranty unless the heir actually had assets by descent in fee simple from the same ancestor who made the warranty. In the latter case warranty was held to be a sufficient bar to an estate tail, and was formerly one of the ways in which an estate tail might be destroyed, it being in fact nothing more than an exchange of the lands entailed for others of equal value.

The heir, whether assets descended to him or not, was held to be bound by collateral warranty, not only in cases of estates in fee simple, but in cases of estates tail also; and collateral warranty (though without assets) was considered to be a sufficient bar of the estate tail, and all remainders and reversions expectant thereon. The hardship and inconvenience of this doctrine with respect to collateral warranties were found to be so great, that various statutes were from time to time passed to restrain its effects. The statute of Gloucester, 6 Edw. I., c. 3, declared that a warranty of lands by a father, tenant by the curtesy, should be no bar to the son claiming his maternal inheritance, unless assets descended to him from the father. The 11 Hen. VII., c. 20, enacted that notwithstanding any alienation with warranty by the tenant in dower, the heir of the husband should not be barred, though he were also heir of the wife. And by the 4 & 5 Ann., c. 16, all warranties by any tenant for life were made void against those in remainder or reversion, and all collateral warranties by any ancestor who had no estate of inheritance in possession were void against the heir. As this last statute did not extend to estates of inheritance in possession, a tenant in tail in possession until lately might in some cases have made a good conveyance in fee simple by superadding to his grant a warranty, which, if accompanied with assets, barred his own issue by lineal warranty, and without them barred by collateral warranty such of his heirs as might be in remainder or reversion.

The doctrine of warranty was the foundation of the assurance by way of common recovery. [RECOVERY.]

The use of warranties in conveyances has long been superseded in practice by covenants for title, whereby, as the covenantor engages for his executors and administrators, his personal as well as his real assets are answerable for the performance of the covenant; while, on the other hand, he usually covenants for himself, or himself and his ancestors only, whereas a warranty extended to all mankind. By the 3 & 4 Wm. IV., c. 27, s. 39, no warranty can toll or defeat any right of entry or action for the recovery of land; by the 3 & 4 Wm. IV., c. 74, s. 14, estates tail and estates expectant thereon are no longer barrable by warranty; and in consequence of the recommendation of the Real Property Commissioners (*Third Real Prop. Rep.*), it is probable that the doctrine of warranty will before long be entirely abolished.

All the learning upon the subject of warranty of lands will be found in 'Coke upon Littleton,' with Hargrave and Butler's notes.

2. *Warranty of things personal.*—By the civil law an implied warranty as to the vendor's title was annexed to every sale, and in our law also a purchaser of goods and chattels may have satisfaction from the seller, who sells them as his own and whose title proves deficient, without any express warranty, if there be any fraudulent misrepresentation or concealment by the vendor, but, it seems, not otherwise. The authorities however upon this subject are not very satisfactory. (2 Bl., *Comm.*, 451; Chitty *On Contracts*, 447, 3rd edit.) But the vendor is not bound to answer for the quality of the wares purchased, unless he expressly warrants them to be sound and good, or unless he knew them to be otherwise, and has used art to disguise them, or has misrepresented them to the buyer. (Chitty, 449.)

No particular form of words is necessary to constitute a warranty, and a bare representation or description of the quality may amount to a warranty if there be nothing to negative such an understanding. The custom of any particular trade may establish an implied warranty between parties transacting business therein, it being presumed that the dealings of the parties were regulated by the custom in the absence of evidence to the contrary; but when there is express warranty, it cannot be affected by the custom of the trade. A sale of goods by sample is in effect a sale by warranty. A promise or warranty that the goods sold shall be of a merchantable quality is implied when the vendee had not at the time of the sale an opportunity of inspecting them, and when of course the general maxim of *caveat emptor* cannot apply. Also it seems that when a commodity is sold for a particular purpose, the seller must be understood to warrant it reasonably fit and proper for such a purpose, though at the time of sale the purchaser had an opportunity of inspection. Where there is an express warranty, written or, it seems, even verbal, the vendee is not at liberty to avail himself of representations not embodied in the contract and made by the vendor without fraud. A general warranty will not extend to defects that are plain and obvious to the senses, and require no skill to detect. it being presumed that the purchaser knew of and bought subject to them. It seems to be settled that when goods are sold expressly 'with all faults,' the seller is not liable in respect of latent defects, though he knew of them, unless some artifice be practised to prevent the buyer from discovering them; but even in the case of a sale with all faults, the vendor will still be liable on an express warranty against a particular defect. It has been said that there cannot be a warranty against future defects, but there seems to be no good foundation for the doctrine. It seems that a warranty ought to be given during the treaty for sale, or at least before it is substantially completed, and that a warranty given after the completion of a sale is not binding for want of consideration. It has been decided that in actions upon warranty it is not necessary to offer to return the goods before bringing the action, nor even to give notice of the breach of warranty to the seller, though of course the not having done so would be a suspicious circumstance in the plaintiff's case. If there has been no offer to return the goods, the measure of damages will of course be the difference between the sum given and the real value, as ascertained either by sale or estimation. If the warranty be accompanied by an express condition to take back the goods, if found defective, and return the price, the buyer ought to return the goods within a reasonable time in order to maintain his action; and if, after an offer is made to do seller refuse to receive them, they remain at his k.

e are certain rules which have been laid down with to sales of horses, one of the most common subjects ns on warranty. The fact that what is termed a price is given for a horse, does not imply any of its soundness. If at the time of the sale the s any disease, or has met with any accident which loes, or in its progress or results will diminish the ss of the animal, such a horse is unsound, and e a cough or temporary lameness which, though it curable and not permanently injurious, diminishes ent usefulness, is unsoundness. So any organic de- nsoundness, and therefore a nerved horse cannot dered sound. Roaring is unsoundness if it proceed ease or organic defect; but crib-biting, it seems, amount to unsoundness, though it is within a war- hat a horse was free from vice. A warranty of ss is broken if the disease or defect existed at the the sale, though it could not then be detected, and appear till some time afterwards. The question of dness or unsoundness of horses is one peculiarly he province of a jury to determine, and therefore a ll not set aside a verdict on account of the mere erance of contrary evidence, nor on the ground of uliarity in the nature of the unsoundness proved.

the subject of warranty of things personal, see *n Contracts*, 3rd edition, p. 447 *et seq.*, and the ies there cited.

REN. A Free Warren is a franchise which gives o have and keep certain wild beasts and fowls, ame, within the precincts of a manor, or any other known extent, whereby the owner of the franchise roperty in the game, and a right to exclude all rsons from hunting or taking it. It is laid down stone (2 *Comm.* 417), that originally the right of nd destroying game belonged exclusively to the d it is certain that this franchise, like that of a park, must either be derived from a royal grant, prescription, which supposes a grant. The law is tled in the Case of Monopolies (11 *Rep.*, 87, b.), is said that 'none can make a park, chace, or ithout the king's licence, for that is *quodammodo* priate those creatures which are *feræ naturæ et n bonis* to himself, and to restrain them of their liberty.' It is the opinion of Spelmann (*Gloss. Varrenna*) that free warren was introduced into by the Normans, and there are many instances of nts by the English monarchs subsequent to the t. Free warren cannot appertain to a manor ex- prescription, and even when held with the manor, ot pass by a grant of the manor without the ap- ces; nor, if it be held in gross, will it pass by a the manor and appurtenances. (3 N. & M. 671.) eral rights with respect to game which now belong f manors are vested in them by statute. [MANOR.] s not appear that the crown ever had the right of free warren to one person over the lands of an- ough such a right might be enjoyed by prescrip- he right of free warren over the land of another o arise under other circumstances, as when a man, ee warren over certain lands, aliened them, reserv- varren. (8 *Rep.*, 108.)

ren may lie open, and there is no necessity of en- t, as there is of a park. (4 *Inst.*, 318.) The beasts of ppear to be only hares and rabbits; and the fowls n are partridges and pheasants, though some add oodcocks, and water-fowl. (*Terms de la Ley*, 589.) tee of free warren acquired thereby the right to a person to watch over and preserve the game, warrener, who is justified in killing dogs, polecats, vermin which he finds disturbing or destroying the ro. Jac. 45), and by 21 Edw. I., s. 2, entitled *De toribus*, every forester, parker, or warrener was ed to kill persons trespassing in forests, parks, as, who resisted and refused to render themselves. anchise of free warren has nearly fallen into dis- the enactment of the modern statutes with respect

REN, SIR PETER, K.B., was born in Ireland in l was descended from a family long settled in that Having gone early to sea, he received his first l in 1727, and had distinguished himself in various parts of the world, both by his good conduct and his good fortune, when, in 1745, he was sent out with a small armament to surprise Louisbourg, the capital of Cape Breton. The town and the whole island surrendered on the 15th of June; and for this service Warren was immediately made a rear-admiral of the blue, and after his return home rear-admiral of the white. In the beginning of 1747 he was appointed second in command, under Anson, of a fleet sent out to intercept two French squadrons, the one bound for America, the other for the East Indies; when the former, whose object was the recovery of Louisbourg, was fallen in with, and effectually disabled. For his share in this affair Warren was rewarded with the Order of the Bath, and soon after made a vice-admiral of the white. The next year he was made vice-admiral of the red. Meanwhile, in the autumn of 1747, in the height of a popularity to which his private virtues contributed as well as his public services, he had been returned to Parliament for Westminister. A few years after this, in 1752, the general estimation in which he was held brought him a more singular compliment:—the inhabitants of the Ward of Billingsgate, in the city of London, having lost their alderman, insisted upon electing Warren, who had recently been made free of the Goldsmiths' Company, to the vacant post; the admiral declined the honour, and sent them a present of 200*l.*; pocketing the money, they sent a deputation to him to endeavour to persuade him to alter his resolution: it was in vain that he remonstrated with them; they persisted in their choice; and eventually he was obliged to pay the fine of 500*l.* to avoid serving. Warren died, after a short illness, on the 29th of July, 1752, while on a visit to his native country. He was buried in Westminster Abbey, where there is a monument to him by Roubiliac.

(Charnock's *Biographia Navalis*, 1796, vol. iv., pp. 184-192.)

WARREN, JOSEPH, was born at Roxbury, Massachusetts, in 1740: he graduated at Harvard College in 1759; and after leaving college he studied medicine, and obtained, while yet young, an eminent position among the medical practitioners of Boston. From 1768 till the commencement of hostilities, he was a leading member of the secret committee, or caucus, which directed the movements of the citizens of Boston. He was engaged in the affair of Lexington; and when Hancock left Boston to take part in the Congress at Philadelphia, was chosen president of the provincial congress. Four days later the battle of Bunker's Hill was fought, and Warren, who had thrown himself into the lines to encourage the Provincials, was killed by a ball which struck his head at the moment they began to retreat. He fell in his 35th year. His influence over his fellow-citizens was owing to his amiable manners, their conviction of his sincerity, his fearlessness, activity, and power of stimulating the passions by his oratory. The moral character of Warren stands high; he had displayed great ability as an agitator, but his premature death has left it uncertain whether he possessed in an equal degree the talents of the officer or statesman.

WARREN, THE RIGHT HONOURABLE SIR JOHN BORLASE, BART., G.C.B., was born in 1754, at the family-seat of Stapleford, in Nottinghamshire. His father, of the same names, was fourth son of Borlase Warren, eldest son of Arthur Warren of Stapleford, who married Anne, daughter and heiress of Sir John Borlase, Bart., the head of an antient Cornwall family, but resident at Great Marlow in Buckinghamshire, where he had considerable estates. The family of Warren traces its descent from the Norman William de Warrenne, earl of Surrey, who married Gundred, daughter of William the Conqueror.'

The subject of this notice, when at Winchester school, ran off and joined a king's ship, upon which his friends procured him an appointment as a midshipman on board the Alderney sloop, commanded by Captain O'Hara; and in this capacity he served for some time in the North Sea. Returning to England, he placed himself as a pupil with the Rev. Thomas Martyn, the well-known botanical professor, at Taplow near Cambridge; and was soon after admitted as a gentleman commoner of Emmanuel College in that university. He took his degree of M.A. in 1776. Before this, in 1774, he was returned to parliament for the borough of Marlow, and in 1775 was created a baronet. Soon after he returned to sea, and, serving with Lord Howe in America, as a lieutenant on board the Nonsuch, was, in 1779, made master and commander of the Helena sloop of war, and in 1781 received his commission as post-captain. He was re-elected for Marlow in 1780; and after the peace of 1783 he married the youngest daughter of General Sir John Clavering, K.B., by Lady Diana West, daughter of the Earl Delawar. On the breaking out of the war of 1793 he was appointed to the Flora frigate, and in this and other ships greatly distinguished himself as a vigilant and active commander. In 1794 he received the riband of the Bath, as a testimony of his majesty's high opinion of his services. In the summer of 1795 he acted as commodore of the division of ships which effected the debarkation at Quiberon Bay, intended to assist the royalists of La Vendée; and although that expedition proved eventually a failure, Warren was admitted on all hands to have well performed his part. In 1797 he removed into the Canada, of 74 guns; and being soon after detached to the coast of Ireland, he had the good fortune to fall in with the French naval force intended for the invasion of that country, and to obtain over it a signal victory, capturing the whole squadron, consisting of a ship-of-the-line and three frigates, on the 11th of October, 1798. For this important service he received a vote of thanks from both houses of parliament, and on the next promotion he was made a rear-admiral of the blue. Meanwhile at the general election of 1796 he had been returned to the House of Commons as one of the members for the town of Nottingham; and he was re-elected for the same place in 1802. After the peace of Amiens Sir J. B. Warren was made a privy councillor, and sent out as ambassador extraordinary and minister plenipotentiary to St. Petersburg, where he conducted some important and delicate negotiations with great ability. On the breaking out of the war with America in 1812, he commanded for a short time on that station; but this was his last service. He died at Greenwich, on the 27th of February, 1822. Of several children whom he had by his wife, his eldest son, an officer in the Guards, and a young man of great promise, died, many years before his father, in Egypt. Sir John Borlase Warren is understood to have been the author of 'A View of the Naval Force of Great Britain,' &c., published anonymously, in 8vo., in 1791.

(*Annual Biography; Biographical Dictionary of Living Authors;* Stockdale's *Baronetage*, 1806; Wilson's *Biographical Index to the House of Commons*, 1806.)

WARRINGTON, a parliamentary borough in the hundred of West Derby in Lancashire, 189 miles from the General Post-Office, London, by coach-road through St. Alban's, Dunstable, Stoney Stratford, Daventry, Coventry, Coleshill, Lichfield, Stone, Newcastle-under-Lyme, Congleton, and Knutsford; or 192 miles by the London and Birmingham Railway to Birmingham, and from thence by the Grand Junction Railway: this distance is travelled by the mail-trains in little more than nine hours.

Mr. Baines, in his 'History of Lancashire,' adduces evidence to show that Warrington was a Roman station, Veratinum, the Varatin of Ravennas; but the evidence is far from conclusive. In the time of Edward the Confessor the manor, called Walintune, was held by the king, and the place then gave name to one of the three hundreds, now merged in that of West Derby. Warrington derived its importance from a ford over the Mersey, on the north side of which the town stands. At the end of the fourteenth century a bridge was erected, which was about a century after replaced by a more substantial one of stone. For this stone bridge one of wood on stone piers was substituted in 1812. In the civil war of Charles I. the earl of Derby, a Royalist, fortified himself at Warrington. After one unsuccessful attempt, in March, 1643, the Parliamentarians from Cheshire, under Sir Wm. Brereton, and from Manchester, under Colonel Ashton, took the town in May or June that year. In the campaign against the Royalist Scots in 1648, Cromwell compelled a division of the Royalists, 4000 strong, to surrender at Warrington. When Charles II. entered England, in 1651, he had a sharp skirmish at Warrington with the Parliamentarians under Lambert and Harrison, who were compelled to retire. In 1659 Sir George Booth, formerly a Parliamentarian, who had raised the royal standard, was stopped in his flight from Winnington Bridge, near Delamere Forest, in Cheshire, where he had been defeated by Lambert, by the Parliamentary garrison of Warrington. The town was occupied by a strong force in the Jacobite insurrection of 1715; and the bridge was cut down in the insurrection of 1745, to prevent the passage of the rebels. The duke of Cumberland passed through Warrington in his march to the north in 1746.

The parish of Warrington has an area of 12,260 acres, divided as follows:—

Township or Chapelry.		Area in Acres.	Houses in 1831.				Population in 1831.	
			Inhab.	Uninhab.	Building.	Total.	Fam.	Persons
Burtonwood,	Chapelry ..	4,250	143	4	..	147	175	948
Poulton with Fearnhead	Township	1,070	122	7	1	130	124	709
Rixton with Glazebrook	Do. ..	2,850	158	2	..	160	165	902
Warrington,	Do. ..	2,600	3061	287	18	3366	3252	16,018
Woolstone with Martinscroft,	Do. ..	1,490	105	..	..	105	109	578
		12,260	3589	300	19	3908	3825	19,155

The town is on the north bank of the Mersey, just above the junction of the Sankey Brook, which passes not far from the town on the west side. It consists of a number of streets irregularly laid out and narrow. The principal coach-road between Liverpool and Manchester passes through the town, and formerly as many as seventy public carriages were running daily; but the formation of the Manchester and Liverpool Railway has almost entirely diverted this traffic. The streets are well paved, and lighted with gas; the houses are many of them old and indifferently built; but interspersed among them are a number of modern well-built habitations. The parish church is on the east side of the town, near the entrance of the coach-road from Manchester. It is a large cruciform building of various dates, capable of accommodating nearly 1800 persons. The chancel is the most antient part, and is a good specimen of decorated English character. The windows, especially the east window, have very elegant tracery. The north transept is of perpendicular character, of late date, and poor execution: the remaining parts of the church are modern. There are five episcopal chapels or churches in the parish, two in the town, three in the out-parts of the parish. One of these, St. Paul's, in the town, was finished in 1831, and is of Gothic architecture, with a tower; and one (Padgate) is of still later erection. The others were erected in the last century. There are in the parish three Catholic chapels and ten meeting-houses for dissenters. Beside these buildings there are a town-hall, a market-hall in the market-place, two cloth-halls, a bridewell, or place of temporary confinement, assembly-rooms, a theatre, and extensive gas-works.

Warrington was among the earliest seats of manufacture in Lancashire. Coarse linens and checks were its first fabrics, to which succeeded huckaback, then sail-cloth (with which Warrington is said at one time to have supplied half the British navy), and sacking. At present the chief branches of industry are cotton-spinning and power-loom weaving, the manufacture of flint-glass and glass bottles, machinery and mill-work, wire, pins, files, nails and tools, spades, rope, sail-cloth, soap, glue, size, hats, and gunpowder: there are steam-mills for flour, malt-houses, tan-yards, a paper-mill, and two or three breweries. The Warrington ale has long been celebrated. The market is on Wednesday for corn, vegetables, and butcher's meat: a market of less consequence is held on Saturday. There is a chartered fair every fortnight for cattle, long disused, but revived a few years since with good success; and there are two yearly fairs for woollen-cloth, Irish linens, Welsh flannels, horses, horned cattle, pigs, sheep, and pedlery. Potatoes and vegetables are cultivated to a considerable extent round the town. The Mersey is navigable up to Warrington at spring-tides for vessels of from 70 to 100 tons. The navigation of the river Mersey and its feeder the Irwell is continued upward to Manchester. The Mersey and Irwell Canal joins the Mersey near Warrington; and the Sankey Canal, the Duke of Bridgewater's Canal, and the Grand Junction Railroad, all pass near the town. There was formerly an important salmon and smelt fishery in the Mersey, but it has much declined.

Warrington was made a parliamentary borough by the Reform Act, and returns one member. The borough includes the township of Warrington and that of Latchford, with some detached portions of Thelwall township. Latchford township is in Grappenhall parish, on the Cheshire side of the Mersey: it has an area of 1010 acres, with (in 1831) 422 houses inhabited, 26 uninhabited, and 2 building;

together 450 houses, with 439 families and 2166 persons. The portions of Thelwall township (or rather chapelry) in Runcorn parish, also in Cheshire, which are included, have only two houses. The population of the parliamentary borough by the census of 1831 was 18,184, exclusive of those in Thelwall. The number of voters in 1835-6 was 557; in 1839-40, 633.

The living of Warrington is a rectory, of the clear yearly value of which there is no return. The perpetual curacies of Trinity and St. Paul's chapels or churches, in the town, are of the respective clear yearly values of 130*l.* and 150*l.*; Hollinfair or Hollinfare chapelry, of 136*l.*; and Burtonwood chapelry, of 96*l.* The value of Padgate is not returned. The parish is in the rural deanery of Warrington, and in the archdeaconry and diocese of Chester.

There were in the parish, in 1833, one infant-school, with 50 boys and 50 girls; forty other day-schools of all kinds, with 828 boys, 685 girls, and 95 children of sex not distinguished in the return; making a total of 1708 children, or about one in eleven of the whole population, under daily instruction. One of the schools was a free grammar-school, well endowed, with 40 boys; two others were also endowed, one of them richly, with 164 boys and 60 girls; and another was a school of industry, partly supported by subscription, with 100 girls. There were at the same time sixteen Sunday-schools, with 1334 boys, 1308 girls, and 42 scholars of sex not distinguished, giving 2684 children, or about one in seven of the population, under Sunday instruction.

About the middle of the last century an academy for superior education among the dissenters was established at Warrington; and several eminent men, including Dr. John Taylor, author of the Hebrew Concordance; the elder Dr. John Aikin, father of Mrs. Barbauld; Dr. Enfield; Dr. Priestley; Reinhold Forster, the naturalist; and Gilbert Wakefield, were engaged in conducting it. It did not however succeed. During the continuance of the academy several works were printed and published at Warrington, including Howard's work 'On Prisons,' Mrs. Barbauld's 'Corsica,' and some other poems, and 'Mount Pleasant,' a poem, the earliest publication of the late William Roscoe. Dr. Percival was a native of Warrington.

There are a public subscription library, a mechanics' institution, and a dispensary.

(Baines's *History of Lancashire*; *Parliamentary Papers*; *Clergy List*; Pigot's *Directory*.)

WARSAW, formerly the capital of all Poland, and now of the kingdom of Poland, of which the emperor of Russia is sovereign, and of the government Mazovia, is agreeably situated on an eminence on the left bank of the Vistula, in 52° 10′ N. lat. and 21° E. long. It consists of the city itself, which is divided into the Old and the New Town, and of several suburbs, among which Praga, on the right bank of the Vistula, over which there is a bridge, is sometimes reckoned. The city is not regularly fortified, yet it is surrounded with lines, and since the revolution of 1830 a very strong citadel has been erected, which completely commands it. The circumference of the city and suburbs (including Praga) is ten miles, but there are many gardens and fields in this area. The city itself is irregularly built and the streets narrow, but the suburbs, especially those called the New World and the Cracow suburbs, are distinguished by their regularity and fine buildings: it is probably with these in view that Cannabich says (in 1836): 'Warsaw has latterly become one of the handsomest cities in Europe, adorned with splendid edifices, with broad, well-lighted, and paved streets; the mean wooden houses in the remote streets gradually disappear, and others of stone take their place.' Among the public buildings are—1, the royal palace, built by King Sigismund III., who transferred his residence from Cracow to Warsaw; 2, the Saxon palace, with a fine garden; 3, the palace, formerly the residence of the primate, since occupied by the commissariat department; 4, the Krasinski palace, a very fine building, now the palace of the government; 5 and 6, the palaces formerly belonging to Prince Radzivil and Count Brühl; 7, the university (now suppressed); 8, the arsenal; 9, the new mint; 10, Marieville, an imitation of the Palais Royal at Paris; 11, the military hospital; 12, the great barracks. There are besides above a hundred palaces of the Polish nobles, fourteen monks' and four nuns' convents (some of them have been suppressed) with churches, and many other churches, a few of which are remarkable; among them are the cathedral, the church of the Holy Cross, that of St. Alexander (built by means of contributions which were collected for the purpose of erecting a triumphal arch in honour of the emperor Alexander's first entry into Warsaw); and, above all, the beautiful Lutheran church. Warsaw has five theatres, and numerous useful and charitable institutions, such as the National Bank, established by order of the emperor Nicholas in 1828, for the purpose of discharging the national debt and promoting trade and commerce; a foundling hospital, six other hospitals, an agricultural academy, a deaf and dumb asylum, and numerous schools. The population of the city and suburbs has greatly increased, and probably amounts to nearly 150,000 inhabitants, of whom 30,000 are Jews. The manufactures are of many different kinds, and the trade of the city is considerable, being favoured by the Vistula and five annual fairs. It is a great impediment to the foreign trade that the mouth of the Vistula is in possession of Prussia, and this impediment will continue as long as Russia persists in its very rigorous prohibitory system against commercial intercourse with Prussia.

Before the Cracow gate stands the gilt bronze statue of King Sigismund III. on a marble column 26 feet high. The emperor Nicholas caused a splendid monument to be erected in the church of the Capuchins, in honour of King John III. (Sobieski), the conqueror of the Turks. In 1830 the statue of Copernicus was erected before the palace of the Royal Society of Friends of the Sciences, and that of Prince Joseph Poniatowski, who lost his life in the battle of Leipzig, in the Cracow suburb, both executed by a Polish artist named Taturkinvitsch, under the direction of Thorwaldsen.

We have given a rather less detailed account of Warsaw than of some other great cities; but it is in fact more easy to say what Warsaw was than what it is: the changes made by the Russian government, especially since 1831, are very numerous, and a system, the manifest tendency of which is to Russianize Poland, is followed up with unremitting perseverance. The university was abolished in 1834, and its library of 150,000 volumes and all its other valuable collections transferred to St. Petersburg; the Academy of Sciences is dissolved: the provinces, formerly called Woiwodships, are to be henceforth called governments, as in Russia, and the Polish names for circles and districts, Obwodi and Poweti, are changed for the Russian names, Ujesdi and Okrugi. 'Many changes in Warsaw and the kingdom,' says a letter from Poland, of the 7th of May, 1843, 'indicate that the great measure of reform projected by the emperor will be steadily carried into effect. The work of assimilation to the colossal empire proceeds rapidly, and one Polish institution, one Polish name after another disappears. Measures, weights, money, the division of the kingdom into circles and districts, the superintendence and management of the roads and rivers, all are Russian. Thus, a beginning is made with things that interfere in the daily concerns of life, and, however inconvenient and disagreeable this may be to the people, they gradually become used to it, and the great work advances. The Roman Catholics complain to heaven of the measures adopted with regard to the church in favour of the Greek religion; but who shall put a veto on the imperial commands issued from St. Petersburg? We even believe that a new allocution of his Holiness which should complain of further infringements of the rights of the Romish church, would be welcome at St. Petersburg, and give occasion for the issue of further ukases. While the clergy, with much zeal, hold fast to the antient faith, the people appear in general to be indifferent. There can be no greater proof of the spread of the Greek religion than the manner in which Easter has been observed at Warsaw this year; it was an exact counterpart of Easter at St. Petersburg; there were games of all sorts, rope-dancing, puppet-shows, dioramas, equestrian exercises, shows of wild beasts, swings, in a word, everything to which a purely Greek population is accustomed at that season. The people of Warsaw in general were quite delighted, especially as spirituous liquors were not wanting; even the higher classes did not keep away, but beheld from their carriages the amusements of the people. What the Roman Catholic clergy felt it would not be easy to describe. On the 29th of April, the birthday of the emperor's eldest son, the grand duke Alexander, was celebrated in the most splendid manner, by divine service in all the churches, a parade of the garrison, a grand ball at the residence of the military governor, and a general illumination. The magnificent church of St. Borromeo now building at Warsaw is to be finished this year. It is enriched with marble and various ornaments, and will indisputably be the handsomest in the capital of Poland.'

(Hassel, *Das Russische Reich in Europa*; Bro
Conversations Lexicon; Cannabich, *Lehrbuch*;
Handbuch, by Hörschelmann; *The Allgemeine Zei*
Augsburg.)

Table of some of the principal Buildings at Warsaw.

	Date.	Architect.	Remarks.
Church of the Holy Cross	1682-96	..	In Italian style, with two towers to front.
Lutheran Church	fin. 1781	..	A rotunda 200 feet in diameter, with dome 300 fee Tetrastyle Doric portico.
Alexander Church	1814	Aigner	Hexastyle Corinthian portico at each end. Low d lofty tambour with windows.
St. Andrew's	..	Aigner	Tetrastyle Ionic portico.
Observatory	..	Aigner	Said to be one of the finest in Europe.
Exchange	..	Aigner	
Guard-house	..	Aigner	In imitation of 'La Gran Guardia' at Verona.
University	1816	Spilefski	Formerly a royal palace, Corinthian order with po basement.
Mint	..	Lessel	Finished by Aigner. Hexastyle Ionic portico.
Academy of Sciences	1822-23	Corazzi	An order in columns and pilasters on a basement of arcades.
School of Fine Arts	..	Spilefski	
Dominican Church	1823	Spilefski	Gothic.
Zamek, or antient Royal Palace	1816	Kubicki	New façade added by him.
Riding-House	1818	Kubicki	Hexastyle Doric portico, both fronts.
Artillery Barracks	1818	Kubicki	
Cavalry Barracks	1818	Kubicki	
Government Palace	1823	Aigner	A Corinthian order on a lofty basement. Style ver
Palace, Minister of Finance	1822-23	Corazzi	Centre Corinthian with bold hexastyle portico on ment; the Ionic colonnades forming the wi Spilefski.
Foundling Hospital	1824	..	Façade upwards of 1000 feet long.
Engineer and Artillery Schools	..	Minder	One of the noblest buildings in the city.
Military Hospital	..	..	A vast pile, originally begun by Kramsitzer, as a residence for Stanislaus Augustus.
Krasinski Palace	..	..	Ionic; marble columns.
Lazienka, Royal Villa	1780	Kramsitzer	

WARTS, the name of small tumours or excrescences which occur on the cuticle. Like all other epidermoid tumours, they are unorganized in their origin and course. They are generally of a conical form, embrace only a small extent of surface, are hard, insensible, and in colour are usually darker than the surrounding surface. In structure they have a radiated character. Their growth is slow, and they derive their nutriment from the cutis over which they lie. The parts of the body on which these excrescences most frequently occur are the hands and face, although they are by no means confined to these localities. They are of an innocent character, and produce no ill consequences, except by pressure, when they occur in such parts as between the fingers and toes or on the eyelids.

When stimulated strongly, they generally get smaller or disappear altogether. Hence the best mode of treatment is the application of stimulants. It is however a curious fact that they often disappear under the use of the simplest remedies, when more violent ones have failed to affect them. The most effectual remedy is cutting them away. When this may be objected to, the caustic applications recommended are nitrate of silver, strong acetic acid, muriated tincture of iron, or a powder composed of subacetate of copper and sabine in equal parts, or the application of a hair-pencil dipped in sulphuric acid.

The thin integuments situated near the anus are often found to be the seat of excrescences having the character of warts. They are of all sizes, from a pea to an orange. When small, they may be removed by the application of the stimulants recommended above; and when large, they should be cut away with the knife.

WARTON, JOSEPH, D.D., was the eldest son of the Rev. Thomas Warton, professor of poetry in the university of Oxford, and afterwards vicar of Basingstoke, Hampshire, and Cobham, Surrey; and of Elizabeth, daughter of the Rev. Joseph Richardson, rector of Dunsford, Surrey. He was born at Dunsford, in the house of his maternal grandfather, in 1722; was educated, till he reached his fourteenth year, principally at home by his father; was then admitted on the foundation of Winchester College, whence
to Oriel College, Oxford, in 1740. Having taken
gree of B.A. in 1744, he was ordained to the cura
father's vicarage of Basingstoke; and here he offici
he removed, in February, 1746, on the death of hi
to Chelsea, where he was curate for about a year
this he held for a few months the curacy of Chaw
Droxford in Hampshire, and then returned to Basi
In 1748 he was presented by the duke of Bolto
rectory of Winslade, in the neighbourhood of Basi
upon which, although the living was but a poor
immediately married Miss Damon, to whom he h
for some time attached.

One of Warton's schoolfellows at Winchester
lins, afterwards the celebrated poet; and they two
other boy had in those early days been poetical con
to the 'Gentleman's Magazine.' Warton's next
composition appears to have been his ode entitled
stition,' which he sent from Chelsea to Dodsley's 'M
in April, 1746. The same year he published a vo
Odes and other poems, in the same month, it is
which his friend Collins printed his 'Odes, Descrip
Allegorical.' In this or the next year also, he jo
brother Thomas in publishing by subscription a v
his father's poems. In 1749 appeared his 'Ode
West' (Gilbert West, the translator of Pindar).

In 1751 Warton accepted the invitation of his pa
duke of Bolton to accompany him on a tour to t
of France, with the understanding that he shou
readiness, immediately on the death of the duchess
a confirmed dropsy, to marry his grace to his
Miss Lavinia Fenton, the actress. This engagem
pears to have been thoughtlessly made by Wart
after all, left the duke before the duchess died, a
he, upon that event, solicited permission to return,
to his mortification that the marriage had been p
by another clergyman.

After his return to England, Warton published
tion of Virgil, accompanied with a new verse tr
of the 'Eclogues' and 'Georgics' by himself, and o

'Æneid' by Christopher Pitt, and illustrated by numerous notes and dissertations. The translation was intended to be an improvement upon that of Dryden, but its greater smoothness is obtained at a considerable sacrifice of ease and spirit. The work, which appeared in 1753, brought Warton great reputation at the time; and is stated to have been the ground upon which he was honoured by the university of Oxford with a diploma of M.A. in 1759.

Among the most popular of Warton's literary performances are some papers on critical subjects, which he contributed to Dr. Hawkesworth's periodical publication, the 'Adventurer,' in 1753. In 1754 he sent some of his early poetical productions to Dodsley's Collection, then in course of publication. That year he was instituted to the living of Tunworth, on the presentation of the Jervoise family; in 1755 he was elected second master of Winchester school; and in 1756 his friend Sir George Lyttelton, on being made a peer, nominated him one of his chaplains. He now published, in 1756, the first volume, in 8vo., of the work by which he is principally known, his 'Essay on the Writings and Genius of Pope.' It appeared without his name, but the authorship of it seems to have been generally known from the first. This is the work in which the principles of what has been called the Warton school of poetical criticism will be found to be most systematically expounded; although the same mode of thinking is to be detected in all the critical writings of the two brothers. Though the author was far from disputing the great merit of Pope in his own walk of poetry, and only contended that his was not the highest kind of poetry, the book gave great offence to the generality of Pope's admirers; and its reception on the whole does not appear to have been encouraging. Its conclusion, in a second volume, did not appear till 1782. It has however since made its way in public favour, and is now admitted, even by many who do not go all the length of the author's distinction between what he called the poetry of fancy and the poetry of reason, and of his exaltation of the former over the latter, to have at least called attention to some important views in regard to this matter which had been too much forgotten, and in that way to have had a decidedly favourable effect upon our poetical literature.

In 1766 Warton became head master of Winchester school, upon which occasion he visited Oxford, and took his degrees of Bachelor and Doctor in Divinity. In 1772 he lost his wife; but in about a year married Miss Nicholas, daughter of Robert Nicholas, Esq. In 1782 his friend Dr. Lowth, then Bishop of London, gave him a prebend of St. Paul's, and the living of Thorley, in Hertfordshire, which he afterwards exchanged for Wickham. In 1788, through Lord Shannon, he obtained a prebend in Winchester cathedral, and, through Lord Malmesbury, the rectory of Easton, which he was soon after permitted to exchange for Upham. In 1793 he resigned the mastership of Winchester school. After this he undertook an edition of Pope's works with notes, which he completed in 9 volumes, 8vo., in 1797. It was followed by the commencement of a similar edition of Dryden, of which he lived only to publish two volumes. He died 23rd of February, 1800, leaving a son and three daughters, the youngest by his second wife, who survived till 1806. A Biographical Memoir of Dr. Joseph Warton, with a selection from his poetry and literary correspondence, was published in 1806 by the Rev. John Wooll, master of the school of Midhurst in Sussex. The poetry of Joseph Warton has little merit beyond that of an agreeable vein of common-place fancy, and some elegance and neatness of expression.

WARTON, THOMAS, was the younger brother of Dr. [illegible]eph Warton, and was born at Basingstoke, in 1728. [illegible]ke his brother, he was mostly educated at home by his [illegible]ther, till he was admitted a commoner of Trinity College, [illegible]xford, in March, 1743. He was soon after elected a [illegible]holar, took his degree of M.A. in 1750, succeeded to a [illegible]llowship in 1751, and spent the rest of his life in his col[illegible]ge, employing his time partly as a tutor, partly in literary [illegible]cupations.

[illegible]he first of his compositions that were printed were a [illegible]g and a prose essay, which he communicated in 1745 to [illegible]dsley's 'Museum.' Soon after he published by itself his [illegible]m entitled 'The Pleasures of Melancholy.' The first [illegible]duction however that brought him into much notice [illegible] his 'Triumph of Isis,' published in 1749, in reply to [illegible]son's poem of 'Isis,' which was a satire upon the loyalty of Oxford. In 1750 he contributed a few pieces to 'The Student, or Oxford and Cambridge Miscellany,' amongst which was his 'Progress of Discontent,' one of the happiest of his humorous effusions. The next year he published his satire entitled 'Newmarket,' and some other pieces in verse. In 1753 he edited, without putting his name to it, a small volume, which appeared at Edinburgh, with the title of 'The Union, or select Scots and English Poems,' among which were several of his own, some previously published, some new. In 1754 he published, in an 8vo. volume, his 'Observations on the Faerie Queene of Spenser,' a work which at once established his reputation both for true poetical taste and for extensive and varied learning. It was extended to two volumes in a second edition, which appeared in 1762.

In 1757 Warton was elected professor of poetry; and in the course of the lectures which he delivered while he held that office he introduced his translations of pieces in the Greek Anthology now printed among his collected poems, and also his Dissertation on the Bucolic Poetry of the Greeks, which he afterwards prefixed, in Latin, to his splendid edition of Theocritus, published, in 2 vols. 4to., in 1770. In 1758 he published, in 4to., a tract, now become rare, entitled 'Inscriptionum Romanarum Metricarum Delectus,' a selection of Roman epigrams or inscriptions, with the addition of some modern ones, among which are a few of his own. In this and the following year also he contributed several papers to his friend Dr. Johnson's periodical publication, 'The Idler.' In 1760 he published anonymously, in 12mo., 'A Description of the City, College, and Cathedral of Winchester.' This was followed the same year by a piece of drollery, entitled 'A Companion to the Guide, and a Guide to the Companion, being a complete supplement to all the Accounts of Oxford hitherto published,' which presently went through three editions. Soon after this he wrote for the 'Biographia Britannica' the life of Sir Thomas Pope, which he republished by itself, in 8vo., in 1772, and again in 1780, with considerable alterations and additions. In 1761 he produced, in an 8vo. volume, his 'Life and Literary Remains of Dr. [Ralph] Bathurst' (celebrated for his Latin poetry). His next separate publication was the *jeu d'esprit* entitled 'The Oxford Sausage, or Select Pieces written by the most celebrated Wits of the University of Oxford,' which came out anonymously in 1764. From this date he appears to have printed nothing till 1766, when he superintended an edition from the Clarendon press of the Greek Anthology of Constantinus Cephalas, to which he prefixed a learned preface.

He took his degree of B.D. in 1767, and in 1771 he was instituted to the small living of Kiddington in Oxfordshire, on the presentation of the earl of Lichfield, then chancellor of the university. This and the donative of Hill Farrance in Somersetshire, to which he was presented by his college in 1782, were Warton's only ecclesiastical preferments, although, as has been remarked, the number of persons of rank to whom he had been tutor (among them the son of Lord North) might have fairly led him to expect a much larger share of patronage. He would no doubt have obtained something more, if he had cared very much about it; but, besides that his modest and unambitious nature kept him from asking, he had no taste either for theological studies or professional duties. It is related that in preaching he used to confine himself mostly to two sermons, one of which was an old one of his father's—the other a printed one, here and there curiously abridged with the pen.

In 1774 he published the first volume, in 4to., of his great work, 'The History of English Poetry.' A second volume appeared in 1778, and a third in 1781. Into this elaborate performance Warton poured the accumulated stores of a lifetime of reading and reflection; and the survey he has given us of his subject is accordingly both eminently comprehensive in its scope, and rich and varied in its details. The work is indeed too discursive and too much encumbered by minute learning to have anything of the character of a classical composition; but it is a repository of information respecting our early national literature altogether unapproached in extent and abundance by any other single work of the same kind in the language. Warton's just taste and true poetic feeling give at the same time a [illegible] to his pages which [illegible] the book for [illegible] a [illegible]. [illegible] unfinished: of the fourth volume only about ten sheets were found to be printed at his death, bringing down the history very little beyond the commencement of the reign of Elizabeth. There have been two recent editions of it in 8vo., with the addition of much new matter in the form of annotation, but without any continuation of the narrative: one in four volumes, by the late learned and accomplished Mr. Richard Price, London, 1824; the other in three volumes, forming a reprint of Mr. Price's edition, with additional notes, which was brought out under the care of Mr. Richard Taylor, in 1840.

Warton made a collection of those of his poems which he thought worthy of preservation, and published it in 1777; and other editions followed in 1778, 1779, and 1789. He was made poet-laureate on the death of William Whitehead; and the same year he was elected Camden Professor of History at Oxford, on the resignation of Dr. William Scott (the late Lord Stowel). In 1785 also he published an edition of Milton's Juvenile or Minor Poems, copiously illustrated with learned and curious notes, of which a re-impression, prepared before his death, appeared in 1791. He died suddenly, on the 21st of May, 1790. A Life of Warton was prefixed to a new edition of his Poems, by Mr. Mant, in 1802.

Thomas Warton, having produced no poetical performance of any considerable length, can only be reckoned as one of our minor poets; but among these he occupies a high place—not in the first rank, with Collins and Gray, but perhaps in that next to them. His poetry, without including his Pindaric odes, which, although they are also superior to many, may be dispensed with in the estimate of his claims, embraces three very distinct departments—the descriptive, the romantic, and the humorous; and in each of these kinds of writing he has shown much more than mere taste and imitative power. He had at least both the ear and eye, if not much of the 'fine frenzy,' of a poet, and wrote always from genuine, although not perhaps the most passionate, impulses. There are not many things of the kind in the language, except in Prior and Swift, better than his 'Progress of Discontent;' his lines 'To the First of April,' without the same richness of glow, have much of the picturesqueness, as well as true natural feeling, of Milton's 'L'Allegro' and 'Il Penseroso;' and his tale, or ode, as he calls it, entitled 'The Crusade,' is perhaps superior to any preceding attempt to re-awaken the echoes of our antient romantic minstrelsy.

WARWICK. [WARWICKSHIRE.]

WARWICK, GUY, EARL OF. Several of our mediæval chroniclers speak of this famous personage as having without doubt actually existed: Henry Knighton, for instance, who wrote about the end of the fourteenth century, gives a full abstract of his story in his 'Chronica de Eventibus Angliae' (printed in Twysden's 'Scriptores Decem,' pp. 2311-2743). And even in modern times several writers have been inclined to hold that his exploits had probably a basis of reality. Dugdale does not admit him into his Baronage; but in his 'Warwickshire,' although he acknowledges that the monks have sounded out his praises too hyperbolically, he considers his story to be not wholly legendary or apocryphal, and even takes pains to fix the date of one of his achievements,—his combat with the Danish champion, 'Colbrand, the giant, that same mighty man,' as he is called in 'King John' by Shakspere, who has also another allusion to the same matter in his 'Henry VIII.' (act v., sc. 3),—to the year 926, when Guy, as he conceives, was in the sixty-seventh year of his age. Much more recently, Mr. George Ellis (in his 'Specimens of Early English Metrical Romances') has suggested that possibly Egil, an Icelandic warrior, who contributed very materially to the important victory gained by the Saxon king Athelstan over the Danes and their allies at Brunanburgh, 'becoming the hero of one of the many odes composed on the occasion of that much celebrated battle, may have been transformed, by some Norman monk, into the pious and amorous Guy of Warwick.' 'This,' observes Mr. Price, the late editor of Warton's 'History of English Poetry' (ii. 2), 'at best is but conjecture, nor can it be considered a very happy one. . . . . The initial letters in Guy, Guyon, and Guido are the representatives of the Teutonic W, and clearly point to some cognomen beginning with the Saxon *Wig* (bellum).'

Guy, in fact, must be considered as a personage belonging not to history, but to fable and romance. Camden was perhaps one of the first inquirers among us, if not the very first, who ventured to intimate so much, when in giving an account of the earls of Warwick in his 'Britannia' (Warwickshire) he wrote (as Bishop Gibson has translated the passage), 'To pass by Guar, and Morindus, and Guy, the echo of England [the Latin is, Angliae tympanum, meaning rather the drum of England, that is, the most resounding of English names], with many more of that stamp, which the fruitful wits of those times brought forth at one birth.' Ritson, in his 'Dissertation on Romance and Minstrelsy,' prefixed to his 'Antient English Metrical Romances,' pp. 91, &c., has taken some unnecessary pains to establish the non-historical character of Guy.

Even as a hero of romance Guy can scarcely be traced with certainty to a more remote date than the earlier part of the fourteenth century. 'Guy of Warwick,' Ritson observes, 'is mentioned by no English historian before Robert of Brunne, or Peter de Langetoft, about 1340.' Among the 'romances of price' enumerated by Chaucer in his 'Rime of Sir Thopas,' in the 'Canterbury Tales,' are mentioned those of 'Bevis and Sir Guy' (line 13,827). Bishop Percy, in his 'Essay on the Antient Metrical Romances,' in the third volume of his 'Reliques of Antient English Poetry,' remarks (p. 33) that 'the Romance of Sir Guy was written before that of Bevis, being quoted in it.' In this place Percy gives an account of various manuscripts of the romance of Sir Guy, and also of some other old romances connected with the same story. See also the fourth appendix to Sir Walter Scott's edition of 'Sir Tristrem.' Percy (vol. iii., pp. 100-117) has published two old English poems, 'The Legend of Sir Guy,' and 'Guy and Amarant.' Some extracts from the romance of Sir Guy are given by Warton, 'Hist. of Eng. Poet.,' ii. 1-7 (edit. of 1824). See also vol. i., pp. xxxix., ccxliv., 91-93, 146, 147, 149; ii. 44; iii. 2, 425. An account of the romance of Guy of Warwick, with copious extracts, is given in Ellis's 'Metrical Romances,' vol. ii., pp. 3-94. For a compendious summary of the hero's exploits, the reader may turn to the 'Legend' printed by Percy, or to the 12th and 13th songs of Drayton's 'Polyolbion.' The modernised prose abridgment of the story of Sir Guy used to be a common stall pamphlet. The original metrical work, under the title of 'The Book of the most victorious Prince, Guy, Earl of Warwick,' was, according to Ritson, printed in 4to. by William Copland before 1567, and again by John Cawood before 1571: of the earlier impression there is an imperfect copy in Garrick's collection at the British Museum, and there was a perfect one in the Roxburgh Library. There is also a French romance of Sir Guy, which was printed in 1525; but whether earlier or later than the English may perhaps be doubted, although Mr. Ellis has said that the work which he has abridged 'was written, in French at least, as early as the thirteenth century, and translated in the beginning of the fourteenth; so that Mr. Warton is evidently mistaken in supposing that it was partly copied from the 'Gesta Romanorum' (cap. 172), which, by his own admission, was composed at a much later date.'

WARWICK, EARLS OF. The first historical earl of Warwick was Henry de Newburgh, a younger son of Roger de Bellomont, earl of Mellent in Normandy: he was so created by the Conqueror, and died in 1123. In this family the honour remained till Thomas de Newburgh, dying in 1242, without issue, left Margery, his half-sister, his heir; and, she marrying first John Mareschall, of the family of the earls of Pembroke, and, after his death, John de Plessets, each of these her husbands took successively the title of earl of Warwick. She had however no issue by either; and her second husband having died in 1263, and she herself soon afterwards, the earldom was inherited by William Mauduit, or Malduit (in Latin, Male-doctus), who was her first cousin, being son of her aunt Alice (half-sister of her father) and of William Mauduit, baron of Hanslap. On his death, without issue, in 1267, he was succeeded in the earldom by William de Beauchamp, baron of Elmley, who was his nephew, being the son of his sister Isabel de Mauduit and her husband William de Beauchamp. The Beauchamps continued earls of Warwick till the death, without issue, of Anne, countess of Warwick, in 1449, upon which Richard Nevil, eldest son of Richard, earl of Salisbury, having married Anne de Beauchamp, aunt of the late countess, was created earl of Warwick the same year: he succeeded to the earldom of Salisbury in 1469, and was killed at the battle of Barnet, in 1471; when, an act of attainder having taken place, his honours were forfeited, and George Plantagenet, duke of Clarence, brother of king Edward IV., having married Isabel Nevil, his eldest daughter, was created earl of Warwick and Salisbury in 1472. Clarence was put to death and attainted in 1478; but his son Edward Plantagenet bore the title of earl of Warwick till he also met with a similar fate in 1499. From this time there was no earl of Warwick till the honour was conferred by Edward VI., in 1547, upon John Dudley, Viscount L'Isle, who was maternally descended from Margaret Beauchamp, daughter of Richard de Beauchamp, twelfth earl. Dudley (afterwards created duke of Northumberland) was attainted and beheaded in 1553; but his second son, Ambrose Dudley, after being restored in blood, was created earl of Warwick by Queen Elizabeth in 1562, and retained the title till his death, without issue, in 1589. After this the earldom remained extinct till 1618, when it was revived and conferred by James I. upon Robert Rich, third Baron Rich of Leeze; and it was retained (from 1673 in conjunction with the earldom of Holland) by this family till the death of Edward Rich, earl of Warwick and Holland, without male issue, in 1759. Upon this event the earldom of Warwick was conferred upon Francis Greville, first Earl Brooke, whose ancestor, Sir Fulke Greville, early in the sixteenth century, married Elizabeth Willoughby, granddaughter and heiress of Lord Willoughby de Broke and his wife Elizabeth Beauchamp, who was descended from Walter de Beauchamp, baron of Alcester and Towyck, third son of Isabel de Mauduit and William de Beauchamp, and brother of William de Beauchamp, who became earl of Warwick in 1267. In this family the titles of Earl Brooke and earl of Warwick still remain, the latter, contrary to what is usual, being the one commonly used, although the former, conferred in 1746, is by a few years of earlier date.

WARWICK, RICHARD DE BEAUCHAMP, EARL OF, K.G., was the son of Thomas, eleventh earl, and of Margaret, daughter of William, Lord Ferrers of Groby, and was the first of his family who greatly distinguished himself in the service of the state. He succeeded to the title upon the death of his father in 1401. In 1417 he was created earl of Aumerle for life. In 1425, having been sent over to France with a reinforcement of 6000 men, he was left by the duke of Bedford to act as regent of that kingdom during his own absence in England. While holding this post he carried on the war with great success, making himself master in the course of the next two years of some of the strongest places in the province of Maine. On the return of the duke of Bedford to France in February, 1428, Warwick was called home by the English council, and appointed governor to the king, Henry VI., now in his seventh year, and hitherto brought up under the care of Dame Alice Botiller. He continued to perform the duties of this honourable office, which seems to have been no sinecure, till 1437, when, on the recall of the duke of York from the regency of France, Warwick was sent over as his successor; but this his second administration of the affairs of that kingdom was not distinguished by any remarkable event, or by any at least in which he was personally engaged. He fell sick before he had held his appointment quite two years, and died at the castle of Rouen on the 30th of April, 1439. In October following his body was brought over to England, and interred at Warwick. This earl of Warwick, who was styled the Good, left by his second wife, Isabel, daughter of Thomas Despenser, earl of Gloucester, a son, Henry, and a daughter, Anne, who married Richard, eldest son of Richard Nevil, earl of Salisbury, created earl of Warwick in 1449.

WARWICK, HENRY DE BEAUCHAMP, EARL AND DUKE OF, K.G., was the son of Richard, twelfth earl, whom he succeeded in the title in 1439. It is said that his estate was kept out of his possession by the king, Henry VI., for two years after his father's death; but Henry afterwards, by way of making up for this injustice, on the 2nd of April, 1444, nominated him premier earl of England, with the privilege of wearing a gold coronet, and on the 5th of the same month raised him to the dignity of duke of Warwick. The next year he made him king of the islands of Wight, Jersey, and Guernsey, crowning him with his own hand. Beauchamp however did not live long to enjoy these extraordinary honours; he died on the 11th of June, the same year, when his dukedom became extinct, and the earldom of Warwick fell to his daughter Anne de Beauchamp, his only child by his wife Cicely, daughter of Richard Nevil, earl of Salisbury, the sister of his sister's husband. Anne, countess of Warwick, died at six years of age, in 1449.

WARWICK, RICHARD NEVIL, EARL OF, K.G., was the eldest son of Richard Nevil, earl of Salisbury, and was probably born about the beginning of the reign of Henry VI., or soon after 1420. His mother was Alice, daughter and heiress of Thomas Montacute, earl of Salisbury; and it was in consequence of his marriage with this lady that Richard Nevil, himself a younger son of Ralph, earl of Westmoreland, was created earl of Salisbury in 1422. His son, the subject of the present notice, in his father's lifetime married Anne, daughter of Richard de Beauchamp, earl of Warwick, who, upon the death of her niece Anne, infant daughter of Henry, duke of Warwick, in 1449, came into possession of the great estates of the Warwick family. Upon this, the Lord Richard Nevil, as he was then styled, was created earl of Warwick, the dignity to descend to the heirs of his wife, 'with all pre-eminences that any of their ancestors before the creation of Henry duke of Warwick used.' His two uncles William and Edward Nevil, younger brothers of his father, were at the same time Barons Fauconberg and Abergavenny, having acquired these dignities by marriage; and another of his uncles, George Nevil, was Baron Latimer, an honour which had also come into the family by marriage a generation or two before. But the highest and most important of Nevil's alliances was that which connected him with Richard, duke of York, whose wife was Cecily, daughter of Warwick's grandfather, Ralph, earl of Westmoreland, and who, as representative of Lionel, earl of Clarence, third son of Edward III., was the undoubted lineal heir to the throne, now occupied by the house of Lancaster, descended from King Edward's fourth son, John of Gaunt. In this way the earl of Warwick and King Edward IV. (son of Richard, duke of York) were first cousins.

It is important to keep in view this strong natural or family position of the great earl of Warwick as to a material extent accounting for the vast power which he came to exercise in the state. The Nevils were at this time perhaps the most extensively connected family that has ever existed among the nobility of England. Besides the Nevils of Raby, from whom the earls of Westmoreland were sprung, there were several other baronies held by other branches of the same stock, dating also from the first reigns after the Conquest. The Talbots, earls of Shrewsbury, were also descended from a Thomas Nevil, brother of Ralph, earl of Westmoreland, and from him had inherited the barony of Furnival, which he had acquired by marriage, after the fashion of so many of his family.

His extended connections and immense possessions were joined in Warwick to the most distinguished personal qualities; intrepidity, decision, and all the military virtues, eloquence and general talent, an affability and frankness of bearing that captivated equally all classes, a boundless hospitality and magnificence that enthroned him in the universal heart of the commons. Wherever he resided, we are told, he kept open house. It is affirmed that the number of people daily fed at his various mansions, when he was at the height of his prosperity, was not less than thirty thousand. 'When he came to London,' says Stow, in his Chronicle, 'he held such an house that six oxen were eaten at a breakfast, and every tavern was full of his meat; for who that had any acquaintance in that house he should have had as much sodden and roast as he might carry upon a long dagger.'

The history of this mighty peer is that of the whole of the contest between the two houses of York and Lancaster from the first armed rising against Henry VI. to the final establishment of Edward IV. on the throne, by the overthrow of the Lancastrian forces in the fight of Barnet. Here we can only briefly note the more important events that marked his career.

He is first mentioned as accompanying his father, the earl of Salisbury, upon a hostile incursion across the Scottish marches, which Salisbury conducted in 1448 in conjunction with the earl of Northumberland. The Lord Richard Nevil, as he was then called, greatly distinguished himself by his bravery on this expedition. When the duke of took up arms in 1455, he was joined both by Warwick and Salisbury; and the battle of St. Albans, fought 22nd May, was mainly won by the impetuous valour of Warwick. Immediately after this, while the office of chancellor was bestowed by the parliament upon Salisbury, Warwick was rewarded with the government of Calais, then and for a long time after the most important military charge in Christendom. To this was added two or three years subsequently by Henry, who perhaps wished to attach to himself so able and powerful a subject, the custody of the sea, or command of the fleet, for five years. It was in virtue of the latter appointment that, on the 29th of May, 1458, he set out from Calais with five large and seven small vessels, and, attacking a fleet of twenty-eight sail belonging to the free town of Lübeck, captured six of them after a contest which lasted six hours. When the Yorkists made their next attempt in the summer of 1459, Warwick came over from Calais with a large body of veterans, with which he joined his father at Ludlow, a day or two after Salisbury's victory over Lord Audley at Bloreheath in Staffordshire, 23rd September. On the discomfiture of the Yorkists at Ludiford, a few weeks after, through the treachery of Sir Andrew Trollop, who deserted to the royal army, Warwick returned to Calais: he was superseded in that government by the duke of Somerset, and in his command of the fleet by the duke of Exeter; but when Somerset attempted to enter the harbour of Calais, he was fired upon from the batteries and compelled to retire. In the beginning of June following Warwick again landed in Kent with a force of fifteen hundred men; before he reached London, according to some accounts, nearly forty thousand of his countrymen had flocked to his banner; the capital, from which King Henry had fled, received him with all welcome; the battle of Northampton followed, on the 10th of July, at which Henry fell into the hands of the Yorkists. The next remarkable events in this fluctuating struggle were the battle of Wakefield, in Yorkshire, fought on the 30th of December, where the duke of York was defeated by Queen Margaret, and lost his life, and where the earl of Salisbury was also taken, and beheaded next day at Pontefract; and the queen's second victory over the Yorkists, commanded in this instance by Warwick, at Bernard's Heath near St. Albans, on the 17th of February, 1461, which restored Henry to liberty. But the junction, immediately after this, of the forces of Warwick and the young Edward, earl of March, now duke of York, compelled the royal army to retire to the north; Edward, accompanied by Warwick, entered London in triumph; on the 4th of March he was proclaimed king, by the title of Edward IV.; and on the 29th the defeat of the Lancastrian army at Towton in Yorkshire secured the throne to King Edward. On this occasion the main body of the Yorkist army was commanded by the earl of Warwick; who also, during the next two or three years, while the contest still lingered, performed various important military services to his new prince. In the winter of 1462-3 he reduced the three strong fortresses of Bamborough, Alnwick, and Dunstanburgh; and it was to him also that the castle of Bamborough capitulated a second time, in May, 1464, after it had been made over to the Lancastrians by the defection of the governor, Sir Ralph Grey. Finally, it was Warwick by whom the unfortunate Henry was conducted to the Tower, in June, 1465, after his capture at Waddington Hall in Yorkshire, about fourteen months after the final defeat of the Lancastrians at Hexham by Warwick's brother, Lord Montague.

The Nevils were now in a manner the rulers of king and kingdom. Warwick himself, besides his government of Calais, held the office of chamberlain and the wardenship of the West Marches; his next brother, Lord Montague, was warden of the East Marches, and had obtained the extensive estates of the Percies, with the title of Earl of Northumberland; his youngest brother, George, was lord high chancellor and archbishop of York. But circumstances soon arose to alienate Edward from partisans to whom he was too deeply indebted for the two parties to continue friends in their relative positions. The king's marriage, which took place in 1464; the jealousy of the queen's relations, the Wydvilles; the marriage of the king's sister, the Princess Margaret, with the duke of Burgundy, brought about in 1468, in opposition to the advice of Warwick; the seductions of the French king Louis XI.; the arts of Lancastrian emissaries; and, according to one account, an attempt made by Edward, in the earl's own house, to violate the chastity of his niece or daughter—are supposed to have been the principal causes that contributed to sever the king from the Nevils; but the story is too complicated, and, in many parts, obscure, to admit of being detailed, or investigated to any purpose, in so rapid a summary as this. We may merely remark that Dr. Lingard appears to have shown that the common account which makes Warwick to have been in France negotiating on the part of the king a marriage with Bona of Savoy, sister to the French queen, at the time when Edward clandestinely married Elizabeth Wydville, cannot be true. (See his 'Hist. of Eng.,' v. 190, note, edition of 1837.) The first open intimation of the loss by the Nevils of the royal favour was given in June, 1467, by the king commanding the archbishop of York to deliver up the great seal. After this there was a formal reconciliation, and the next year Warwick, who had retired, with a clouded countenance, to his castle of Middleham in Yorkshire, appeared again at court. But the hollow compact did not last long. In July, 1468, Edward's next brother, George, duke of Clarence, gave great offence to his majesty by marrying Isabella, the eldest of the two daughters of the earl of Warwick. Immediately after this there broke out in Yorkshire an insurrection of the peasantry, which, being joined by two near connections of Warwick's, the sons of the lords Latimer and Fitzhugh, speedily became converted into an avowed attempt to drive the Wydvilles from the management of affairs. The royalists were routed with great slaughter at Edgecote, on the 26th of July; and a few days after, Edward was taken prisoner by Warwick and Clarence at Olney. The king was detained in confinement at Middleham, under the care of the archbishop of York, for two or three months, during which Warwick twice defeated bodies of the Lancastrians who had risen in the north, counting upon his support of the cause of king Henry. While Edward was in his hands, also, the earl obtained from him a grant of the office of justiciary of South Wales, and of all the other dignities held by the late earl of Pembroke, who had been beheaded after the battle of Edgecote. Contradictory accounts are given of the manner in which the king recovered his liberty; but he was at large again before the end of the year, and apparently with the consent of Warwick. A new rupture, followed by another seeming reconciliation, took place in February, 1470. But in all these movements both parties were probably only attempting to gain time and opportunity to destroy one another. In the beginning of March an insurrection broke out in Lincolnshire, which soon very clearly appeared to have been instigated by Warwick and Clarence; but before they could join the insurgents, who were headed by Sir Robert Wells, the son of Lord Wells, the latter were defeated by the king's troops, on the 12th of March, at Erpingham in Rutlandshire. Upon this Warwick and Clarence fled first to the north; whence, pursued by the king, they returned to Exeter, and embarked for Calais; but here, to their astonishment, the guns of the batteries were turned upon them by the deputy, a Gascon named Vauclerc, to whom Warwick had entrusted the keeping of the place. On this they made for Harfleur, and were there received with distinguished honours by the admiral of France. Shortly after this, on the 15th of July, Warwick met Henry's queen, Margaret, at Amboise, and there the two solemnly agreed to forget the past, and to unite their interests and efforts for the future, sealing their compact by the marriage of Margaret's son, prince Edward, to Warwick's second daughter, Anne. A force was now raised for the invasion of England; Warwick landed at its head, at Plymouth, on the 13th of September, and immediately proclaimed Henry VI.; Edward, who was in Yorkshire, fled to the town of Lynn, and there taking ship, on the third of October, made his escape to Alkmaar in Holland. On the 6th Warwick and Clarence entered London in triumph, and taking Henry from the Tower, conducted him with the crown on his head to the cathedral of St. Paul's. Warwick was now formally restored by parliament to his offices of chamberlain of England and captain of Calais, with the addition of that of lord high admiral; his brother, the archbishop of York, was again made chancellor; his other brother, now marquis of Montague, for which title he had a few months before been forced to exchange that of earl of Northumberland with the estates of the Percies, was restored to the wardenship of the East Marches. But all this lasted only a few months. On the 14th of March, 1471, Edward, secretly assisted by his brother-in-law the duke of Burgundy, landed at Ravenspur in Yorkshire. First Clarence was won over, and then the archbishop of York. On the 14th of April the two armies met at Barnet; and there the Lancastrians were defeated; and Warwick, their commander, and his brother Montague, slain. Their bodies were afterwards exposed for three days in St. Paul's, and then interred in the abbey of Bisham in Berkshire.

By his wife, Anne de Beauchamp, who survived him many years, and was after his death reduced to great poverty, till she was restored to her estates by act of parliament after the accession of Henry VII., the earl of Warwick left only the two daughters already mentioned. The eldest, Isabella, who died in 1477, had by her husband, the duke of Clarence, who was put to death in 1478, a son Edward, who was styled earl of Warwick, and was beheaded on Tower Hill in 1499; and a daughter Margaret, who was created countess of Salisbury in 1513, and was also executed on Tower Hill, at the age of seventy, in 1541. By her husband, Sir Reginald Pole, knight, she was the mother of the celebrated Cardinal Pole, and of other three sons and a daughter. Warwick's second daughter, Anne, whose first husband, Edward, prince of Wales, was murdered in 1471, after the battle of Tewkesbury, was married the next year to the duke of Gloucester, afterwards Richard III., and died in 1485. By Richard she had one son, Edward, who was born in 1473, and died in 1484.

WARWICK, JOHN DUDLEY, EARL OF, and DUKE OF NORTHUMBERLAND, K.G., was the eldest son of Edmund Dudley, Esq., a grandson of the Lord Dudley, and famous or infamous as the instrument, along with Empson, of the extortions of Henry VII., for his share in which he was beheaded on Tower Hill, 18th August, 1510. His mother was Elizabeth Grey, daughter of Edward Viscount L'Isle (his father's second wife); and he was born in the year 1502. The attainder of Edmund Dudley was reversed the year after his execution; and his widow having in 1523 married Arthur Plantagenet, a natural son of Edward IV., her son was brought to court, where he attached himself to the suite of the reigning favourite, Charles Brandon, duke of Suffolk. This same year he received the honour of knighthood for the gallantry he had shown while attending the duke on his expedition to France. After this he successively enjoyed the patronage of Wolsey and Cromwell, the former of whom gave him, in 1535, the office of master of the armoury of the Tower, and by the interest of the latter of whom, when Anne of Cleves was brought over, he was appointed master of the horse to the new queen. The fall of Cromwell, in 1540, did not deprive Sir John Dudley of the king's favour; as may sufficiently appear by his being raised in 1542 to the peerage by the title of Viscount L'Isle (which had been enjoyed by his mother's second husband, recently deceased), and by his being soon after elected a Knight of the Garter. In 1543 he was made lord high admiral for life. The same year, having been principally instrumental in the capture of Boulogne, he was appointed to the government of that place as the king's lieutenant; and in 1546 he received a patent constituting him commander of all the king's forces at sea for the war against France. Finally, the Viscount L'Isle was one of the sixteen persons nominated by Henry in his will as his executors for carrying on the government during the minority of his successor.

For some time Dudley went, to all appearance cordially enough, along with the majority of the council of government, or rather with the whole of that body after Southampton was turned out, in supporting the authority of the earl of Hertford, now become duke of Somerset and Protector of the Realm. It had been originally intended to make him earl of Coventry; but on the 17th of February, 1547, he was created earl of Warwick, his pretension to which antient dignity consisted in his mother having been the daughter of John Talbot, the first Viscount L'Isle, whose mother was Margaret Beauchamp, a daughter, by his first wife, of Richard Beauchamp, earl of Warwick, who died in 1439. Before the end of the year also he exchanged his post of high admiral (which was wanted for Somerset's brother Sir Thomas Seymour, made at the same time Baron Seymour of Sudley) for that of lord great chamberlain (which Somerset had himself held, and now gave up for those of lord high treasurer and earl marshal, forfeited by the recent attainder of the duke of Norfolk).

Warwick had greatly distinguished himself in the expedition to Scotland in the autumn of 1547, and in the battle of Pinkey, gained over the Scots on the 10th of September: and when it was found necessary to send an armed force against the Norfolk rebels in the summer of 1549, 'that noble chieftain and valiant earl,' as Holinshed calls him, was thought the fittest person to be entrusted with the command; 'for such,' continues the chronicler, 'was the opinion then conceived of that honourable earl, for the high manhood, valiant prowess, and great experience in all warlike enterprises, sufficiently tried and known to rest in him, that either they might be vanquished and overcome by him, or by none other.' They were in fact attacked, and their whole force dispersed, by the earl at Dussingdale on the 10th of August. Soon after this we find Warwick openly disputing the supremacy with the Protector. According to Burnet, his instigator was the ex-chancellor Southampton, who, although no longer taking any share in the government, was at this time secretly exerting all his industry to make a party against Somerset. 'The earl of Warwick,' observes the historian, 'was the fittest man to work on; him therefore he gained over to his side, and, having formed a confidence in him, he showed him that *he* had really got all those victories for which the Protector triumphed: he had won the field of Pinkey, near Musselburgh, and had subdued the rebels in Norfolk; and, as he had before defeated the French, so, if he were sent over thither, new triumphs would follow him; but it was below him to be second to any: so he engaged him to quarrel in everything with the Protector, all whose wary motions were ascribed to fear or dulness.'

The course and issue of the contest between the two rivals are related under the head of EDWARD VI. Somerset was deposed from his office of Protector and sent to the Tower in October of this year; then there was an apparent reconcilement between the old and the new dictator, during which, in the beginning of June, 1550, Warwick's eldest son, Lord L'Isle, was married to Somerset's daughter, the Lady Anne Seymour. Warwick was created duke of Northumberland on the 11th of October, 1551; and Somerset was brought to the block on the 22nd of January, 1552. In the beginning of May following the duke of Northumberland's fourth son, the Lord Guildford Dudley, was married to the Lady Jane Grey, daughter of Frances, duchess of Suffolk, and great-granddaughter of Henry VII., through his daughter the Princess Mary, who had been married first to Louis XII. of France, and then to Charles Brandon, duke of Suffolk. Edward died on the 6th of July, leaving the succession by will to Lady Jane Grey (or Dudley). The event was kept concealed for a few days; but at last, on the evening of the 10th, Lady Jane was proclaimed queen. On the 14th, Northumberland left London at the head of a force of 6000 foot and 2000 horse, to meet the adherents of Mary: he advanced as far as St. Edmund's-bury, and then returned to Cambridge, where, losing all hope, he proclaimed Queen Mary on the 20th. But the same day he was arrested by the earl of Arundel; on the 25th he was committed to the Tower; on the 18th of August he was arraigned of high treason, along with his eldest son, before the lord high steward, in Westminster Hall: both were found guilty, but only the father was executed: he suffered on Tower Hill on Tuesday the 22nd of August. To the general surprise he professed in his last moments that he died 'in the true Catholic' (meaning the Roman Catholic) faith; and that, notwithstanding his profession of Protestantism, this had been his real religion all his life.

By his wife Jane, daughter of Sir Edward Guildford, who died in 1555, in her forty-sixth year, Northumberland had eight sons and five daughters. Of the sons two died before their father, the eldest, Henry, having been killed at the age of nineteen at the siege of Boulogne; the third, John, styled earl of Warwick, who was condemned along with his father, but reprieved, died in October, 1554, a few days after being released from custody; the fourth, Ambrose, was restored in blood by Queen Elizabeth, was created Baron L'Isle, 25th December, 1561, and the next day earl of Warwick, and died without issue in 1589; the fifth, Robert, was the famous earl of Leicester, the powerful favourite of the next reign: the sixth, Guildford, was executed, along with his wife, the Lady Jane Grey, 12th February, 1554; the seventh, Henry, was killed at the siege of St. Quintin's in 1557; the eighth died young.

WARWICKSHIRE is a midland county of England, bounded on the north [illegible]

Derbyshire, on the north-east by Leicestershire, the line of separation being formed in great part by the Roman road, Watling Street; on the east by Northamptonshire, on the south-east by Oxfordshire, on the south and south-west by Gloucestershire, on the west by Worcestershire, and on the north-west by Staffordshire. The form of the county is tolerably compact. The greatest dimension or length is from the junction of the three counties of Warwick, Derby, and Stafford, in the north, to the neighbourhood of Long Compton, in the south, 50 miles; the greatest breadth is from the border of Worcestershire, near Redditch, on the west, to the border of Northamptonshire, near Rugby, on the east, 33 miles. There is a detached portion of the county on the west wholly enclosed by Worcestershire, in the neighbourhood of Broomsgrove; and another detached portion on the south-west, near Shipston-on-Stour, surrounded by portions of Worcestershire and Gloucestershire. The boundary of the three counties is very complicated in this part. The area of the county is estimated at 897 square miles. The population at the time of the different enumerations was as follows:—1801, 208,190; 1811, 228,735; increase in the previous ten years, 10 per cent.: 1821, 274,392; increase, 20 per cent.: 1831, 336,988; increase, 23 per cent.: 1841, 402,121; increase, 19·4 per cent. The population has very nearly doubled in the last forty years. The enumeration for 1831 (which we retain, to facilitate comparison with former articles) gives 375 inhabitants to a square mile. In area Warwickshire is the twenty-fourth English county; in amount of population (still judging by the census of 1831), the eleventh, being next below Gloucestershire and next above Cheshire; and in density of population, the fourth, being exceeded only by Middlesex, Lancashire, and Surrey. The enumeration of 1841 gives 448 inhabitants to a square mile. The county is situated between 51° 58′ and 52° 42′ N. lat., and between 1° 10′ and 2° W. long. Warwick, the county town, is 83 miles in a direct line north-west of the General Post-Office, London, or 92 miles by the road through Barnet, St. Albans, Dunstable, Stoney Stratford, Towcester, Daventry, and Southam; or 93 by Watford, Berkhampstead, Aylesbury, Buckingham, and Banbury: it is in 52° 17′ N. lat. and 1° 35′ W. long.

Surface and Geology.—Warwickshire has no lofty hills, but the whole county is occupied by gentle hills of moderate elevation with intervening vales. The south-eastern border is skirted by hills composed of the lower formations of the oolitic series, overlooking the valley of the Stour and the Vale of Red Horse, so called from a colossal figure of a horse carved in the ferruginous sands of the slope of Edge Hill, now obliterated by the progress of inclosures, and replaced by one of much smaller dimensions. These oolite hills just appear on the border of the county, about Priors Merton or Marston, between Daventry and Banbury; but the principal portion in Warwickshire consists of two ridges separated from each other by a narrow valley drained by a small brook which joins the Cherwell near Banbury in Oxfordshire, through which valley the road by Banbury and Gaydon to Warwick runs. The northernmost ridge, comprehending the Burton hills, Gredenton Hill, Bitham Hill, Compton (*i.e.* Fenny Compton) Hill, Farnborough Hill, Mollington Hill, and others, runs from north-west to south-east, dividing the valley just mentioned from a parallel valley drained by another small feeder of the Cherwell, and through which the Oxford Canal passes. There are extensive quarries of gritstone, part of the oolite series, on Compton Hill: the stone is used for troughs and flagstones. The other ridge consists of two parts or branches, meeting at Knowl Hill: one part runs parallel to that just described, and overlooks the valley between them; the other is nearly at right angles to the former, and runs southward, overlooking the valley of the Stour. This latter part of the ridge, known in one part as Edge Hill, possesses considerable interest as overlooking the scene of the first pitched battle in the civil war of Charles I.: it consists of an elevated platform with a steep escarpment, commanding an extensive prospect over Warwickshire and Worcestershire as far as the Malvern and Abberley hills west of the Severn. The southern prolongation of Edge Hill consists not of a continuous ridge or platform, but of detached summits, sach as Tysoe Hill, Broom Hill, Mine Hill, and Long Compton Hill. Brailes Hill is detached from the principal chain of hills, and is more advanced into the valley of the Stour: it has two rather lofty summits. The Ilmington hills or downs, which form the northern extremity of the oolitic range of the Cotswolds, and skirt the valley of the Stour on the western side, are in the detached portion of the county west of Shipston.

The valley of the Stour and the Vale of Red Horse, which skirt the foot of the oolite hills, are occupied by the beds of the lias formation, which overspread the greater part of the county south-east of a line drawn by Alderminster, Loxley, Wellesbourne Hastings, Morton Merial or Morrell, Upton, Marton, Stretton-on-Dunsmore (on the high road from London to Coventry and Birmingham), Stretton-under-Fosse (between Lutterworth and Coventry), and Willy. The lias forms towards its north-western limit a range of high ground, including Walton or Bath Hill, Morton Hill, Bromston Hill, Harbury-upper-field, Dunsmore Heath, at the foot of which range the formations of the red marl and new red-sandstone group crop out, and occupy the valley of the Avon nearly as far as Rugby. The lias forms the cap or summit of several hills, Red Hill, Borton or Bardon Hill, Welcome Hill, Rime Hill, Black Hill, and others, north-west of the Avon, between Stratford, Alcester, Warwick, and Henley-in-Arden. The marlstone of the lias beds is quarried at Binton and Grafton, between Stratford and Alcester, and is used for paving, for stone seats, and as marble for chimney-pieces; it is not variegated in colour, but presents dendritical appearances.

The rest of the county, with one or two exceptions, is occupied by the formations of the red marl and new red-sandstone group; and forms part of the great midland red marl and new red-sandstone district. There is a range of high ground in Feckenham forest, west of Alcester, along which the Ridgeway runs. Another range of high ground forms a semicircle north of Henley-in-Arden, inclosing the valley drained by the Alne (a small feeder of the Avon), which passes Henley and Alcester. A third range extends across the northern part of the county, forming a crescent, and passing by Solihull, Coleshill, and Dosthill, to the border of the county between Atherstone and Tamworth; and a fourth runs northward from the lias-capped hills near Warwick, by Hatton, Berkswell, Meriden, and Maxtoke to Whitacre, where it unites with the third range. None of these high grounds are of much elevation, and they are all in the red marl and new red-sandstone district. A range of hills partly in the red marl and new red-sandstone, partly in the lias district, runs eastward from Warwick, or rather from Leamington Priors, by Dunchurch and Rugby to the border of the county, separating the valleys of the Leam and the Avon.

There is one coal-field in Warwickshire: it extends in length sixteen miles from south-south-east to north-north-west from Wicken or Wyken and Sow, two villages close to Coventry on the east, to the border of Staffordshire east of Tamworth: it has an average breadth of about three miles. The strata rise towards the east-north-east, the inclination becoming greater towards the eastern edge of the field, where it is sometimes as great as 45°. The coal district is hilly, and the outcrop of the strata on the east forms a well-defined low escarpment, presenting in some places the coal-measures, in others the subjacent strata of the millstone-grit. At the foot of the escarpment is a level plain, where the lower formations are covered by the red marl and new red-sandstone, which completely encircle the coal-field. The principal coal-works are at Griff and Bedworth, in the southern part of the field, between Nuneaton and Coventry. Greenstone is found at Griff, resting to all appearance conformably between beds of shale.

Hydrography and Communications.—The greater part of Warwickshire belongs to the basin of the Severn; a considerable portion in the north is included in the basin of the Trent, and a small portion in the south-east to the basin of the Thames. No part of the course of the Severn is in Warwickshire: the drainage of the county is conveyed into it by the Avon, one of its most important tributaries. The Avon rises in Northamptonshire, and crossing Watling Street under Dove Bridge, or Dow Bridge, the Tripontium of the Romans, enters Warwickshire about 12 miles from its source. From Dove Bridge it flows in a winding channel westward, passing near Clifton, Brownsover, Rugby, Newbold-upon-Avon, Church Lawford, Wolston, and Ryton-on-Dunsmore, below which it turns south-west and flows through Stoneleigh Park by Warwick, through Warwick Castle Park, by Barford, Hampton Lucy or Bishop's Hampton, Charlecote and Stratford-upon-Avon; and from thence, partly within, partly upon the border of the county, by Weston-upon-Avon, Binton Bridges, Welford, and Bidford, till it quits the county just above Harvington mill. Its course through the county may be thus estimated:—from Dove Bridge to the bend below Ryton 17 miles; from thence to Warwick 14 miles; from Warwick to Stratford 13 miles; below Stratford 13 miles: together 57 miles in this county; and if 12 miles be added for its course before entering the county, and 29 for its course after quitting it to its junction with the Severn at Tewkesbury, we have for the whole length of the river 98, or in round numbers 100 miles. The upper course of the river to its junction with the Leam, near Warwick, is sometimes called Dove. The navigation does not commence above Stratford, so that it is navigable only for 42 miles, or less than half its course.

The feeders of the Avon are, the Swift, the Sow, the Leam, the Dene, the Stour, and the Arrow. The Swift is a small stream which rises in Leicestershire, 4 miles from Lutterworth, passes that town, and after a course of 10 miles, joins the Avon on its right bank near Rugby. The Sow rises near Astley, 5 or 6 miles north of Coventry, and flows 18 or 20 miles by Bedworth, Exhall, Foleshill, Sow, Bagginton, and Stoneleigh, into the Avon, which it joins on the right bank in Stoneleigh Park. The Leam rises near Shuckburgh Park, flows first north-east, then north and north-west, and finally west, which last is the general direction of its course. It flows in a very winding channel by Wolfhamcote, Granborough, Leamington Hastings, Birdingbury, Wapenbury, Honingham, Offchurch, Radford Simele, and Leamington Priors, and joins the Avon just above Warwick. It receives the Rains brook on the right below Granborough; and on the left the Itchen, or Ichene, which rises at the foot of Hardwick Hill, near Prior's Hardwick, receives the Ham brook from Fenny Compton, passes near Bishop's Itchington, Southam, and Long Itchington, and joins the Leam at Marton. The length of the Leam is about 29 or 30 miles, that of the Rainsbrook 7, and that of the Itchen, or Ichene, 17 or 18. The Dene rises at the foot of the Burton hills, and flows west and north-west by Kineton or Kington, Butler's Marston, and Wellesbourn Hastings, 13 miles, into the Avon, which it joins on the left bank at Charlecote. The Stour rises near Tadmarton and Swalcliffe in Oxfordshire, flows west to Burmington, where it receives several brooks; then north and north-west by Shipston-on-Stour, Halford, Alderminster, Preston-upon-Stour, and Clifford Chambers, into the Avon, which it joins on the left bank below Stratford. Its length is about 24 miles, nearly all in Warwickshire. The Arrow rises in the Waste hills, or West Hill, about 3 miles east of Broomsgrove Lickey in Worcestershire, and flows south, or south by east, near Alvechurch, Redditch (both in Worcestershire), Studley, Alcester, where it receives the Alne on its left bank, and Arrow, into the Avon below Bidford: its whole course is about 18 or 19 miles, the greater part of which belongs to Warwickshire. The Alne rises near Lapworth, and flows 13 or 14 miles by Preston Bagot, Wootton Wawen, Aston Cantlow, and Great Alne, into the Arrow at Alcester. None of the feeders of the Avon are navigable.

That part of the county which belongs to the basin of the Trent is drained by the Tame, which rises in Essington Wood, near Bloxwich, about 3 miles north-west of Walsall in Staffordshire, flows south-east between Walsall and Wednesbury to Aston, near Birmingham, above which it enters Warwickshire, and below which it receives the Rea from Birmingham on the right bank. It then flows east through Warwickshire, by Castle Bromwich and Water Orton, to the junction of the Blyth and the Bourne, both on the right bank, and turns northward, flowing partly within, partly on the border of the county, to the junction of the Anker at Tamworth, where it quits Warwickshire altogether, and flows still northward into the Trent at Alrewas in Staffordshire. Its whole course is about 42 or 44 miles, of which 20 or 22 miles are in Warwickshire or on the border. The Rea has a course of 12 miles, half in Worcestershire, half in Warwickshire. The Blyth, the Bourne, and the Anker belong wholly, or nearly so, to Warwickshire. The Blyth, or Blithe, rises just within the border of Worcestershire, and has a winding course, 26 miles long, north-east and north, by or near Solihull, Barston, Hampton-in-Arden, Little Packington, and Coleshill, below which it receives on the left bank the little river Cole, 18 miles long. The Bourne rises near Arley, and flows first south-west, then west, 10 miles into the Tame. The Anker rises in Wolvey Fields, between Wolvey, Withybrook, and Shilton; and flows north-west by Burton Hastings, Nuneaton, Mancetter and Witherby, near Atherstone, Grendon, and Polesworth, into the Tame at Tamworth. Its whole course is about 26 miles. It receives the Griff brook on the left bank at Nuneaton, and the Sence, from Market Bosworth in Leicestershire, on the right, below Witherby, both very small. Part of the course of the Anker is on the border of Warwickshire and Leicestershire. Neither the Tame nor any one of its affluents is navigable.

The small portion of the county which belongs to the basin of the Thames is drained by a small stream which rises near Burton Dassett, and flows south-east by Warmington into the Cherwell, below Banbury in Oxfordshire.

The deficiency of river navigation, which in Warwickshire is limited to a small part of the course of the Avon below Stratford, is compensated by the number and importance of its canals. The Grand Trunk, or Trent and Mersey Canal, which follows through Staffordshire and Derbyshire the course of the Trent, running parallel to that river, sometimes on one side, sometimes on the other, and the first act for which was obtained A.D. 1766, may be considered as having given the first impulse to the canal navigation of Warwickshire, though no part of the Grand Trunk is within that county. In 1768 the first act was obtained for the Coventry Canal, which commences in the Grand Trunk Canal, on Fradley Heath, near Alrewas, in Staffordshire, and runs southward, nearly parallel to the river Tame, to Fazeley, near Tamworth: here the canal bends for awhile to the north-east, but gradually turns to the east and south-east, and follows the valley of the Anker, not far from that river, to Polesworth, Atherstone, and Nuneaton. From Nuneaton the canal runs for a few miles southward parallel to the Griff brook as far as Bedworth, and then still southward by Longford and Foleshill to Coventry. The whole length of the canal is nearly 38 miles, 27 of which are in Warwickshire. The part between Atherstone and Coventry (17 miles) was completed first; the part between the Trent and Mersey Canal and Fazeley (11 miles) was made by other canal companies, and finished in 1786 or 1787; and the remaining 10 miles, between Fazeley and Atherstone, was completed in 1790. The part between the Trent and Mersey Canal and Fazeley is level: within about a mile of Fazeley is a rise of 14½ feet by two locks, and then a level of 6½ miles continues to Grendon, near Atherstone. Between Grendon and Atherstone (2½ miles) is a rise of 81½ feet, and from Atherstone to Coventry is level.

The Oxford Canal was commenced under an act obtained A.D. 1769, a year after the first act for the Coventry Canal. It commences in that canal at Longford, and has a winding course eastward to Ansty, or Anstey, on the road from Hinckley to Coventry; and from thence runs south-east by Newbold-upon-Avon (where is a short tunnel) and Brownsover to Hill Moreton. From Hill Moreton it runs south to Branston, where the Grand Junction Canal opens into it; then south-west by Lower Shuckburgh to Napton-on-the-Hill; and then southward, near Wormleighton, through a tunnel 1188 yards, or two-thirds of a mile long, into Oxfordshire. It opens into the Thames at Oxford. The whole length of this canal is about 84 miles; of which about half is in Warwickshire, or in Northamptonshire, one or two small projecting parts of which it crosses before finally quitting Warwickshire. From its commencement in the Coventry Canal it is level for 26½ miles; in the next half-mile it rises 19 feet, and then for 17 miles, including the remainder of its Warwickshire course, it is level. There are several short cuts to enable lime-works, &c. to communicate with the main line of the canal. This canal with the Coventry and Grand Trunk Canals opens a communication between the Thames, the Trent, and the Mersey; and it shows the importance of that communication that, soon after the completion of the Oxford Canal, the value of the Coventry Canal shares was quadrupled.

The Ashby-de-la-Zouch Canal, made under a[illegible] A.D. 1794, commences in the Coventry Canal, [illegible] mile south of Nuneaton, and runs near Hinckley, M[illegible] worth, and Snarston to the collieries in the coal-[illegible] of Ashby. Its whole length is about 29½ miles, 3 [illegible] which are in Warwickshire.

The Staffordshire and Worcestershire Canal, the first act for which was obtained A.D. 1766, the same year as the Grand Trunk or Trent and Mersey Canal, may be considered as having given occasion to another part of the Warwickshire canals, though no part of its own course is in that county. In 1768, two years after the act for the Staffordshire and Worcestershire Canal was passed, an act was obtained for making a canal, called the Birmingham Canal, from Birmingham to Bilston in Staffordshire, and from that town to the Staffordshire and Worcestershire Canal at Autherly near Wolverhampton. In 1783 an act was obtained for making a branch to this Birmingham Canal, and for making another canal from Birmingham to join the Coventry Canal at Fazeley near Tamworth; and in 1784 the proprietors of these canals and of the Birmingham Canal were incorporated into one company, and by subsequent enactments have been enabled to extend their works. The Birmingham Canal, now called the Old Birmingham Canal, 22½ miles long, including its branches, belongs chiefly to Staffordshire; little more than 2 miles being in Warwickshire. The Warwickshire part is on one level. The Birmingham and Fazeley Canal, 15 miles long, belongs almost entirely to Warwickshire, only 2 miles being in Staffordshire. There is a fall between Birmingham and Fazeley of 248 feet. There is a junction between this and the Old Birmingham Canal on the west side of the town of Birmingham.

The Worcester and Birmingham Canal was made under an act obtained A.D. 1791; it commences at the junction of the Old Birmingham and Birmingham and Fazeley Canals, on the west side of Birmingham, and runs southward and south-westward into the Severn at Worcester. Of its whole course, 29 miles long, only the 3 miles nearest to Birmingham are in Warwickshire; this part is on one level, and passes through a short tunnel, 110 yards long, at Edgbaston.

The Stratford-upon-Avon Canal was formed under an act passed A.D. 1793; it commences in the Birmingham and Worcester Canal at King's Norton in Worcestershire, and runs south-east and then south into the Avon at Stratford. Of its whole course, 23½ miles, by far the greater part belongs to Warwickshire. There are three or four short branches. The canal falls, from the Worcester and Birmingham Canal to Stratford, 309 feet.

The Warwick and Birmingham Canal, made under an act passed in 1796, commences at Saltisford, on the north-west side of Warwick, and runs north-west by Hatton and Knowle to Birmingham, where it joins a branch of the Birmingham and Fazeley Canal, on the east side of the town of Birmingham. It is 22½ miles long, and belongs to Warwickshire, except in one part in the neighbourhood of Birmingham, where it crosses a projecting portion of Worcestershire. It rises 188 feet from Warwick to its summit level, 10 miles long, and then falls 42 feet to Birmingham. There is a short branch joining this canal with the Stratford-on-Avon Canal.

The Warwick and Napton Canal commences in the Warwick and Birmingham Canal near Warwick, and runs eastward by Leamington Priors, Radford Simele, and Long Itchington to the Oxford Canal at Napton-on-the-Hill. It was made under an act passed A.D. 1794; is about 14 miles long, rising 134 feet from Warwick to Napton, and belongs entirely to Warwickshire.

The Grand Trunk Canal, uniting the Mersey and its port of Liverpool with the Trent and its port of Hull, constitutes the main trunk or artery of this canal system of central England, in which Warwickshire is comprehended. The Staffordshire and Worcestershire Canal opened a communication between this great line and the Severn, with its port of Bristol; and the Coventry, with the Oxford Canal, connected the system thus formed with the upper part of the Thames at Oxford, and the Grand Junction Canal with the lower part of the Thames just above London. These lines brought the silk and ribbon manufactures of Coventry and its neighbourhood into communication with the four great trading ports of the kingdom; and the Old Birmingham Canal and the Birmingham and Fazeley Canal connected the iron district of Birmingham with the same ports. The communication with London and with Bristol was however circuitous; but the Worcester and Birmingham Canal gave more direct communication with Bristol; and the Warwick and Birmingham, and Warwick and Napton Canals, with London.

Of the coach-roads, the most important is the parliamentary road to Shrewsbury and Holyhead, which enters the county between Daventry and Dunchurch, and passes over Dunsmore Heath and through Ryton, Coventry, Meriden, and Birmingham. There are two other main lines of road to Birmingham: one by Buckingham and Banbury, which enters the county at Shotswell, 4 miles from Banbury, and runs by Gaydon, Warwick, and Solihull to Birmingham; and the other by Oxford, which enters the county near Long Compton, and runs by Shipston-on-Stour, Stratford-on-Avon, and Henley-in-Arden. The distance of Birmingham from the General Post-Office, London, by these three roads, is respectively 110, 113, and 120 miles. A road from London to Liverpool crosses the northern part of the county between Hinckley in Leicestershire and Tamworth, passing through Atherstone; and the principal road between Bristol and the north of England passes through Birmingham and Sutton Coldfield in the northern part of the county. Roads lead from Warwick by Southam to Daventry, and by Kenilworth to Coventry, and there are others of less importance.

There are several railways. The London and Birmingham was commenced under an act obtained A.D. 1833; and was opened throughout in September, 1838. It enters the county on the eastern side, not far from Rugby, and passes by Rugby, Coventry, and Hampton-in-Arden. Its whole length is 112 miles, about 35 of which are in Warwickshire. The Grand Junction Railway unites with the London and Birmingham at Birmingham, and runs by Walsall, Wolverhampton, the Potteries, Nantwich, and Warrington to the Manchester and Liverpool Railway at Newton in Lancashire; and with the London and Birmingham, forms part of the great system of railway communication which unites the metropolis with Liverpool and Manchester, and the manufacturing district of the north of England; but only a small part of it belongs to Warwickshire. The act for it was obtained A.D. 1833, and it was opened throughout in 1837; its length is 82½ miles. The Birmingham and Derby Junction Railway has two southern branches and termini; one terminus is near Hampton-in-Arden on the London and Birmingham line, and the branch from it runs by Coleshill and Tamworth to Derby, where it unites with the North Midland and Midland Counties railways. This line was opened in 1839, and is 38¼ miles long, about half of which is in Warwickshire. The other southern terminus is at Birmingham, and runs by the valley of the Tame to Tamworth, where the two branches unite. The Birmingham and Tamworth branch was opened A.D. 1842; it is nearly 10 miles long. The Midland Counties Railway branches from the London and Birmingham line at Rugby, and runs by Leicester and Loughborough to Derby and Nottingham. The act was obtained A.D. 1836, and the railroad was opened A.D. 1840; it is 57 miles long, but only a very few miles are in Warwickshire. There is an extensive viaduct near Rugby. An act was obtained (A.D. 1837) for a railway between Manchester and Birmingham, but greater part of the line has been given up, and it unites with the Grand Junction Railway at Crewe in Cheshire. An act was obtained (A.D. 1836) for a railway from Birmingham to meet the Cheltenham branch of the Great Western Railway; it runs by Broomsgrove, and is now completed; the length is 53 miles, but only a small part is in Warwickshire. An act was passed in 1842 for a railway from the London and Birmingham line at Coventry to Leamington Priors and Warwick, but we are not aware what progress has been made in it.

Agriculture.—This county, being situated nearly in the centre of England, has a comparatively mild and healthy climate: except in the higher and more exposed situations, where the soil is cold and heavy, the harvest is as early as in more southern counties.

The soil varies extremely, so that two or three different kinds of soil are often found in a field of no great extent. The red loam, which is found to a considerable extent across the centre of the county, and especially between Warwick and Coventry, and from the borders of Worcestershire to Leicestershire, is mostly of a superior quality; all of it very fit for white crops, and much of it capable of bearing both beans and turnips. Where the loam inclines to sand, the subsoil is chiefly limestone, marl, or sandstone; and under the colder and heavier loams the substratum is clay. There is also a fertile clay on limestone. The best soils, as is generally the case, are not cultivated with that care and economy which would greatly increase their value. Where the tenant can get an easy livelihood without much outlay, exertion, or risk, improvements are very slowly adopted. It is from the proprietors chiefly that improvements originate; and unless the tenant has the advantage of a long lease, he has little motive for improving his farm. From various reasons of a political nature, and from old prejudices, there is a general disinclination in landlords to grant long leases, and yet nothing tends so much to improve a property. Some proprietors begin to see this, but many prefer the old system, and like to see their tenants somewhat dependent on their good will. The farms used to be of small extent formerly, but many have been thrown together of late years, and there are now some extensive occupations. A great part of the land was formerly in common fields, but is now mostly inclosed, and, as a natural consequence, better farmed; but many improvements might still be introduced, not only in the course of cropping, but in the economy of labour, especially in ploughing: fewer horses and men might be employed, by a more general adoption of the light two-horse ploughs; some of the heavy loams may require three horses to plough them when the soil is wet and heavy, but it is absurd to use four horses and only make a furrow an inch wider than you could with two, or at most three. Besides, a very wide furrow is seldom of advantage, whatever a deep one may be.

The course of crops on the best loams used to be: a clean fallow—wheat, beans, oats or barley, and clover—and sometimes two white crops succeeded each other after the fallow. A better rotation is—fallow, barley, clover, wheat, beans, oats—manured on the fallow and for the beans; and if these last be well hoed and the land in good heart, another crop of wheat may be taken after the beans, instead of oats. Potatoes grow well in some of the lighter loams, and they, together with turnips and mangold-wurzel, well manured, take the place of the fallow, and are followed by barley, clover, wheat.

Lime is used in considerable quantities, and with very good effect; it improves the quality of the wheat, and increases the crop.

On the light loams and sands turnips have been long cultivated, but till lately not with the care which they deserve. They were generally sown broadcast, and thinned out by hoeing; and the sheep were folded on them, to eat them as well as they could. This is now done on a much improved system by some of the best farmers. The land is better prepared, the turnips sown in drills over the manure, and the roots are cut by a machine in the field, and given to the sheep in troughs, with clover-hay cut into chaff, and oil-cake or meal: in this way the crop is much heavier, and the sheep thrive better, while the land is more richly manured. There is a great extent of excellent pasture land in Warwickshire, and although some of it is very capable of being converted to arable land and farmed on the convertible system of husbandry, the landlords do not readily give their tenants leave to break up old sward. It is only on poor pastures that breaking them up may be advantageous; and although more food is produced by arable land for the public, the farmer will always prefer that system which is most profitable to himself, and the landlord that which ensures the highest and most regular rent. But pasture land may be badly managed as well as arable, and much of the grass land in Warwickshire is sadly neglected. Docks and thistles are allow to grow and extend; moles and ants raise hills which diminish the useful surface; the dung of the cattle is allowed first to burn the place where it drops, and then to be carried away by insects.

On the heavy lands in this county, as in most others, the custom of continually ploughing from the crown and gathering the furrows, as it is called, had produced such high ridges that a man might be hid behind them; and the water always running down the steep sides of the ridge, made a kind of morass in the deep intervals. All the best soil was accumulated in the crown, and there only the plants were vigorous. On a better system being introduced, great difficulty arose in levelling these high and always crooked ridges. The most scientific farmers or proprietors took advantage of the low furrow to put in a drain of broken stones or tiles barely covered with earth. By twice gathering four or five furrows on each side of this drain a little ridge was formed, and in course of time the large ridge was split in two. As soon as cross-ploughing could be effected, the whole was soon brought to a tolerable level. The drains now were covered with a sufficient depth of earth; but the old crowns were pared down to the hard subsoil, and it took much lime and manure, with several fallows, to render them equally fertile with the new. In some fields not long levelled, ploughed in straight and regular ridges, the wave of the crown of the old ridge could be distinctly traced in the crop by a deficiency in produce; while the old hollows were the more luxuriant from the accumulation of fresh soil.

Thorough draining is in its infancy in this county; but where the subsoil is clay it will no doubt soon become universal. The great superiority of the rich loams lying on sandstone arises in part from being underdrained by nature, without which all their natural fertility would have been of little advantage.

There are not many water-meadows in the county, and considering the copious springs which rise from the calcareous rocks, and might easily be collected and carried over the grounds situated below their level, it is surprising that so little use is made of these advantages.

In the neighbourhood of Warwick, Coventry, and especially Birmingham, much land is laid out in gardens, at a high rent, and well cultivated: pieces of meadow land, likewise, for feeding milch cows, are let very high near these manufacturing towns. The mechanics delight in a small spot of ground, in which they work themselves or employ labourers, as a relaxation from their counting-houses and workshops. These gardens are generally highly cultivated.

The county of Warwick is extremely well timbered: on every estate of any extent, besides hedgerow timber, there are woods and coppices. At one time the forest of Arden occupied a large portion of the centre of the county. The Stoneleigh estate, which is one of the finest in the county, is extremely well wooded. Some splendid trees might be seen some years ago, and probably remain there still; and also at Ragley, the marquis of Hertford's. The greater part of the soil of the county is peculiarly adapted to the growth of oaks. Coppice-wood is of less value in a district where coal abounds than it would be elsewhere: it is chiefly converted into hoops, hurdles, and hedge-stakes. There are several thriving young plantations, which will keep up the character of the county when the old wood is cut down.

There is no breed of cattle peculiar to the county. The dairy cows are chiefly long-horns, crossed in every possible way: short-horns have been introduced, and are preferred by many, especially for feeding, although the Herefords are in great repute with the graziers; as well as Scotch, when they can be bought in at a reasonable price.

The old Warwickshire sheep is nearly forgotten, having been superseded by the New Leicester and a cross of the two breeds: for folding, the South Downs are preferred.

The following is a list of the fairs held in the county:—Alcester, Tuesd. before April 5, May 15, 2nd Tuesd. in July, Oct. 17; Atherstone, April 7, July 18, Sept. 19, Dec. 4; Birmingham, Thursd. in Whitsun week, Sept. 29; Bractes, Easter Tuesd.; Coleshill, Shrove Monday, May 6, Wedn. after new Michael.-day; Coventry, 2nd Frid. after Ash Wedn., May 2, Aug. 26 and 27, Nov. 1; Henley in Arden, Lady-day, Tuesd. in Whitsun week, Oct. 29; Kenilworth, April 30, Sept. 30; Kington, Jan. 25, Oct. 18; Nuneaton, Feb. 18, May 14, Oct. 31; Rugby, 2nd Tuesd. after Jan. 6, Feb. 17, March 31, May 15, July 7, Aug. 21, Nov. 22, Mond. before St. Michael, Sept. 29, Dec. 10; Solihull, May 10, Oct. 10, April 29, Oct. 12; Southam, East. Mond., Mond. after Holy Thurs., July 10, 1st Mond. in Oct., 1st Mond. in Lent; Stratford-upon-Avon, Thursd. after March 25, May 14, Sept. 25, Thursd. after Sept. 25; Warwick, 3rd Mond. in Jan., 1st Mond. in Febr., Mond. before April 5, 1st Sat. in Lent, May 12, 1st Mond. in June, July 5, 2nd Mond. in Aug., Oct. 12, Nov. 8, Mond. before St. Thomas, Dec. 21.

Divisions, Towns, &c.—At the time of the Domesday Survey the county contained ten hundreds; now there are four. The hundreds of Domesday were—Fexhole, Honesberie, Tremelau, and Berricestone, now comprehended in Kineton hundred; Mereton, Stanley, and Bomelaw, now comprehended in Knightlow; Pathelau and Fernecumbe, now comprehended in Barlichway; and Coleshill, now Hemlingford hundred. The position, area, and population in 1831 of the present hundreds, and their respective divisions, are as follows:—

Hundred.	Position.	Area in Acres.	Population in 1831.	Divisions of the Hundred.
Barlichway . .	W.	100,310	26,685	Alcester, Henley, Snitterfield, and Stratford.
Hemlingford . .	N.	160,220	193,174	Atherstone, Birmingham, Solihull, and Tamworth.
Kineton, or Kington.	S.	125,050	32,242	Brails, Burton Dasset, Kington, and Warwick.
Knightlow . .	E.	167,280	46,679	Kenilworth, Kirby, Rugby, and Southam.
County of the City of Coventry.	Central	15,070	37,830	
		567,930	336,610	

The borough of Warwick is included in Kineton hundred; Birmingham in Hemlingford; and the city of Coventry in the county of the same.

Warwickshire comprehends the city of Coventry, which, with a surrounding district, forms a county of itself [COVENTRY]; the county-town and municipal and parliamentary borough of Warwick; the municipal and parliamentary borough of Birmingham [BIRMINGHAM]; the municipal boroughs of Stratford-upon-Avon [STRATFORD-UPON-AVON] and Sutton Coldfield; and the market-towns of Alcester [ALCESTER], Atherstone [ATHERSTON OR ATHERSTONE], Coleshill, Henley-in-Arden, Kenilworth, Kington or Kineton, Leamington Priors, Nuneaton, Rugby, Solihull, and Southam.

Warwick, the county-town, is a place of considerable antiquity. It does not appear to have been a Roman town, though Camden and some others have regarded it as such. A charter of Beorhtwulf, king of Mercia, extant in the 'Textus Roffensis' (cap. 44, ed. Hearne), is dated from 'Vicus Regalis Werburgewic,' which is supposed to be Warwick. Warwick was ruined in the early wars of the Danes, and restored by the Lady Ethelfleda, daughter of Alfred the Great, and governor of Mercia, who built a fort here, A.D. 913. At the time of Domesday Survey, it was a borough and contained 261 houses, of which 130 belonged to the king. After the Conquest the town was protected by a ditch and gates, and the castle was much strengthened. Several religious houses were founded. In the time of Edward I., the paving of the town and the erection of the wall round it were commenced. In the time of Philip and Mary, the town received its first regular charter of incorporation, though it had sent members to parliament in the reign of Edward I.

The borough boundaries comprehend the two parishes of St. Mary and St. Nicholas, the statistics of which in 1831 were as follows:—

Parishes.	Area in Acres.	Houses.			Population.	
		Inhabited.	Uninhabited.	Building.	Families.	Persons.
St. Mary . .	5360	1239	113	4	1397	6678
St. Nicholas .		476	14	12	526	2431
		1715	127	16	1923	9109

The municipal boundaries include the town, with a portion of the surrounding country extending from half a mile to above four miles from the town in different directions. The town is on the west side of the Avon, from which it is separated by Warwick Castle and the castle grounds. Its site is a solid rock, in which the cellars are excavated. The streets are irregularly laid out, but are spacious, well-paved, lighted with gas, and in general lined with modern well-built houses. The castle is one of the finest specimens in the kingdom of the antient residences of our feudal nobles. The apartments have been modernised, but the outward arrangement and form of the building have sustained little alteration. The approach to the castle is from the eastern part of the town, opposite St. Nicholas's church, by a winding path cut in the rock. One of the towers in the castle, known as Cæsar's Tower, is the most antient part of the whole building, and is of uncertain date; another, known as Guy's Tower, is of the latter part of the 14th century and of decorated English character, in fine preservation, of noble outline, and of curious construction and composition. The great hall of the castle, a noble room, 62 feet by 37, retains, in its appearance and furniture, much of its antient character. The other apartments contain a number of portraits and other paintings by the old masters, and a valuable and interesting collection of antient and modern armour. The grounds are extensive and beautiful, and one of the greenhouses contains the capacious and beautiful antient vase brought to England by the late Earl of Warwick, to whom it had been given by Sir William Hamilton, and known as 'the Warwick Vase.' St. Mary's church, built on the site of an older structure in the 14th century, and in great part rebuilt after a fire in 1694, which destroyed a large portion of the church, is in the centre of the town. It is a cross church, of which the choir and its adjuncts, especially the chapel of St. Mary, usually termed Beauchamp Chapel, adjacent to the choir on the south side side, are antient; the nave and transept are modern, and are of most barbarous architecture, with an absurd admixture of different styles. The choir has a finely designed and beautifully worked stone ceiling, and ranges of stalls on each side. 'The chancel,' says Rickman, 'is an uncommonly beautiful specimen of perpendicular work; and the east front is remarkably fine—simple in its arrangements, yet rich from the elegance of its parts.' The Beauchamp Chapel, according to the same author, is 'completely enriched both within and without; its details of the most elegant character and excellent execution, and in very good preservation.' It consists of a chapel of several arches, and a small aisle or rather passage on the north side, between the chapel and the chancel of the church.' In the centre of the chapel is a very rich altar-tomb, with the figure of Richard Beauchamp, earl of Warwick, whose executors erected the chapel according to the directions of his will; and there are some monuments of later date. St. Nicholas's Church is modern, neat in the interior, but small and altogether devoid of architectural beauty. There are a spacious and handsome county-hall; a large modern gaol, adjoining the county-hall; a county house of correction, on the opposite side of the street to the gaol; a town-hall of respectable appearance; and a substantial market-house. 'Leicester Hospital' was originally two buildings, the halls of two guilds, founded in the reign of Richard II., one in honour of the Virgin, the other of St. George the Martyr, and afterwards united. After the dissolution of the united fraternity at the Reformation, the buildings became the property of Robert Dudley, earl of Leicester, the well-known favourite of Elizabeth, who converted them into an hospital or almshouse for a master and twelve brethren, impotent or infirm men. The endowment of this hospital is of considerable value; the master now has, or is to have, a salary of 400*l*. per annum, and each of the brethren (who have been increased to twenty) 80*l*. per annum. The buildings consist of the brethren's lodgings and public kitchen, forming a quadrangle; a chapel of antient architecture over the west gate of the town; and an antient hall. An antient place of worship, called St. Peter's Church, over the east gate of the town, is now used as a free-school; and there are some other schools and almshouses, some dissenting meeting-houses, a neat but small building for the public library, and a theatre. There is a race-course on the west side of the town, where races are held yearly.

Some worsted and cotton and lace manufactures are carried on at Warwick, but only 51 men were returned in 1831 as engaged in manufactures. There are malthouses, and lime, timber, and coal wharfs on the bank of the Warwick and Napton Canal. The market, which is well supplied and well attended, is on Saturday. There are twelve yearly fairs, some of which are considerable cattle-fairs.

Warwick returns two members to parliament; the number of voters in 1835-36 was 1046; in 1839-40 it was 977; showing a decrease in four years of 69. The town is the principal place of election and one of the polling-stations for the southern division of the county. The assizes and quarter-sessions for the county are held here. The borough has a commission of the peace, and, under the Municipal Reform Act, is divided into two wards, with six aldermen and 18 councillors. Its limits were not altered by the Boundary Act. Quarter-sessions for the borough are held, and there is a Court of Record for personal actions under 40*l*., but it is not extensively resorted to.

The living of St. Mary is a vicarage, of the clear yearly value of 300*l*., with a glebe-house; that of St. Nicholas is a vicarage, of the clear yearly value of 218*l*., with a glebe-house. Both are in the rural deanery of Warwick, and in the archdeaconry and diocese of Worcester.

There were in the borough, in 1833, twenty day-schools of all sorts, with 714 children, namely, 394 boys and 320 girls: three of these schools were supported partly or wholly by endowments, and contained 89 boys and 36 girls; three others, two of them national schools, were supported chiefly by charitable contributions, and contained 90 boys and 120 girls. Of the population in the borough about one in thirteen was, in 1833, under daily instruction. There were at the same time ten Sunday-schools, with 865 children, viz. 503 boys and 362 girls; to which may be added one of the national schools which was also a Sunday-school, with 80 girls: making 945 children, or rather more than one in ten of the population, under instruction on Sunday.

Sutton Coldfield is in the Birmingham division of Hemlingford hundred, 7½ miles N.N.E. of Birmingham and 25 miles N.N.W. of Warwick. This town, having fallen into decay, was revived by the benefactions of John Vesey, a native of the place, bishop of Exeter in the time of Henry VIII. Vesey procured for the town a charter of incorporation, paved the principal avenues, built a moot-hall and market-place, founded and endowed a free school, enlarged and embellished the church, and introduced the clothing manufacture, building many houses which were to be free for such as followed that business. The parish has an area of 13,030 acres, and contained, in 1831, 757 houses, namely, 736 inhabited, 18 uninhabited, and 3 building; with a population of 750 families, or 3684 persons—about half agricultural. The town has a neat appearance, and contains some handsome houses. The church is handsome, and comprehends a nave with side aisles and chancel. The nave is modern: the chancel contains the effigy of Bishop Vesey with his mitre and crosier; he died A.D. 1555, at the age of 103. On the town-hall, a neat brick building, are the arms of the prelate emblazoned on a shield, surmounted with a mitre. South-west of the town is 'the Coldfield,' a bleak and cheerless tract of 13,000 acres, extending into Staffordshire; and N.W. and W. of the town is Sutton Park, containing about 3500 acres, granted to the poor of the town as pasturage by Bishop Vesey; it was antiently the park and part of the chace of the lords of the manor, and contained some large pools or pieces of water. Some branches of the hardware manufacture, especially the manufacture of spades, saws, axes, and gun-barrels, are carried on, and gave employment, in 1831, to 34 men. The weekly market is on Monday, and there are two yearly fairs for cattle, sheep, and pedlery.

The corporation of Sutton Coldfield consists of a warden, two capital burgesses, and twenty-two aldermen; the title of the corporation is 'The Warden and Society of the Royal Town of Sutton Coldfield.' It is not included in the Municipal Reform Act. The warden and the two capital burgesses are magistrates. Quarter-sessions are held, but their criminal jurisdiction has gone into disuse, and offenders are committed for trial to the county: the Court of Record is also disused. The borough is co-extensive with the parish. The income of the corporation consists of a rental of nearly 750*l.*, and the interest of 18,000*l.* 3 per cent. consols: this is expended in supporting three (or rather six) schools and ten almshouses, apprenticing two poor maids yearly, and other purposes chiefly charitable.

The living is a rectory, of the clear yearly value of which there is no return; in the rural deanery of Arden, in the archdeaconry of Coventry, and in the diocese of Worcester.

There were, in 1833, ten day-schools, with 450 children, namely, 216 boys and 194 girls, and 40 children of sex not distinguished in the returns. About one in eight of the population was under daily instruction. Of these ten day-schools, six were endowed from the funds of the corporation; and there was, besides, a richly endowed but nearly useless grammar-school; the income of which was nearly 500*l.* per annum, but the scholars seldom amounted to five. There was one Sunday-school with 16 boys and 40 girls.

Coleshill is in the Birmingham division of Hemlingford hundred, about 10 miles E. by N. of Birmingham, and 18 miles N.N.W. of Warwick. The parish has an area of 6200 acres, and contained in 1831, 404 houses, namely, 380 inhabited, 14 uninhabited, and 10 building, with 404 families, and a population of 1853. The town is on an eminence, at the foot of which the river Cole flows, and consists principally of one long street, with a number of respectable and some spacious and handsome houses. The church is on a lofty site, and has a square western tower with buttresses, surmounted by a crocketed spire of late perpendicular character, of better design than execution. The church contains a font of Norman architecture, and is rich in monuments, especially of the Digby family. Coleshill has no manufacture. The market is on Wednesday; and there are three annual fairs for cattle and horses. There is a brick bridge of six arches over the Cole. The river Blyth, over which there is a bridge, flows near the town on the east side. The living is a vicarage, of the clear yearly value of 718*l.*, with a glebe-house, in the rural deanery of Arden, in the archdeaconry of Coventry, and in the diocese of Worcester. There were in the parish, in 1833, thirteen day-schools, which contained 286 children, namely, 142 boys and 144 girls: and three Sunday-schools with 152 children, viz., 65 boys, 67 girls, and 20 of sex not stated: so that of the total population of the parish nearly one in six was under daily instruction, and about one in twelve under instruction on Sundays.

Henley-in-Arden is in the parish of Wootton Waven or Wawen, in the Henley division of Barlichway hundred, about 10 miles west of Warwick, and 15 miles S.S.E. of Birmingham. The town is pleasantly situated, and consists principally of one long street on the road between Stratford-on-Avon and Birmingham. The houses, though mostly antient, are well built; and there are some of more modern date interspersed. The chapel is small but of good perpendicular character, with well executed details. There are the remains of a cross in the market-place; the embellishments of the shaft are mutilated. The chapelry contained in 1831, 276 houses, namely, 261 inhabited, 13 uninhabited, and 2 building, with 271 families, and 1214 individuals. The whole parish contained 521 houses, namely, 489 inhabited, 30 uninhabited, and 2 building, with 504 families, and 2271 persons. The town has a market on Monday; and three yearly fairs, one for cattle, one for hops, and one pleasure-fair. The living is a perpetual curacy of the clear yearly value of 104*l.*, in the rural deanery of Warwick, and in the archdeaconry and diocese of Worcester. There were in the whole parish, in 1833, seventeen day-schools, with 274 children, namely, 118 boys and 156 girls; one of these schools was partly supported by an allowance from the high-bailiff of Henley: and there were six Sunday-schools, with 255 children, namely, 109 boys and 146 girls: giving about one in eight or nine of the population under daily instruction, and about one in nine under Sunday instruction.

Kenilworth is in the Kenilworth division of Knightlow hundred, about 5 miles N. of Warwick, and about the same distance S.W. of Coventry. The manor was an antient demesne of the Crown, and had a castle which was demolished in the war of Edmund Ironside and Canute the Dane, early in the eleventh century. In the reign of Henry I. the manor was bestowed by the king on Geoffry de Clinton, who built a strong castle and founded a monastery. In the reign of Henry III. Kenilworth received a grant for a weekly market and a yearly fair; but the market probably fell into disuse, as a new grant for one was obtained by the Earl of Leicester in the time of Queen Elizabeth. The historical interest of this place attaches to its castle, which was one of the strongholds of Simon de Montfort, earl of Leicester, in his insurrection against Henry III., and afforded shelter to his son and others of his adherents after the fatal battle of Evesham (A.D. 1265). It was however, after a gallant defence, obliged to capitulate (A.D. 1266). Edward II. was confined for a time at Kenilworth Castle, shortly before his murder in Berkeley Castle (A.D. 1327). In the following reign, John of Gaunt became owner of the castle, which he much augmented by new and magnificent buildings. Henry IV., son of John of Gaunt, united the castle, which he inherited, to the domains of the crown, of which it formed part till the time of Elizabeth, who granted it to Robert Dudley, earl of Leicester. The magnificent entertainment given here by Leicester to Elizabeth has been made familiar to the general reader by Sir Walter Scott's historical romance of 'Kenilworth.' After the civil war of Charles I., the castle was dismantled, but extensive and picturesque ruins remain. The parish of Kenilworth has an area of 6460 acres, and contained, in 1831, 676 houses, namely, 651 inhabited, 22 uninhabited, and 3 building, with 670 families, and 3097 persons. The town consists principally of one long street, extending nearly a mile along the road from Coventry to Warwick, which here has a number of bends; another street leads towards the castle, and near this street is the church. Many of the houses are very neat: the church has some remains of antient architecture, especially a fine and much enriched western door of Norman architecture, in the lower part of an antient tower surmounted by a spire of more modern date. But the most interesting object in the place is the castle, the ruins of which are extensive: they are principally of late perpendicular character, but there are some Norman portions. The most antient part is an old tower called Cæsar's Tower, of which three sides remain, with walls in some parts sixteen feet thick. The large and massive additions of John of Gaunt, known as Lancaster Buildings, are in different stages of decay; and the additions of the earl of Leicester, though of comparatively modern date, present, from the friable nature of the stone of which they are built, an appearance of great antiquity. They are called Leicester Buildings. They contain the ruins of the noble banqueting hall, 86 feet long by 45 wide. The gate-house erected by the same earl is in better preservation, and is (or was, not long since) occupied as a farm-house. The ruins are in many parts mantled with ivy, which adds to their picturesque character, and are on an elevated, rocky site, commanding an extensive view of the country round. There are very few remains of the monastery, which was first a priory, and afterwards made an abbey. It belonged to the Regular Canons of St. Augustin. Its possessions were valued at the dissolution at 643*l.* 14*s.* 9½*d.* gross, or 538*l.* 19*s.* (or, according to another statement, 533*l.* 15*s.* 4*d.*) clear yearly income. There is an antient stone bridge over a brook flowing into the Avon.

The manufacture of horn combs, and of some chemicals, such as Prussian blue, sal-ammoniac, and Glauber's salts, is carried on at Kenilworth. The comb-manufacture, in 1831, employed 150 men. The market is on Wednesday, and there is a yearly cattle-fair. There are some dissenting meeting-houses and some alms-houses.

The living is a vicarage, of the clear yearly value of 280*l.*, with a glebe-house, in the rural deanery of Stonely, in the archdeaconry of Coventry, in the diocese of Worcester.

There were in the parish, in 1833, five dame-schools, with 68 children, namely 26 boys and 42 girls; and twenty other day-schools of all kinds, with 438 children, namely 201 boys and 237 girls; making one in six of the population of the parish under daily instruction. Of these schools, one was an endowed school with 66 boys, one a 'school of industry,' partly supported by endowment, partly by charitable contributions, with 30 girls. Three others, with 43 boys and 35 girls, were supported either by endowment or contribution. One of the day-schools was also a Sunday-school, and there were two other Sunday-schools, the whole containing 114 boys and 141 girls, giving 255 children, or one in twelve of the population, under instruction on Sunday.

Kington, or Kineton, is in the Kington division of the hundred of Kington, between 10 and 11 miles south-by-east of Warwick. The etymology of the name is disputed, and the place has no historical interest attached to it. There was formerly a castle situated on a hill west of the town; the ruins are popularly termed King John's Castle, and at the foot of the hill there is a well commonly called King John's Well. The area of the parish is 2540 acres, or, including the chapelry of Combrook, 3810 acres; it had, in 1831, 197 houses, namely 195 inhabited and 2 uninhabited; 199 families, and 820 persons. The chapelry of Combrook had at the same time 55 inhabited houses and 7 uninhabited; together 62: with 57 families, and 282 persons. The population of the whole parish was 1102. The town is irregularly built, the principal street being along one of the roads from Banbury to Warwick; the houses are chiefly old, built of stone and thatched; there are however some detached modern houses. There is an old market-house in the market-place, which is small. The church retains some antient portions amid many alterations: it is a cross church, with a square embattled tower. The western door has a richly-moulded Norman archway. The market is on Tuesday, but is almost disused. There are two yearly fairs. The living of Kineton is a vicarage united with the chapelry of Combrook, of the clear yearly value of 97*l.*, with a glebe-house, in the rural deanery of Kington or Kineton, and in the archdeaconry and diocese of Worcester. There were in the whole parish, in 1833, two day and Sunday schools (one of them a national school, and one partly supported by endowment and contribution), with 120 children, namely 49 boys and 71 girls on week-days, giving about one in nine of the population under daily instruction; and with 147 children, namely 68 boys and 79 girls, on Sundays, giving two in fifteen of the population under Sunday instruction.

Leamington Priors is in the Kenilworth division of Knightlow hundred. Its importance is quite of modern date, and is owing to its mineral waters, the existence of which was noticed by Camden and Dugdale, but the valuable medicinal qualities of which were brought into notice by Dr. Kerr of Northampton, in 1784, whose recommendation attracted a few patients, and more prominently by Dr. Lambe, about the year 1797. The parish has an area of 1720 acres, and contained, in 1831, 1193 houses, namely 1003 inhabited, 139 uninhabited, and 51 building; with a population of 1039 families, or 6209 persons, a very small part of which was agricultural. The town is 90 miles north-west of the General Post-office, London, and two miles east of Warwick. It is situated in the valley of the Leam, in a situation sheltered by gentle and well-wooded declivities; and consists of two parts, the old town and the new town, separated from each other by the lawn, gardens, and shrubberies of the Royal Spa, and by the river Leam, which joins the Avon about a mile below the town. Leamington contains a number of new streets regularly laid out, well paved, and lighted with gas, chiefly in the New Town, which is on the north side of the river, over which is a handsome stone bridge. The old well or spring noticed by Camden has a neat pump-room erected over it. Since 1784 new springs have been discovered, and in connection with these other establishments for drinking the waters or bathing, of which the Royal Spa is the principal, have been formed in different parts of the town. These establishments have hot, cold, vapour, and shower baths, and pump-rooms. There are a number of handsome hotels and lodging-houses, and many elegant private houses, chiefly fronted with Roman cement. There is a handsome building comprehending a public library and reading-rooms, with an assembly-room above; another assembly-room has card, music, billiard, and refreshment rooms attached; and there are a museum and picture-gallery; a theatre; a public promenade called the Ranelagh Gardens; a botanical garden; a parish church, which retains some old portions amid various mutilations and alterations; a modern episcopal chapel (St. Mary's); places of worship for Independents, Methodists, and Roman Catholics; a national school; and baths for the poor. A market is held on Wednesday. The Warwick and Napton Canal passes through the Old Town, and enables the inhabitants to obtain coals at a reasonable price from the neighbourhood of Birmingham.

The living is a vicarage, of the clear yearly value of 255*l.*: the value of the perpetual curacy of St. Mary's Chapel is not given. The parish is in the rural deanery of Stonely, in the archdeaconry of Coventry and in the diocese of Worcester. There were in the parish, in 1833, four dame-schools with 60 children, namely, 30 boys and 30 girls; a day and Sunday national-school with 154 children, namely, 100 boys and 54 girls; and twenty other day or boarding and day-schools with 512 children, namely, 231 boys and 281 girls; making a total of 726 scholars, or two in seventeen of the population under daily instruction. There were at the same time three Sunday-schools with 310 scholars, of sex not stated in the returns, giving one in twenty of the population under instruction on Sunday.

Nuneaton is in the Atherstone division of Hemlingford hundred, about eight miles north of Coventry, or 101 north-west of the General Post-office, London. This town is indebted for its early prosperity to a nunnery of the order of Fontevrauld, founded here in the reign of Henry II., by Robert Bossu, earl of Leicester; the yearly revenues of the nunnery were valued, at the dissolution, at 290*l.* 15*s.* 0½*d.* gross, or 253*l.* 14*s.* 5½*d.* clear. It was the first established of the very few houses of this order in England. The nuns obtained the grant of a weekly market in the time of Henry III. The hamlet of Attleborough, about half a mile to the south-east of Nuneaton, in Nuneaton parish, may be regarded as one suburb, and the village of Chilvers Coton, about the same distance south of the town, as another suburb. The small hamlet of Stockingford, in Nuneaton parish, is two miles west of the town. The statistics of the two parishes of Nuneaton and Chilvers Coton, in 1831, were as follows:—

Parish.	Area in Acres.	Houses.			Population,	
		Inhabited.	Uninhab.	Building.	Families.	Persons.
Nuneaton . .	7020	1735	135	6	1772	7799
Chilvers Coton .	3730	523	18	4	534	2494
	10,750	2258	153	10	2306	10,293

Only about a fifteenth part of the population of Nuneaton, and a fifth part of that of Chilvers Coton, were agricultural.

The town of Nuneaton is irregularly laid out, but tolerably well built. The river Anker runs through it. The church, which is on the south-east side of the town, is a Gothic building, with a square tower, but too small for the accommodation of the inhabitants. The chief branch of industry in the town and neighbourhood is the ribbon-manufacture, which employed, in 1831, about 900 men in the parish of Nuneaton, and 200 in the parish of Chilvers Coton, besides women and children. The coal-field, which extends from Tamworth to Coventry, passes through both parishes, and there are some coal-pits. The market of Nuneaton is on Saturday, and there are three yearly fairs for cows, horses, and sheep. The living of Nuneaton is a vicarage united with the chapelry of Stockingford, of the joint clear yearly value of 902*l*., with a glebe-house, in the rural deanery of Arden, in the archdeaconry of Coventry, and in the diocese of Worcester. The living of Chilvers Coton is a vicarage, of the clear yearly value of 106*l*., with a glebe-house, in the same ecclesiastical divisions.

There were in Nuneaton parish, in 1833, eighteen day-schools with 511 children, namely 91 boys and 30 girls, and 390 children of sex not discriminated in the return. Two of the schools were endowed: one of them was a grammar-school founded by king Edward VI., with 45 boys; the other, called Smith's Charity-school, contained 46 boys and 30 girls. About one in fifteen of the population was under daily instruction. There were six Sunday-schools, with 789 children, namely 286 boys and 377 girls, and 126 children of sex not stated, giving about one in ten of the population under instruction on Sundays. In the parish of Chilvers Coton there were at the same period one infant-school, partly supported by an individual contributor, with 45 children, namely 20 boys and 25 girls; four other day-schools, two of them national schools, with 263 children, namely 148 boys and 115 girls: making a total of 308 children, or one in eight of the population under daily instruction. The two national schools were also Sunday-schools, and were attended on Sundays by 120 boys and 80 girls; beside which there were five other Sunday-schools, with 67 boys, 88 girls, and 250 children of sex not stated: making a total of 605 children, or two in seven of the population under instruction on Sunday. From this unusually large proportion it is probable that the Sunday scholars are from Atherstone or other adjacent parishes. There are several dissenting meeting-houses in the two parishes.

Rugby is in the Rugby division of the hundred of Knightlow, about 83 miles from the General Post-Office, London, by the parliamentary Holyhead road, through St. Albans, Towcester, Daventry, and Dunchurch, or 86 by the Birmingham railway, from which Rugby is distant about a mile. Rugby possesses no historical interest. It had a castle in the middle ages, of which only the earth-works remain. The parish comprehends an area of 2190 acres; and had, in 1831, 515 houses, namely, 496 inhabited, 7 uninhabited, and 12 building; with a population of 496 families, or 2501 persons. The town stands on an eminence near the south bank of the Avon, and consists of several streets irregularly laid out, containing a number of well built and handsome houses. The importance of the town is chiefly derived from its grammar-school, founded A.D. 1567 by Lawrence Sheriff, a native of Brownsover near Rugby, or perhaps of Rugby itself, and a shopkeeper (some call him grocer, others haberdasher) in London; he had also some employment in the household of Queen Elizabeth, before her accession to the throne. The school buildings are in the southern part of the town; the greater part of them form a quadrangle, enclosing a court 90 feet long by 75 feet wide, surrounded on three sides by open cloisters. The buildings are in the Elizabethan style, of white brick, with the angles, cornices, and dressings to the openings and windows, of Attleborough stone. They were erected early in the present century, and comprehend a house or apartments for the head-master, school-rooms, and a dining-hall, private studies and dormitories for those scholars who are resident under the care of the head master. There is also a chapel erected since the completion of the other buildings, containing a monument of Doctor James, formerly head master, under whom the school first rose to great eminence. The principal buildings form the south side of the quadrangle, with an eastward prolongation which includes the head master's house, and present a handsome front toward the extensive play-ground of eight acres, which lies on the south side of the school buildings. Rugby church possesses little architectural interest; it has a square western tower without buttresses and devoid of ornament. There are two ranges of almshouses, one of them endowed by Sheriff, the founder of the grammar-school.

Rugby has a weekly market on Saturday, and eleven or twelve yearly fairs, one of them a great horse-fair. The Oxford Canal passes near the town. There are places of worship for Baptists and Wesleyan Methodists.

The living of Rugby is a rectory, of the clear yearly value of 510*l*., with a glebe-house, in the rural deanery of Marton, in the archdeaconry of Coventry, and in the diocese of Worcester.

There were in the parish, in 1833, six daily schools of all kinds, with 625 scholars, namely, 465 boys and 160 girls, giving about one in four of the total population under daily instruction. This unusual proportion was mainly owing to the eminence of the grammar-school noticed above, which contained 300 youths collected from various parts of the kingdom. The endowment of the school is estimated to produce 5000*l*. per annum; a very valuable part of it consists of eight acres of ground, now covered with buildings, in or near Lamb's Conduit Street, London. Another day-school was endowed for 30 boys by Richard Elborow, and another, with 230 boys, was established A.D. 1830, by a gentleman who allowed the master 50*l*. a year. There were at the same time two Sunday-schools, with 245 children, namely, 115 boys and 130 girls; giving one in ten of the population under instruction on Sunday.

Solihull is in the Solihull division of Hemlingford hundred, about 7 miles south-east of Birmingham, on the road to Warwick. The area of the parish is 10,000 acres; it contained, in 1831, 600 houses, namely, 581 inhabited, 15 uninhabited, and 4 building; with a population of 608 families, or 2878 persons, more than half agricultural. The town stands in a valley, about half a mile from the river Blyth, from which it is separated by the park and grounds of Malvern Hall. It consists of two principal streets, nearly parallel to each other, and of two or three smaller connecting streets or lanes. The houses are generally modern and well built, and some of them are handsome. The church, which is on the south side of the town, is a large and curious cross church. The chancel, transept, and part of the nave, with the lower part of the tower, which rises from the intersection of the nave and transept, are of decorated character, of an early date and remarkable character. The west end of the nave and south aisle are of late perpendicular character, as also is the belfry-story of the tower. The spire, which is octagonal, is modern. Attached to the chancel on the north side is a small chapel, now used as a vestry, of similar architecture to the chancel, having under it a small but beautiful plain groined crypt. The windows of the chancel and transept are very good; the west window of the nave, though of singular composition, is also good. The chancel and the vestry have each on the south side a niche for the vessels of the altar; that in the chancel is richly canopied that in the vestry plainer. The tracery and mouldings in these parts of the church are very good; the corbels on the wall of the chancel are very perfect, and deserve attention for the spirit and beauty of their foliage. The piers of the tower are plain, but very good. There is some good tabernacle and screen work in the church. There are a meeting-house for Independents and a chapel for Roman Catholics.

The market (if kept up) is on Wednesday, and there are three, or, according to other accounts, five yearly fairs for cattle, horses, cheese, or hops.

The living is a rectory, of the clear yearly value of 1455*l*., in the rural deanery of Arden, in the archdeaconry of Coventry, and in the diocese of Worcester. There is in the parish a chapel dedicated to St. James, the curacy of which is of 49*l*. clear yearly value.

There were in the parish, in 1833, thirteen day-schools of all kinds, with 279 children, namely, 117 boys and 42 girls, and 120 children of sex not distinguished in the return; giving nearly one in ten of the population under daily instruction. There were at the same time four Sunday-schools, with 270 children, namely, 127 boys and 143 girls; giving about one in eleven of the population under instruction on Sundays.

Southam is in the Southam division of Knightlow hundred, 83 miles north-west of the General Post-Office, London, through Daventry, 9 miles east by south of Warwick and 12 south-east of Coventry. The parish has an area of 2770 acres; and contained, in 1831, 289 houses, namely, 280 inhabited and 9 uninhabited, with a population of 282 families, or 1256 persons: about one-third of the population was agricultural. The town lies in a valley, watered by a small stream which flows into the Itchen, or Ichene, just below the town. It contains a number of modern well-built houses. The church is of various dates; some portions are of decorated English architecture, with some good windows; other parts are of perpendicular character, some parts very good, others inferior. It has a western tower and spire. Some of the tracery has been much mutilated. There are a place of worship for Baptists, a free school, a self-supporting dispensary, and an infirmary for diseases of the eye and ear. The last is an ornamental building of perpendicular character. The market is on Monday, and is a good corn-market; there are several yearly fairs for sheep, horned cattle, and horses. There are two mineral-springs near the town.

The living is a rectory, of the clear yearly value of 534*l*., with a glebe-house, in the rural deanery of Marton, in the archdeaconry of Coventry, and in the diocese of Worcester. There were in the parish, in 1833, two day and Sunday national schools, chiefly supported by endowment or contributions, with 97 children, namely, 67 boys and 30 girls; giving about one in thirteen of the population under daily instruction: these schools were also Sunday-schools, and were attended on Sunday by 101 children, viz. 73 boys and 28 girls, or one in twelve of the population.

A few of the villages claim a brief notice. Bedworth is in the Kirby division of Knightlow hundred, about 3 miles south of Nuneaton: the area of the parish is 2240 acres: the population, in 1831, was 3980, a very small part of which was agricultural. There are coal-pits and stone-quarries near the village, which, in 1831, gave employment to 180 men: more than 300 men were at that time engaged in manufactures, but of what kind is not stated in the population returns. The village is on the road between Nuneaton and Coventry, which are the chief seats of the ribbon-manufacture.

Bidford is in the Stratford division of Barlichway hundred, on the northern bank of the Avon, over which there is a bridge 6 miles lower down than Stratford, on the line of the Icknield Way. The parish has an area of 3240 acres, with a population, in 1831, of 1268; above half agricultural.

Brails is in the Brails division of Kington hundred, in the southern part of the county, 10 miles from Banbury, on the road to Shipston-upon-Stour. The area of the parish is 5220 acres: the population, in 1831, was 1272; more than two-thirds agricultural. There is a small manufacture of plush for liveries. Brails had, in 1833, an infant-school with 40 children; an endowed day-school with 104 boys and 10 girls; two national Sunday-schools; and a small day and Sunday school, taught gratuitously by the Roman Catholic priest; beside private schools. The church is large, and has a lofty tower: some parts are of early English, others of decorated English, others of perpendicular character. In the churchyard there is an antient tomb with an effigy.

Bulkington is in the Kirby division of Knightlow hundred, about 4 miles south-east of Nuneaton. The parish has an area of 4600 acres: the population, in 1831, was 1792; nearly half agricultural. The village of Bulkington is on an eminence: the church, which has been enlarged in the last few years, is close to the village on the north side. In 1831, 166 men in the parish were engaged in manufactures, chiefly or wholly in that of ribbons.

Dunchurch is in the Rugby division of Knightlow hundred, 11 miles south-east of Coventry. The parish has an area of 5010 acres, and comprehends the hamlets of Toft and Thurlaston: the population, in 1831, was 1029; about half agricultural. Dunchurch village is on the south-eastern brow of the high waste land of Dunsmore Heath. The church is on the east side of the village, in a commanding situation, and is a handsome and curious building. ‘The chancel is early English, with some good decorated windows inserted, particularly the east window: this chancel has the low side window. The nave is decorated, with good piers and arches, and some good windows: the doors of the aisles have remarkably rich mouldings. The tower is perpendicular, with considerable enrichment, but mutilated. There are two antient water-drains, and the antient font is in the tower: it was plain and circular, with a cabled moulding round the upper edge. There are some small portions of antient wood-work in the church.’ (Rickman.) There is a substantial brick school-house for the free grammar-school, which contained, in 1833, between 60 and 70 boys; and near the school-house is a range of almshouses.

Exhall is in the county of the city of Coventry, about 4 miles north of that city. The area of the parish is 1750 acres: the population, in 1831, was 840; about one-third or one-fourth agricultural: the ribbon-manufacture gave employment at that time to above 50 men.

Foleshill is also in the county of the city of Coventry, about 2 miles north-east of Coventry. The area of the parish is 2810 acres: the population, in 1831, was 6969; a very small part agricultural. This parish is one of the principal seats of the ribbon-manufacture, which employed, in 1831, more than 900 men, beside women and children: about 30 men were at the same period employed in collieries. There are, beside the parish church, places of worship for Independents, Baptists, and Wesleyan Methodists.

Polesworth is in the Tamworth division of Hemlingford hundred, between 3 and 4 miles east-south-east of Tamworth, on the road to Atherstone. The area of the parish is 6310 acres: the population, in 1831, was 1870; about half agricultural. There was antiently a Benedictine nunnery at Polesworth, said to have been founded by King Egbert early in the ninth century: its possessions were valued, at the dissolution, at 109*l*. 6*s*. 6*d*. gross, or 87*l*. 16*s*. 3*d*. clear yearly revenue. There are considerable remains of the buildings of very picturesque character. Polesworth has an Independent place of worship, and an endowed free-school or schools. There are coal-works and a stone-quarry near the village.

Sow is in the county of the city of Coventry, about 3 or 4 miles east-north-east of Coventry: the parish extends into the Kirby division of Knightlow hundred, and has an area of 2300 acres: the population, in 1831, was 1414. The ribbon-manufacture gave employment to 100 men in this parish, and to above 90 in the neighbouring parish of Shilton (the area of which was 850 acres; and the population, in 1831, 460), in the Kirby division of Knightlow hundred. There are considerable coal-works in Sow parish: the Oxford Canal passes through the midst of them.

Stoke is also in the county of the city of Coventry, about a mile east of Coventry. The area of the parish is 950 acres: the population, in 1831, was 848. The ribbon or other manufactures employed about 53 men in 1831.

Stoneleigh is in the Kenilworth division of Knightlow hundred, on the river Sow, just above its junction with the Avon, about 2 miles east of Kenilworth, and 6 north-east of Warwick. There was antiently a Cistercian abbey here, transferred hither from Radmore in Staffordshire about A.D. 1154, the yearly revenues of which at the dissolution were estimated at 178*l*. 2*s*. 5½*d*. gross, or 151*l*. 0*s*. 3½*d*. clear. The gateway of the abbey is still standing in Stoneleigh Park, the seat of Lord Leigh. The church of Stoneleigh is a large irregular building, partly of Norman architecture, partly of later date. Among the monuments is that of Alice, titular duchess of Dudley, who claimed to be wife of Robert Dudley, earl of Leicester, the favourite of Queen Elizabeth, but could not establish her claim. The area of Stoneleigh parish is 8680 acres: the population, in 1831, was 1298; three-fourths agricultural. There are two endowed free-schools, which had, in 1833, 149 scholars, 74 boys and 75 girls, in the week, and 108 scholars, 51 boys and 57 girls, on Sundays.

Studley is in the Alcester division of Barlichway hundred, nearly 5 miles north of Alcester. There was a priory of Austin canons, transferred hither in the beginning of the reign of Henry II., the yearly revenues of which at the dissolution were 181*l*. 3*s*. 6*d*. gross, or 117*l*. 1*s*. 1½*d*. clear: there are some considerable remains of the conventual buildings. There was also an hospital for the infirm poor at the priory gate. The area of the parish is 5070 acres: the population, in 1831, was 1903; about one-third agricultural. A considerable manufacture of needles and fishing hooks is carried on in the parish, which gave employment, in 1831, to above 100 men, beside women and children.

Wolvey, nearly 6 miles south-east of Nuneaton, had, in 1831, 48 persons engaged in manufactures, apparently of ribbons. The area of the parish is 3790 acres: the population, in 1831, was 935; two-fifths agricultural.

Divisions for Ecclesiastical, Legal, and Parliamentary Purposes.—This county is at present wholly included in the diocese of Worcester. It comprehends the whole archdeaconry of Coventry and a part of the archdeaconry of Worcester. The rural deaneries and ecclesiastical cures are as follows:—

Rural Deanery.	Rectories.	Vicarages.	Perpet. Curacies.	Chapelries.	Donatives.	Total.
I. Archdeaconry of Coventry.						
Arden . .	20	18	21	9	5	73
Coventry . .	8	14	3	1	0	26
Marton . .	10	14	5	3	0	32
Stonely . .	6	18	2	3	1	30
	44	64	31	16	6	161
II. Part of the Archdeaconry of Worcester.						
Blockley (pt. of)	1	0	0	0	0	1
Droitwich (pt. of)	0	1	0	0	0	1
Kington (pt. of)	18	17	1	2	0	38
Warwick .	15	14	6	5	0	40
	34	32	7	7	0	80
Add Archdeaconry of Coventry as above	44	64	31	16	6	161
Total of the county	78	96	38	23	6	241

The archdeaconry of Coventry was formerly included in the diocese of Lichfield and Coventry; but, in pursuance of the recommendation of the church commission, has been separated from that diocese, and added to the diocese of Worcester, in which the whole county is now included. The archdeaconry of Coventry includes the greater part of the county, and especially the rich and populous manufacturing districts of the north and north-east. The archdeaconry of Worcester comprehends the southern and south-western parts, which are agricultural, together with the adjoining county of Worcester.

The county is included in the midland circuit; the assizes and quarter-sessions for the county are held at Warwick; those for the county of the city of Coventry at Coventry. There are a county gaol and a county house of correction at Warwick; a gaol and house of correction at Coventry for the county of that city; lock-up-houses at Leamington and Birmingham; a debtors' or Court of Requests' prison at Birmingham; and a county asylum for discharged juvenile prisoners at Stretton.

The county gaol at Warwick is well ventilated and dry, and moderately clean; but so much crowded as to make it difficult to maintain effective discipline: the townspeople give more trouble than prisoners from the country parts; but the most troublesome are the debtors.

The county house of correction at Warwick has not a sufficient number of cells for the proper separation of the prisoners; but the management is such as to reflect the highest credit on the keeper and officers. The system of labour is reported by the inspectors of prisons as deserving of imitation. Nearly half the prisoners are from Birmingham. The chaplain to the gaol and house of correction is a zealous and efficient officer, and some interesting cases of reformed prisoners are given by him in the Fourth Report of the Inspectors of Prisons. The gaol and house of correction at Coventry is not large enough, but the number of cells is sufficient for the usual number of inmates: it is secure, dry, and moderately well ventilated; and the management is good. The bulk of the prisoners are weavers and agricultural labourers; about one-fourth are strangers not resident in the county of the city of Coventry.

The two lock-up-houses at Leamington are small and insufficient; one is under the town-hall, the other at the police station, in a distant part of the town; that at the town-hall, which is most used, has not a sufficient number of cells. It is used only for the temporary confinement of prisoners. The principal lock-up-house at Birmingham (there are three lock-up-houses, if not more, in the town) is attached to the police-office. The time of confinement is usually short, and there is little attempt at discipline; there is no chaplain, and no instruction of any kind is provided. The debtors' prison at Birmingham is exclusively for debtors from the Court of Requests; it is neglected and dirty.

The county asylum in Stretton was established in 1817, at the suggestion of Judge Dallas, for the reception and reformation of juvenile offenders at the expiration of their imprisonment. The house, formerly occupied as a farmhouse, is in a retired situation. A keeper and his wife are the only resident officers. The age of admission is from 14 to 16; but some boys under 14 had been received and transmitted to 'the Children's Friend Society' during the existence of that association. The boys are taught to read and write and the elements of arithmetic, and are employed in making clothes and shoes, and in working in a large garden, in which they commonly take great delight. There is an ample supply of books, religious and miscellaneous; and the vicar and curate of the parish visit and catechize the children. Each boy receives a portion of the estimated value of his labour: this portion is divided into thirds; one-third he receives at the time, and two-thirds on his discharge. The boys stay two years, and are considered as the hired servants of the keeper. The management of the institution reflects great credit on the keeper, and on the committee (appointed by the county magistrates) under whose supervision it is placed; the results have been good; many boys have turned out well, and have become respectable workmen. Some have called afterwards, and expressed their gratitude for the benefits derived from their residence here. The institution is supported by voluntary contributions, and by the sale of articles made in the house.

Before the Reform Act, Warwickshire sent only six members to the House of Commons, namely, two for the county, two for the city of Coventry, and two for the borough of Warwick. By the Reform Act the number was increased to ten, namely, four for the county, which was divided into two parts; two each for Warwick and Coventry as before; and two for Birmingham, which was made a parliamentary borough. By the Boundary Act the northern division of the county was determined to comprehend the hundred of Hemlingford, the county of the city of Coventry, and the Rugby and Kirby divisions of Knightlow hundred: the principal place of election is Coleshill; and the polling places are Coleshill, Nuneaton, Coventry, Birmingham, and Dunchurch. The southern division of the county comprehends the hundreds of Barlichway and Kington, and the Kenilworth and Southam divisions of Knightlow hundred: the principal place of election is Warwick; and the polling places are Warwick, Kington or Kineton, Stratford-on-Avon, Henley-in-Arden, and Southam. The limits of the city of Coventry, which are less extensive than those of the county of the city, and those of the borough of Warwick, were not altered by the Boundary Act. The parliamentary borough of Birmingham comprehends the parishes of Birmingham and Edgbaston, and the townships of Bordesley, Duddeston or Duddlestone with Nechells, and Deritend, in the parish of Aston. The population of the parishes and townships included in the borough was, in 1831, 142,251. Birmingham has since been incorporated as a municipal borough, by charter dated 6th Oct., 1838. The municipal borough has the same limits as the parliamentary. The parliamentary constituency of the county and the city and boroughs in it, in 1835-6, and 1839-40, was as follows:—

County Constituency in	1835-6	1839-40	City and Borough Constituency in	1835-6	1839-40
Northern division	6505	6786	Coventry . .	3681	3810
Southern do.	3997	4253	Warwick . .	1046	977
			Birmingham .	4847	4619
	10,502	11,039		9574	9406

History and Antiquities.—In the earliest historic period this county appears to have been on or near the border of the three nations, the Cornabii (Κορναύιοι, Ptolemy, or in one MS. Κορνάβιοι), on the north-west: the Coritani or Coritavi (Κοριτανοί, Ptolemy), on the north-east; and the Dobuni (Δοβοῦνοι, Ptolemy), on the south; but to which of these nations it belonged, whether to one or more, and in what proportion, there are no means of determining. Camden assigns it to the Cornavii; Mr. Britton, in the 'Beauties of England and Wales,' to the Cornavii and the Wigantes, whom he identifies with the Jugantes or Iugantes, a people named only in one passage of Tacitus (*Annales*, lib. xii. 40, 'Civitas Jugantum'), of which the reading is disputed.

In the Roman division of Britain, Warwickshire appears to have been included in the province of Flavia Cæsariensis.

Several Roman or other antient roads cross the county or pass along its borders. The antient Watling Street in its north-westward progress meets the border of the county on the east side near Hill Moreton, and runs along the north-eastern border as far as Mancetter, near Atherstone, beyond which its course, still north-westward, is wholly within the county to the passage of the Tame, between Wilnecote and Fazeley, where it enters Staffordshire. While on the border it separates Warwickshire partly from Northamptonshire, but chiefly from Leicestershire. The Fosse Way, another antient road, enters the county on the south, and crossing first the detached portion of the county at Stretton-on-the-Fosse, and then the intervening portion of Worcestershire, enters the main part of the county at Halford-on-the-Stour, and runs north-eastward by Compton Verney, Stretton-on-Dunsmore, Brinklow, and Stretton-under-Fosse, to High Cross, where it intersects Watling Street and enters Leicestershire. Another road, designated in the Ordnance map the Icknield Street, but in the map of Antient Britain published by the Society for the Diffusion of Useful Knowledge, more correctly 'the Ryknield Way,' enters the county on the south-west side, and runs north by west by Bidford, Alcester, Studley, and Ipsley, into Worcestershire. It then bends gradually to north by east and again crosses the county or touches the border near Birmingham and near Sutton Coldfield; after which it enters Staffordshire and intersects Watling Street at Etocetum, now Wall, near Lichfield. Between Alcester and Studley it is called 'the Hayden Way.'

Some Roman towns and stations, in the county or on the border, may be identified. The Tripontium of Antoninus is fixed by Dugdale and Gale at Dove bridge, or Dow bridge, on Watling Street, at the junction of the three counties of Northampton, Leicester, and Warwick, or at Lilbourne in Northamptonshire, close by, where there are some antient trenches and one or two tumuli. The Venonæ of the same writer is fixed by Camden, Stukeley, and others, at or near High Cross, where the Watling Street and the Fosse Road intersect. Camden has preserved a local tradition of an antient 'most flourishing city, named Cleycester, which had a senate of its own, and of which Cleybrook, about a mile off, was a part;' and speaks of foundations of hewn stone buried under the furrows, and of Roman coins turned up by the plough. The Manduessedum of the same writer is fixed at Mancetter or Mancester, near Atherstone. Here are evident remains of a Roman station; the ditch and vallum being in many parts very perfect. Alcester may be identified with the Alauna of the 14th Iter of Richard of Cirencester. Roman coins and medals of brass, gold, and silver, and antient bricks, have been found at Alcester. Probably the name may have belonged also to the river (Alne) on which the town stands. It may be observed that Richard assigns this town to the Dobuni. Near Chesterton, on the Fosse Way, is an encampment, evidently Roman, which is identified by Mr. Hatchard, the translator of Richard of Cirencester, with a station, the name of which is lost, in the 14th Iter of Richard.

Roman coins or other antiquities have been found near Birmingham, Hampton-in-Arden, Willoughby near the Leam, on the eastern border of the county, and at Warwick; and a Roman pavement at Coventry. Mr. Reynolds mentions the remains of a Roman camp or station at Monk's Kirby, between Lutterworth and Coventry; but it is not marked in the Ordnance map. There are some earthworks at Brinklow, near Monk's Kirby, on the line of the Fosse, which Dugdale conjectured to be Roman.

In the earlier Saxon period Warwickshire formed part of the kingdom of Mercia. The southern part of the county, which has been all along included in the diocese of Worcester, appears to have been included in the subordinate kingdom of Hwiccas, or, as it is termed by Bede (*Hist. Eccles.*, Lib. iv., c. 13, 23) 'provincia Huicciorum,' which was in existence as early as the middle or latter end of the seventh century. Notices of this subordinate principality or province continue down to the year 855. The treacherous death of the Mercian king Ethelbald, A.D. 757, is placed by the Saxon chronicle at Seccandune, apparently Seckington in Warwickshire, near Tamworth. Under king Alfred, Warwickshire came, with the rest of Mercia south-west of Watling Street, into direct subjection to the West Saxon crown (about A.D. 886), and during part of the reign of Alfred and his son Edward the Elder was governed by the alderman Aethered, and after his death by his wife, the lady Aethelflaed or Ethelfleda, Alfred's daughter. During this and the subsequent reigns it was the scene of the war with the Danes or Northmen.

To this period of history, namely, A.D. 926, the third year of the reign of Athelstan, son and successor of Edward, some of our early chroniclers assign the existence of the fabulous Guy, Earl of Warwick. According to the legend, Athelstan was at war with the Danes, who had penetrated to the neighbourhood of Winchester; and it was to depend on the issue of a single combat between an English champion to be appointed, and Colbrand, who, though acting as champion of the Danes, is described as being an African, or Saracen, of gigantic size, whether the crown of England should be retained by Athelstan, or be transferred to Olaus, or Aulaf or Anlaf, king of Denmark, and Golavus or Govelaph, king of Norway. Earl Guy, whose valour had obtained for him great renown, had at the very time just landed at Portsmouth in the garb of a palmer, having returned from a pilgrimage to the Holy Land; and being engaged as champion by the king, who, without knowing him, had been directed by a vision to apply to him to undertake the matter, he succeeded in killing the Danish champion. He then privately discovered himself to the king, on whom he enjoined secrecy, retired unknown to the neighbourhood of his own castle at Warwick, and lived the life of a hermit till his death. Guy's Cliff near Warwick is pointed out by tradition as the place of his hermitage; and armour said to be his is still preserved in Warwick Castle. What is the origin of this tradition, which cannot be traced higher than the early part of the twelfth century, it is difficult to determine. The story, as given in those of our early historians who have mentioned it, and in Dugdale, who, with Leland, Camden, and some others, has received it as a true history, is inconsistent with the known circumstances of the times. And it may be observed that the name of the champion, Guy, the pilgrimage to the Holy Land, and the African or Saracenic origin of Colbrand, point to a period subsequent to the Norman conquest as that in which the legend received its present form. Dr. Pegge has examined into the origin of the legend, in a paper contained in the fourth volume of the 'Bibliotheca Topographica Britannica.' He disputes the existence of the Earldom of Warwick; but it is probable that there were earls, or rather aldermen (the equivalent Saxon title, represented in the Latin of the middle ages by 'dux' and 'comes'), of Warwickshire in the time of Athelstan; as it was then or soon after in existence as a separate county; for a deed of the year 962 contains the name of 'Uuathawede, vicecomes Warwichiæ,' *i.e.* Sheriff of Warwickshire. It is probable that there were at the same time, or soon after, earls or aldermen of Coventry, or perhaps Chester and Coventry, and with one of these Leofric III., who had acquired the government of Mercia, is connected another celebrated legend, that of the fair Godiva, his wife, who is said to have ridden naked through the city of Coventry. [COVENTRY.] This legend also is seriously given by Dugdale. Many circumstances of the legend are obviously fabricated, but Leofric and Godiva are historical, not fabulous persons, and belong to the reign of Canute; and an antient inscription accompanying a picture of the pair, on a window of Trinity church, Coventry, set up in the time of Richard II., may be taken as evidence that the city owed some immunities to the lady's intercession. The inscription was—

> 'I Luriche, for the love of thee,
> Doe make Coventre tol-free.'

Warwickshire was ravaged by the Danes under Canute in the last year of the reign of Ethelred II., A.D. 1016.

In the civil war of Stephen and the empress Maud, Coventry Castle, belonging to Ranulph, earl of Chester, one of the supporters of the empress, was taken by the king's troops; and the attempt of the earl to retake it brought on an engagement, in which the king was hurt, and the earl wounded and repulsed. This incident is given by Mr. Britton, in 'The Beauties of England and Wales;' but we cannot trace his authority, or fix the year of its occurrence. In the civil troubles of Henry III., after the defeat and death of Simon de Montfort, earl of Leicester, the castle of Kenilworth held out for the insurgents for six months (A.D. 1266); and in the troubles of the reign of Edward II. the murder of Gaveston, the king's minion, took place at Blacklow Hill, near Warwick. He was taken from the custody of Aimeric, or Aimery, earl of Pembroke, by Guy Beauchamp, earl of Warwick (whom Gaveston had insultingly called 'the black dog of Arden'), and was beheaded by his order. The incident is commemorated by an antient inscription in the rock near the summit of the hill: P. GAVESTON, EARL OF CORNWALL, BEHEADED HERE, + 1311.

In the war of the Roses the inhabitants of the county were divided between the two parties: the Warwick men, swayed by their earl, the celebrated 'king-maker,' were Yorkists; the men of Coventry, won by the frequent visits and favours of Henry VI. and his queen, Margaret of Anjou, were supporters of the house of Lancaster.

In the civil war of Charles I. the county generally embraced the cause of parliament, being especially swayed by the influence of Lord Brooke. The first great battle of the war was fought at Edge Hill, in the southern part of the county (A.D. 1642). The king was near Banbury in Oxfordshire, where was a Parliamentarian garrison, which he had summoned to surrender, on his way towards London: the earl of Essex, general of the Parliamentarian army, who was at Worcester, was ordered by the parliament to march in pursuit, and had reached Kineton in Warwickshire, when the king turned back to meet him. The Parliamentarians were drawn up in the fields between the foot of Edge Hill and the town of Kineton, and the Royalists descended the hill to attack them. The battle was severe, but indecisive: the loss on both sides is commonly stated at 5000; but the slain were probably about 1300; the wounded may have made up the larger number. The Parliamentarians retreated the next day to Warwick; while the king returned to Banbury, which he forced to surrender. The numbers engaged were stated in an account sent by some Parliamentarian officers to the speaker of the House of Commons, and ordered by the house to be printed, at 10,000 on their own side, and from 14,000 to 22,000 (viz. 18,000 foot and 4000 horse) on that of the king. The king had marched through the county before the battle; and after his leaving Birmingham, the townsmen seized his plate and furniture, and conveyed it to Warwick Castle. They further showed their hostility by refusing to manufacture swords for the Royalists, while they readily supplied the opposite party. They afterwards fortified their town with some slight works to resist Prince Rupert, whom the king had ordered to open the communication between Oxford and York. The town was however taken by the prince early in April, 1643. A minister who acted as governor was killed, and part of the town burned. Warwick Castle, the principal post of the Parliamentarians, was attacked by the Royalists in the early part of the war, but without success.

The only incidents requiring notice in later times are the Birmingham riots. The first of these occurred in 1715, when several dissenting meeting-houses were destroyed or injured. The next occurred in 1791, when two dissenting meeting-houses and the dwellings of several dissenters, including that of Dr. Priestley, minister of 'the New Meeting' (one of those destroyed), were burned, and the doctor was obliged to fly for his life. The last great riot was connected with the Chartist agitation, and occurred in July, 1839, when several houses were destroyed. The riots of 1715 were partly or wholly the result of religious bigotry; those of 1791 were partly religious, partly political; those of 1839 were political. The formation of the great Political Union during the agitation of the Reform Bill, in 1831-2, led to some meetings of immense numbers of people, but was not attended by any breach of the peace.

(*Ordnance Map of England*; Conybeare and Phillips, *Outlines of the Geology of England*; Greenough's *Geological Map of England*; Priestley's *History of Navigable Canals and Rivers*; Dugdale's *Warwickshire*; Britton's account of Warwickshire, in the *Beauties of England and Wales*; Hutton's *History of Birmingham*; Rickman's *Essay on Gothic Architecture*; *Parliamentary Papers*.)

STATISTICS.

Population and Occupations.—As a manufacturing county, Warwickshire is the eighth in rank, a position which it maintained in 1811-21-31, standing in the last year between Northumberland and Staffordshire; the proportion of the manufacturing population was sixty per cent. in 1831, at which period there were 2838 occupiers of land employing labourers, 1142 occupiers not employing labourers, and the number of agricultural labourers was 15,644. The remainder of the male population aged 20 and upwards was distributed as follows:—11,375 employed in manufactures; 32,579 in retail trades and handicrafts; 4012 capitalists, bankers, and members of the professions; 10,358 non-agricultural labourers; 2446 domestic servants; other males aged 20 and upwards, 3729; and there were 13,089 female servants. The following details are from the Returns of 1831:—'About 4500 men are employed in making ribbons, nearly one-half of them in the city of Coventry, upwards of 900 at Nuneaton, 900 at Foleshill, 300 at Astley, 200 at Chilvers Coton, 100 at Sow, 54 at Exhill, 25 at Harthill, and in smaller numbers in many other places; and about 100 men are employed in weaving linen in various parts of the county. Watch-making has been successfully introduced at Coventry. Needles are made by 350 men, chiefly at Ipsley, Studley, Alcester, and Sambourn; and at Kenilworth the manufacture of combs employs upwards of 150 men. But these and the smaller manufacturers of agricultural machines, rush-weavers, and others, are nothing in comparison with the activity displayed at BIRMINGHAM and its vicinity.'

The population of the county at the following decennial periods when the census was taken was as under:—

	Males.	Females.	Total.	Increase per Cent.
1801	99,942	108,248	208,190	
1811	109,539	119,196	228,735	9·8
1821	133,127	140,565	274,392	19·9
1831	165,576	171,034	336,610	22·8
1841	195,679	206,036	401,715	19·4

It is estimated that in 1700 the population was 96,600; from 1801 to 1841 it increased 193,525, or 93 per cent. According to the last census the number of persons to a square mile is 464. The population, &c. of each hundred and borough in 1841 is shown in the following table communicated by the commissioners of the Census, the returns not having yet been published:—

	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
HUNDRED, &c.	English Statute Acres.	Inhabited.	Uninhabited.	Building.	Males.	Females.	Total of Persons.	Under 20 years.		20 Years and upwards.		In this County.	Elsewhere.
								Males.	Females	Males.	Females.		
Barlichway (Hundred) . .	100,310	5,945	293	23	14,434	14,527	28,961	6,679	6,756	7,755	7,771	23,255	5,706
Hemlingford (Hundred) . .	141,440	11,445	707	77	27,725	28,039	55,764	12,780	12,623	14,945	15,416	46,086	9,678
Kington (Hundred) . . .	119,690	5,080	190	13	12,247	11,796	24,043	5,747	5,545	6,500	6,251	19,949	4,094
Knightlow (Hundred). . .	167,280	11,968	744	149	28,192	30,651	58,843	13,082	13,358	15,116	17,293	46,522	12,321
Birmingham (Borough) . .	18,780	36,121	3,847	323	88,572	94,350	182,922	41,211	42,598	47,361	51,752	128,202	54,720
Coventry (City)	4,290	6,466	583	41	14,570	16,173	30,743	6,672	7,290	7,898	8,883	26,041	4,702
County of the same . . .	10,150	2,306	205	30	5,098	5,566	10,664	2,508	2,621	2,590	2,945	9,961	703
Warwick (Borough) . . .	5,360	1,990	334	12	4,841	4,934	9,775	2,201	2,140	2,640	2,794	7,961	1,814
Totals	567,930	81,321	6,903	668	195,679	206,036	401,715	90,880	92,931	104,799	113,105	307,977	

In 1831 the number of inhabited houses was 68,253, inhabited by 72,357 families, and there were 782 houses building and 3882 uninhabited.

County Expenses, Crime, &c.—Sums expended for the relief of the poor: 1748-49-50 (annual average), 10,445*l.*; 1776, 44,071*l.*; 1783-84-85 (average), 59,557*l.* The sum expended in

1801	was 117,353*l.*,	being	11*s.*	3*d.*	for each inhabitant.
1811	.. 157,932	„	13	9	„
1821	.. 146,185	„	10	7	„
1831	.. 161,212	„	9	6	„
1841	.. 109,522	„	6	6	„

In each of the following years ending 25th March, the expenditure for the relief of the poor was as under:—

1835.	1836.	1837.	1838.	1839.	1840.
138,629*l.*	116,404*l.*	98,910*l.*	108,183*l.*	108,711*l.*	109,522*l.*

The expenditure for the year ending 25th March, 1834, the last year under the old administration, was 158,159*l.* The total difference in the sum expended in that year and 1840 was 58,209*l.*, or 31 per cent.: namely, in suits of law, &c., 2845*l.*, or 48 per cent.; and in miscellaneous expenses, 6727*l.*, or 30 per cent. The abuses under the old law were comparatively few in this county. The number of Poor-law unions is 11, comprising 237 parishes which had a population of 191,068 in 1831. There are nine parishes, with a population of 145,542, which are not in any union. Each of the undermentioned places is the centre of a union; and the sums expended in the year ended 25th March, 1840, under the principal heads of In-maintenance, Out-relief, and Establishment and Salaries, were as follows:—

Name of Union.	Population in 1831.	In-Maintenance.	Out-Relief.	Establishment and Salaries.	Total.
		£.	£.	£.	£.
Alcester . . .	15,923	404	3590	858	4,852
Aston	36,635	909	3539	1143	5,591
Atherstone . .	9,489	774	2648	832	4,254
Foleshill . . .	11,965	564	1442	669	2,675
Meriden . . .	10,481	713	2209	663	3,585
Nuneaton . .	13,068	1097	3713	915	5,725
Rugby . . .	16,668	511	3885	1070	5,466
Solihull . . .	11,433	606	1597	810	3,013
Southam . . .	8,579	449	1729	738	2,916
Stratford-on-Avon	18,745	751	4942	1551	7,244
Warwick . . .	28,924	1292	6597	2309	10,198

The number of persons relieved in these unions during the quarter ending Lady-day, 1840, was 13,231 (1728 in-door, and 11,503 out-door), or 8 per cent. of the union population. There were 391 lunatics and idiots chargeable on the poor's-rate in 1836, or 1 in 861; in England 1 in 1033. In 1835-6 there were 1551 bastard children chargeable on the poor's-rate, or 1 in 217 of the whole population; in England 1 in 215. The number of illegitimate births in 1830 was 425, or 1 in 22; in England 1 in 20. The number affiliated in 1834-5 was 305, and 162 in 1835-6. In 1840 the proportion per cent. of persons married under 21 years of age was 10·4; in England and Wales 9·6, for the two sexes.

The annual value of real property assessed to the property tax in 1815 was 1,269,879*l.*; property assessed to occupiers, 835,422*l.*; and the profits of trades, professions, &c., were assessed at 665,998*l.* In 1825-6 the centesimal proportion of the various descriptions of property assessed was:—land, 60 parts; dwelling-houses, 31·3 parts; mills, factories, &c. 6·8 parts; manorial profits, &c. 1·9 parts. The net rental or annual value of real property assessed to the poor's-rate in 1841 was as follows:—

	£.
On landed property . .	713,390
Dwelling-houses . . .	300,427
All other kinds of property .	595,930
Total . . .	1,609,747

In the above year the total amount levied for poor-rates was 171,435*l.*, being a rate of 2*s.* 1*d.* in the pound on the annual value of real property assessed. Taking the total annual value of real property in the county in 1841, the rate per head was 4*l.* 3*s.* 1*d.* for each inhabitant; and dividing it by the number of acres, it was 1*l.* 5*s.* 1*d.* per acre, which is the same as for Lancashire, and is only exceeded by Middlesex and Worcestershire.

The county-rate levied at different periods, and the principal disbursements for the same periods, are shown in the following table:—

	1819.	1820.	1830.	1838.
	£.	£.	£.	£.
Income . .	8706	21,995	21,777	21,881
Expenditure:—				
Bridges . .	196	627	7,797	863
Gaols . .	353	964	704	475
Prisoners .	2924	7,393	6,247	6,953
Prosecutions .	1537	5,580	5,579	7,565
Constables and vagrants .	459	1,678	1,638	645

The particulars of the county expenditure in 1834 are as follows:—

	£.
Bridges, building, repairs, &c. . .	660
Gaols, houses of correction, and maintaining prisoners . . .	5427
Shire-halls and courts of justice .	316
Lunatic asylum	220
Prosecutions	4654
Clerk of the peace	556
Conveyance of prisoners before trial .	745
Conveyance of transports . .	538
Vagrants, apprehending and conveying	385
Constables, high and special . .	552
Coroner	323
Miscellaneous	954
Total . . .	15,336

The length of streets and highways, and the expenditure thereon, were as under in 1839:—

	Miles.	
Streets and roads repaired under local acts	125	
Turnpike roads	407	
All other highways	1833	
		2365
		£.
Amount of rates levied		35,972
Expended in repairs of highways .	£31,839	
Law and other expenses . . .	433	
Total expenditure		32,243

The number of turnpike trusts, in 1840, was 33; the income from tolls was 27,728*l.*; parish compositions in lieu of estate duty, 15*l.*; and total income, 28,685*l.*; the total expenditure for the same year being 28,384*l.* The bond and mortgage debts amounted to 93,370*l.* In 1836 the debt was equal to 3 years' income; for the whole of England the proportion of income to debt being 4·5 years: the proportion of unpaid interest to the total debt was, in Warwickshire, 8 per cent.; in England 12 per cent. The state of sixteen trusts, in 1841, is shown in the following table: the last column is an estimate of the number of years which would be required for each trust to discharge its entire debts, taking the surplus revenue of the year 1840 as an annual surplus:—

Trusts.	Total Debts.	Net Income.	Net Expend.	Surplus in 1840.	No. of Years.
Birmingham and Spernal Ash .	£4,273	£1,618	£1,213	£405	11
Birmingham and Stonebridge .	1,072	1,504	1,447	57	19
Birmingham and Watford Gap .	11,050	2,418	1,855	563	20
Castle Bromwich and Birmingham	2,000	810	618	192	11
Coventry and Wolvey . .	705	238	59	179	4
Dunchurch and Stonebridge .	1,000	1,067	830	237	5
Evesham, Alcester District .	2,425	545	317	228	11
Hinckley and Coventry . .	3,805	1,878	1,490	388	10
Mancetter to Wolvey Heath .	900	365	305	60	15
Rugby and Lutterworth . .	1,152	379	299	80	15
Rugby and Warwick . .	2,271	469	322	140	17
Stratford and Bromsgrove .	2,924	1,814	1,269	545	6
Stratford and Long Compton .	10,931	2,155	1,611	544	21
Warwick and Coventry . .	950	1,235	797	438	3
Warwick, Paddlebrook, &c. .	1,700	1,248	965	283	7
Wellesbourn and Stratford .	400	250	195	55	8

In 1839 the church-rates in Warwickshire amounted to 6635*l.*; and 3916*l.*, applicable to the same objects, was derived from 'other sources,' the amount from estates and rent charges, included under this head, being 2055*l.* in 1832. The sum of 9824*l.* was expended in 1839 for the purposes of the establishment, of which 4063*l.* was for repairs of churches. There was a debt of 7444*l.* secured on the church-rates.

Crime.—Number of persons charged with criminal offences in the septennial periods ending 1819, 1826, 1833, and 1840.

	1813-19.	1820-26.	1827-33.	1834-40.
Total . . .	2,944	3,603	4,650	5,687
Annual average .	420	514	664	812

The numbers committed, convicted, and acquitted in each year from 1834 to 1842 were as under:—

	1834.	1835.	1836.	1837.	1838.	1839.	1840.	1841.	1842.
Committed .	660	756	728	880	884	778	1001	1046	1003
Acquitted .	208	167	159	185	198	153	221	208	229
Convicted .	452	589	569	695	686	625	780	838	774

In 1834 the proportion of persons committed, to the total population of the county, was 1 in 510; and in 1841 the proportion was 1 in 400. The population of the county is to the population of England and Wales as 1 to 39, but in respect to criminal offenders its proportions are as 1 to 31, that is, in England and Wales there is 1 criminal offender in 508, and in Warwickshire 1 in 400. Still Warwickshire may be advantageously compared with several other counties; with Gloucestershire, for example, where the proportion of criminals is 1 in 344, and with several other counties; and in 1842 the number of violent offences against the person was only the fifty-fourth part of this class of crimes, instead of the thirty-ninth, which it would have been had the proportion of population been followed.

Of 1008 offenders (846 males and 157 females) tried at the assizes and sessions in 1842, there were 31 charged with offences against the person; 82 with offences against property committed with violence; 814 (including 584 cases of simple larceny) with offences against property committed without violence; 6 with malicious offences against property; 43 for forgery, coining, and uttering base coin; and 27 for various misdemeanours. In no one case was sentence of death recorded. Of 774 persons convicted, 4 were transported for life; 19 for periods above ten and under fifteen years; 61 for periods above seven and under ten years; and 88 for terms of seven years; making 172 transported. None were sentenced to imprisonment for periods exceeding two years; 12 were imprisoned for one year and under two years; 109 for above six months and less than one year; and 471 for six months and under. Of the 229 persons acquitted, 189 were found not guilty on trial; in the case of 36 no bill was found, and in 4 instances there was no prosecution. Above one-half of the total number of persons committed were between the ages of 15 and 25, or one-fourth between 15 and 20, and one-fourth between 20 and 25, which are higher proportions for these ages than the rest of England and Wales. The degree of instruction was ascertained in all but two cases: 304 males and 59 females could neither read nor write; 449 males and 91 females could read and write imperfectly; 89 males and 6 females could read and write well; and 3 males had received a superior education. The proportion of uninstructed criminals in the county on an average of several years was 93 per cent.; in England and Wales 89·3 per cent.

Savings' Banks.—There are 7 of these institutions in the county; and the number of depositors and amount of deposits in each of the following years were as under:—

	1833.	1836.	1837.	1838.	1839.	1840.
No. of depositors	6,580	10,325	10,824	12,438	13,325	14,657
Am. of deposits	£167,122	£240,859	£246,434	£275,388	£282,177	£312,447

The distribution of the sums invested in 1830, 1834, and 1839 is shown in the following table:—

		1830.		1834.		1839.	
	£	Depositors.	Deposits. £	Depositors.	Deposits. £	Depositors.	Deposits. £.
Not exceeding	20	3,411	22,252	4,500	27,045	8,749	43,716
"	50	1,882	55,072	2,056	61,976	2,958	90,561
"	100	698	47,048	748	51,412	1,107	75,655
"	150	294	24,453	200	23,871	328	39,314
"	200	74	12,342	100	16,756	162	27,199
Above . .	200	47	12,852	29	8,061	21	5,732
		6,286	174,075	7,633	189,151	13,325	282,177

The deposits of 175 friendly societies, not reckoned above, amounted, in 1840, to 17,586*l.*; and 5726*l.* were invested by 136 charitable institutions.

The following particulars respecting the state of each savings' bank in the county, for the year ending 20th November, 1842, are from a parliamentary paper dated 24th of May, 1843:—

	No. of Depositors.	Salaries.	Total Management.	Net surplus Profit.
Atherstone .	631	£91	£100	£20
Birmingham .	10,479	350	609	467
Coventry . .	1,570	110	156	. .
Rugby . .	818	50	56	38
Stratford . .	660	40	63	37
Sutton . .	392	60	64	9
Warwick . .	2,818	160	220	157

Elective Franchise.—The number of county voters registered, in 1839-40, was as under:—

	N. div.	S div.	Total. 1839-40.	Total 1835-6.
Freehold of every class	5,074	2,793	7,867	7,393
Copyholders and customary tenants . . .	148	65	213	190
Leaseholders for life or term of years . . .	458	65	523	510
50*l.* tenants at will . .	1,021	1,291	2,312	2,212
Trustees and mortgagees	20	9	29	74
Qualified by office . .	37	23	60	82
Joint and duplicate qualifications	28	7	35	35
	6,786	4,253	11,039	10,502

Education.—Summary of Returns made to Parliament in 1833:—

	Schools.	Scholars.	Total.
Infant-schools . . .	64		
Number of children at such schools; ages from 2 to 7 years:—			
Males . .		583	
Females . .		592	
Sex not specified .		1,227	
			2,402
Daily-schools . . .	699		
Number of children at such schools; ages from 4 to 14 years:—			
Males . .		11,447	
Females . .		8,940	
Sex not specified .		3,252	
			23,639
Schools . .	763		
Total of children under daily instruction . . .			26,041
Sunday-schools . . .	348		
Number of children at such schools; ages from 4 to 15 years:—			
Males . .		16,714	
Females . .		14,964	
Sex not specified .		2,554	
			34,232

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	1	8	6	390	43	647	14	1,257
Daily Schools	111	5,298	45	2,941	492	11,261	51	4,139
Sunday Schools	31	1,827	297	30,381	4	462	16	1,662
Total...	143	7,133	348	33,712	539	12,370	81	7,058

The schools established by Dissenters, included in the above table, are—

			Scholars.
Infant-schools . .	4, containing		400
Daily-schools . . .	21	.	716
Sunday-schools . .	102	.	15,824

The schools established since 1818 are—

Infant and other daily schools	349, containing		12,440
Sunday-schools . .	191	.	22,641

Lending libraries of books were attached to 66 schools in 1833.

Sixteen Sunday-schools are returned from places where no other school existed. Sixty-six schools, containing 3901 children, were both Sunday- and day-schools. The number of boarding-schools is fifty-four, and the scholars are included in the above returns. The total number of children returned as attending Sunday- and day-schools of all kinds is 60,273, which was above two-thirds of the total number of children in the county between the ages of 2 and 15.

WASHINGTON, the capital of the United States, is situated on the left bank of the Potomac, and on the right bank of the Anacostia, or Eastern Branch, about 38° 40′ N. lat. and about 77° W. long. from Greenwich, according to Arrowsmith. By an act of Congress, passed in 1790, it was decreed that the seat of government should be established at some place on the Potomac, and the district around Georgetown was ultimately ceded to the United States by Virginia and Maryland for this purpose. In 1792 the government advertised for plans of a capital and president's house. The name of Washington was ultimately bestowed upon 'the federal city,' and, in conformity with the act of Congress alluded to, the seat of government was transferred thither from Philadelphia in 1800. The president and other chief executive officers of the federal government have since resided at Washington: Congress meets there every year on the first Monday of December, and the Supreme Court of the United States holds its annual sittings, beginning on the second Monday of January.

Washington is separated from Georgetown by Rock Creek, over which there are several bridges, and from Alexandria by the Potomac, over which is a wooden bridge upwards of a mile in length. There are also several bridges over the Anacostia. This river has a sufficient depth of water for frigates to ascend, without being lightened, above the navy-yard, which is situated upon it. Vessels drawing fourteen feet can come up to Potomac Bridge, whence to the mouth of the Tiber, a small stream which flows through the middle of the city, there are nine feet of water at ordinary high tides. A spacious canal unites the Anacostia with the Potomac. Washington is situated near the head of the tide-water navigation, and is connected with the interior by the Chesapeake and Ohio canal. The city is well supplied with water, and has in front (south) the Potomac, nearly a mile in width, and a range of heights in the rear (north), affording many fine sites.

The city was regularly laid out, according to the design of Major L'Enfant, but only a small part of the ground embraced within the plan is built upon. The Capitol is intended to be the central site: avenues from 120 to 160 feet wide, named after the states of the Union, are to extend from it to the most important public buildings, or the places which offer the finest prospects. These avenues intersect diagonally square blocks formed by streets crossing each other at right angles. The streets north and south of the capital are designated by the letters of the alphabet, A north, A south, &c.: those east and west of it are numbered, 1st street east, 1st street west, &c. The streets are from 70 to 110 feet wide. The effect of the partial filling up of the magnificent plan of the city was thus described by Basil Hall in 1827:—'This singular capital is so much scattered, that scarcely any of the ordinary appearances of a city strike the eye. Here and there ranges of buildings are starting up, but by far the greater number of the houses are detached from one another. The streets, where streets there are, have been made so unusually wide, that the connection is quite loose; and the whole affair, to use the quaint simile of a friend at Washington, looks as if some giant had scattered a box of his child's toys at random over the ground.' Mrs. Trollope, who will scarcely be suspected of undue partiality, and who visited Washington much about the same time, speaks more eulogistically of its appearance:—'The whole aspect of Washington, light, cheerful, and airy, reminded me of our fashionable watering-places. It has been laughed at by foreigners, and even by natives, because the original plan of the city was upon an enormous scale, and but a very small part of it has as yet been executed; but I confess I see nothing ridiculous about it: the original design, which was as beautiful as it was extensive, has been in no way departed from, and all that has been done has been done well. . . . . The houses are scattered, but without ever losing sight of the regularity of the original plan; and to a person who has been travelling much through the country, and marked the immense quantity of new manufactories, new canals, new railroads, new towns, and new cities which are springing as it were from the earth in every part of it, the appearance of the metropolis rising gradually into life and splendour, is a spectacle of high historic interest.' The most recent account of Washington, that of Mr. Charles Dickens, when allowance is made for the flippancy of its tone, leaves the impression that the external appearance of Washington has not materially changed since it was visited by Captain Hall and Mrs. Trollope.

The most striking and important of the public buildings of Washington is the Capitol. It stands on a rising ground at the eastern termination of Pennsylvania avenue, which is a mile in length, spacious, and planted with trees. 'The western façade, to which this avenue leads,' says Mrs. Trollope, 'is approached from the city by terraces and steps of bolder proportion than I ever before saw. The elegant eastern front, to which many persons give the preference, is on a level with a newly planted but very handsome enclosure, which in a few years will offer the shade of all the most splendid trees which flourish in the Union, to cool the brains and refresh the spirits of the members.' The building is constructed of freestone, and composed of a centre and two wings. The length of the whole is 350 feet, the depth of the wings is 121 feet, the height of the dome 120 feet. A Corinthian portico extends the length of the centre, which is occupied by the rotunda, 96 feet in diameter and 96 feet in height. The rotunda is ornamented with relievos, and contains four paintings by Trumbull, representing the landing of the pilgrims at Portsmouth, the treaty between Penn and the Indians, the preservation of Smith by Pocahontas, and the adventure of Daniel Boone with the two Indians. Adjoining to this, on the west, is the library of Congress, a hall 92 feet in length by 34 in width, and 36 high, containing upwards of 16,000 volumes. The senate-chamber is in the north wing: it is a semicircle of 74 feet in length and 42 in height. Over the president's chair is a portrait of Washington, by Rembrandt Peale. The representatives' chamber, in the south wing, is also a semicircle: it is 75 feet long and 60 feet high. The dome is supported by twenty-six columns and pilasters of Potomac marble. A colossal statue of Liberty and a statue of History are the principal ornaments of the hall. Immediately below the senate-chamber, and nearly of the same form and dimensions, is the hall in which the sessions of the Supreme Court are held. Below the representatives' chamber are committee-rooms and other places of business.

The president's house is situated at the opposite extremity of Pennsylvania avenue from the Capitol. It is a handsome building two stories high, with a lofty basement, 180 feet long by 85 wide. In convenient proximity to the mansion are four simple and commodious brick houses, which contain offices of the principal executive departments. The General Post-Office contains also the Patent-Office. Ample areas are left round each, whose shrubs and grass refresh the eye. The Patent-Office contains models of all the mechanical inventions produced in the Union, chiefly by mechanics and agriculturists in remote districts, who had been spurred by necessity to invent substitutes for human labour, and brought them to Washington for patents. At the secretary of state's office are shown the autographs of all potentates who are or have been in alliance with the Union, and the presents made by foreign courts to American ambassadors. At the office for Indian affairs are the portraits of all chiefs who have from time to time come to negotiate with the president. This quarter of the city contains many elegant private dwellings, most of which are occupied by the foreign ministers.

The navy-yard, and the arsenal immediately to the north of it, are situated on the Anacostia, just below the long bridge which spans the Potomac and connects the Maryland with the Virginia shore of the river. To the navy-yard are attached marine barracks, and to the arsenal public manufactories of arms and military stores. The river, on arriving at Washington, makes a beautiful sweep, forming a bay, on which the city stands. The navy-yard and arsenal follow the curve.

Near the arsenal is a penitentiary. There are besides in Washington a city-hall, four market-houses, twenty churches, an orphan asylum, almshouse, &c. Columbia College, which was incorporated by Congress in 1821, is situated a little to the north of the city, and has ten instructors and a library of 4200 volumes. A medical department is attached to this college. There is also a college under the direction of Roman Catholics at Georgetown, which has nineteen instructors and a library of 22,000 volumes.

The census of 1840 gives 23,364 as the total inhabitants of Washington. The total inhabitants of the federal district of Columbia was 43,712; of whom 7312 resided in George Town, 8459 in Alexandria, and 4577 in the rural parts of the district. Of 23,364 inhabitants of Washington, 26 are said to have been employed in agriculture, 103 in commerce, 886 in manufactures and trades; 45 were seamen of the long voyage, 25 navigators of lakes, canals, and rivers, and 83 members of the learned professions. The two colleges in the vicinity of Washington had 224 students in 1840. There were in the city 12 academies and grammar-schools, with 609 scholars; 9 primary and common schools, with 167 scholars; and 213 scholars were supported at the public expense. There were in the city 363 white persons upwards of 20 years of age, who could neither read nor write. There were 649 male and 1064 female slaves; 1949 male and 2859 female free persons of colour; 8025 male and 8647 female white persons.

The population of Washington consists of members of the legislature and of the executive departments of state and of foreign diplomatists, with the addition of such professional, trading, mechanical, and menial persons as are required to minister to their comfort. The tone of society, as might be anticipated from this circumstance, differs considerably from that which prevails in other parts of the Union. Owing to the influence of the example of the foreign diplomatists, it approaches more nearly in some respects to that of Europe. On the other hand, the elective character of the legislature and executive government occasions an ample supply of specimens of all the peculiarities of the several States of the Union. In external appearance and the arrangements of domestic and social intercourse, Washington reminds one of the residence of some second-rate German state; in its business habits, of the political clubs and government and parliamentary offices of Westminster. There is nothing scholastic, nothing commercial in its character: it is a mixture of politics and pleasure. The highest intellects and the best-bred gentlemen of America are to be met with in the circles of Washington. The ladies are comparatively less numerous, for members of Congress rarely bring their families to Washington. The fashionable amusements are as in Europe—balls, soirées, dinner parties, and promenades. Washington does not support a permanent dramatic company. It is said that there is a good deal of high play. The supply of books is ample. The fine arts are less cultivated, though the Capitol affords a fair promise for the future.

(*The American Almanac; The Sixth Census of the Inhabitants of the United States; Encyclopædia Americana; Memoirs, &c. of Thomas Jefferson; Travels* of Captain Hall, Mrs. Trollope, Mr. Dickens, and the Author of 'Cyril Thornton.')

WASHINGTON, GEORGE, was born in Westmoreland county, Virginia, on the 22nd of February, 1732. The first of the family who settled in Virginia came from Northampton, but their ancestors are believed to have been from Lancashire. George Washington's father, Augustine, who died after a sudden and short illness in 1743, was twice married. At his death he left two surviving sons by the first marriage, and by the second four sons (of whom George was the eldest) and a daughter. The mother of George Washington survived to see her son president. Augustine Washington left all his children in a state of comparative independence: to his eldest son by the first marriage he left an estate (afterwards called Mount Vernon) of twenty-five hundred acres, and shares in iron-works situated in Virginia and Maryland; to the second, an estate in Westmoreland. Confiding in the prudence of his widow, he directed that the proceeds of all the property of her children should be at her disposal till they should respectively come of age: to George were left the lands and mansion occupied by his father at his decease; to each of the other sons an estate of six or seven hundred acres: a suitable provision was made for the daughter.

George Washington was indebted for all the education he received to one of the common schools of the province, in which little was taught beyond reading, writing, and accounts. He left it before he had completed his sixteenth year: the last two years of his attendance had been devoted to the study of geometry, trigonometry, and surveying. He had learned to use logarithms. It is doubtful whether he ever received any instruction in the grammar of his own language: he never even commenced the study of the classical languages; and although, when the French officers under Rochambeau were in America, he attempted to acquire their language, it appears to have been without success. From his thirteenth year he evinced a turn for mastering the forms of deeds, constructing diagrams, and preparing tabular statements. His juvenile manuscripts have been preserved; the handwriting is neat, but stiff. During the last summer he was at school he surveyed the fields adjoining the school-house and the adjoining plantations, entering his measurements and calculations in a respectable field-book. He compiled about the same time, from various sources, 'Rules of Behaviour in Company and Conversation.' Some selections in rhyme appear in his MSS., but the passages appear to have been selected for the moral or religious sentiments they express, not from any taste for poetry. When a boy, he was fond of forming his schoolmates into companies, who paraded and fought mimic battles, in which he always commanded one of the parties. He cultivated with ardour all athletic exercises. His demeanour and conduct at school are said to have won the deference of the other boys, who were accustomed to make him the arbiter of their disputes.

From the time of his leaving school till the latter part of 1753, Washington was unconsciously preparing himself for the great duties he had afterwards to discharge. An attempt made to have him entered in the royal navy, in 1746, was frustrated by the interposition of his mother. The winter of 1748-49 he passed at Mount Vernon, then the seat of his brother Lawrence, in the study of mathematics and the exercise of practical surveying. George was introduced about this time to the family of Lord Fairfax, his brother having married the daughter of William Fairfax, a member of the colonial council, and a distant relation of that nobleman. The immense tracts of wild lands belonging to Lord Fairfax, in the valleys of the Allegany mountains, had never been surveyed: he had formed a favourable estimate of the talents of young Washington, and entrusted the task to him. His first essay was on some lands situated on the south branch of the Potomac, seventy miles above its junction with the main branch. Although performed in an almost impenetrable country, while winter yet lingered in the valleys, by a youth who had only a month before completed his sixteenth year, it gave so much satisfaction that he soon after received a commission as public surveyor, an appointment which gave authority to his surveys, and enabled him to enter them in the county offices.

The next three years were devoted without intermission, except in the winter months, to his profession. There were few surveyors in Virginia, and the demand for their services was consequently great, and their remuneration ample. Washington spent a considerable portion of these three years among the Alleganies: the exposures and hardships of the wilderness could be endured only for a few weeks together. He recruited his strength by surveying at intervals tracts and farms in the settled districts. Even at that early age his regular habits enabled him to acquire some property; and his probity and business talent obtained for him the confidence of the leading men of the colony.

At the time he attained his nineteenth year the frontiers were threatened with Indian depredations and French encroachments. To meet this danger, the province was divided into military districts, to each of which an adjutant-general with the rank of major was appointed. George Washington was commissioned to one of these districts, with a salary of 150*l*. per annum. There were many provincial officers (his brother among the number) in Virginia who had served in the expedition against Carthagena and in the West Indies. Under them he studied military exercises and tactics, entering with alacrity and zeal into the duties of his office. These pursuits were varied by a voyage to Barbados, and a residence of some months in that colony, in company with his brother Lawrence, who was sent there by his physicians to seek relief from a pulmonary complaint. Fragments of his journal kept by George Washington on this excursion have been preserved; they evince an interest in a wide range of subjects, and habits of minute observation. At sea the log-book was daily copied, and the application of his favourite mathematics to navigation studied; in the island, the soil, agricultural products, modes of culture, fruits, commerce, military force, fortifications, manners of the inhabitants, municipal regulations and government, all were noted in his journal. Lawrence Washington died in July, 1752, leaving a wife and infant daughter, and upon George, although the youngest executor, was devolved the whole management of the property in which he had a residuary interest. The affairs were extensive and complicated, and engrossed much of his time and thoughts for several months. His public duties were not however neglected. Soon after the arrival of Governor Dinwiddie the number of military divisions was reduced to four; the northern division was allotted to Washington. It included several counties, which he had to visit at stated intervals, to train and instruct the military officers, inspect the men, arms, and accoutrements, and establish a uniform system of manœuvres and discipline.

In 1733 the French in Canada pushed troops across the lakes, and at the same time bodies of armed men ascended from New Orleans to form a junction with them, and establish themselves on the upper waters of the Ohio. Governor Dinwiddie resolved to send a commissioner to confer with the French officer in command, and inquire by what authority he occupied a territory claimed by the British. This charge required a man of discretion, accustomed to travel in the woods, and familiar with Indian manners. Washington was selected, notwithstanding his youth, as possessed of these requisites. He set out from Williamsburg on the 31st of October, 1753, and returned on the 16th of January, 1754. He discovered that a permanent settlement was contemplated by the French within the British territory, and, notwithstanding the vigilance of the garrison, he contrived to bring back with him a plan of their fort on a branch of French Creek, 15 miles south of Lake Erie, and an accurate description of its form, size, construction, cannon, and barracks.

In March, 1754, the military establishment of the colony was increased to six companies: Colonel Fry, an Englishman of scientific acquirements and gentlemanly manners, was placed at the head of them, and Washington was appointed second in command. His first campaign was a trying but useful school for him. He was pushed forward with three small companies to occupy the outposts of the Ohio, in front of a superior French force, and unsupported by his commanding officer. Relying upon his own resources and the friendship of the Indians, Washington pushed boldly on. On the 27th of May he encountered and defeated a detachment of the French army under M. de Jumonville, who fell in the action. Soon after Colonel Fry died suddenly, and the chief command devolved upon Washington. Innis, the commander of the North Carolina troops, was, it is true, placed over his head, but the new commander never took the field. An ill-timed parsimony had occasioned disgust among the soldiers, but Washington remained unshaken. Anticipating that a strong detachment would be sent against him from Fort Duquesne as soon as Jumonville's defeat was known there, he entrenched himself on the Great Meadows. The advance of the French in force obliged him to retreat, but this operation he performed in a manner that elicited a vote of thanks from the House of Burgesses.

In 1755 Colonel Washington acceded to the request of General Braddock to take part in the campaign as one of his military family, retaining his former rank. When privately consulted by Braddock, 'I urged him,' wrote Washington, 'in the warmest terms I was able, to push forward, if he even did it with a small but chosen band, with such artillery and light stores as were necessary, leaving the heavy artillery and baggage to follow with the rear division by slow and easy marches.' This advice prevailed. Washington was however attacked by a violent fever, in consequence of which he was only able to rejoin the army on the evening before the battle of the Monongahela. In that fatal affair he exposed himself with the most reckless bravery, and when the soldiers were finally put to the rout, hastened to the rear division to order up horses and waggons for the wounded. The panic-struck army dispersed on all sides, and Washington retired to Mount Vernon, which had now, by the death of his brother's daughter without issue, become his own property. His bravery was universally admitted, and it was known that latterly his prudent counsels had been disregarded.

In the autumn of the same year he was appointed to reorganize the provincial troops. He retained the command of them till the close of the campaign of 1758. The tardiness and irresolution of provincial assemblies and governors confined him to act during much of this time upon the defensive; but to the necessity hence imposed upon him of projecting a chain of defensive forts for the Ohio frontier, he was indebted for the mastery in this kind of war, which afterwards availed him so much. Till 1758 the Virginia troops remained on the footing of militia, and Washington had ample opportunities to convince himself of the utter worthlessness of a militia in time of war: in the beginning of that year he prevailed upon government to organize them on the same footing as the royal forces. At the same time that Washington's experience was extending, his sentiments of allegiance were necessarily weakened by the reluctance with which the claims of the provincial officers were admitted, and the unreserved preference uniformly given to the officers of the regular army. At the close of 1758 he resigned his commission, and retired into private life.

On the 6th of January, 1759, he married Mrs. Martha Custis, a young widow, with two children. 'Mr. Custis,' says Mr. Sparkes, 'had left large landed estates, and 45,000*l.* sterling in money. One-third of this property she held in her own right; the other two-thirds being equally divided between her two children. Washington had a considerable fortune of his own at the time of his marriage—the estate at Mount Vernon, and large tracts of excellent land, which he had selected during his surveying expeditions, and obtained grants of at different times. He now devoted himself to the management of this extensive property and to the guardianship of Mrs. Washington's children, and till the commencement of 1763 was, in appearance at least, principally occupied with these private engagements. He also found time for public civil duties. He had been elected a member of the House of Burgesses before he resigned his commission; and although there were commonly two and sometimes three sessions in every year, he was punctual in his attendance from the beginning to the end of each. During the periods of his attendance in the legislature, he was frequent in his attendance on such theatrical exhibitions as were then presented in America, and lived on terms of intimacy with the most eminent men of Virginia. At Mount Vernon he practised on a large scale the hospitality for which the southern planters have ever been distinguished. His chief diversion in the country was the chace. He exported the produce of his estates to London, Liverpool, and Bristol, and imported everything required for his property and domestic establishment. His industry was equal to his enterprise; his day-books, ledgers, and letter-books were all kept by himself; he drew up his own contracts and deeds. In the House of Burgesses he seldom spoke, but nothing escaped his notice, and his opinion was eagerly sought and followed. He assumed trusts at the solicitation of friends, and was much in request as an arbitrator. He was, probably without being himself aware of it, establishing a wide and strong influence, which no person suspected till the time arrived for exercising it.

On the 4th of March, 1773, Lord Dunmore prorogued the intractable House of Burgesses. Washington had been a close observer of every previous movement in his country, though it was not in his nature to play the agitator. He had expressed his disapprobation of the stamp-act in unqualified terms. The non-importation agreement, drawn up by George Mason, in 1769, was presented to the members of the dissolved House of Burgesses by Washington. In 1773 he supported the resolutions instituting a committee of correspondence and recommending the legislatures of the other colonies to do the same. He represented Fairfax county in the Convention which met at Williamsburg, in August, 1774, and was appointed by it one of the six Virginian delegates to the first general Congress. On his return from Congress he was virtually placed in command of the Virginia Independent Companies. In the spring of 1775 he devised a plan for the more complete military organization of Virginia. And on the 15th of June of that year he was elected commander-in-chief of the Continental army by Congress.

The portion of Washington's life which we have hitherto been passing in review may be considered as his probationary period—the time during which he was training himself for the great business of his life. His subsequent career naturally subdivides itself into two periods—that of his military command, and that of his presidency. In the former we have Washington the soldier; in the latter, Washington the statesman. His avocations from 1748 to 1775 were as good a school as can well be conceived for acquiring the accomplishments of either character. His early intimacy and connections with the Fairfax family had taught him to look on society with the eyes of the class which takes a part in government. His familiarity with applied mathematics and his experience as a surveyor on the wild frontier lands had made him master of that most important branch of knowledge for a commander—the structure of the country. His experience as a parade officer, as a partisan on the frontier, and as the commander of considerable bodies of disciplined troops, had taught him the principles both of the war of detail and the war of large masses. On the other hand, his punctual habits of business, his familiarity with the details both of agriculture and commerce, and the experience he had acquired as trustee, arbitrator, and member of the House of Burgesses, were so many preparatory studies for the duties of the statesman. He commenced his great task of first liberating and then governing a nation, with all the advantages of this varied experience, in his forty-third year, an age at which the physical vigour is undiminished and the intellect fully ripe. He persevered in it, with a brief interval of repose, for upwards of 20 years, with almost uniform success, and with an exemption from the faults of great leaders unparalleled in history.

Washington was elected commander-in-chief on the 15th of June, 1775; he resigned his commission into the hands of the president of Congress on the 23rd of December, 1783.

A few days after his appointment he left Philadelphia to join the army at Cambridge, Massachusetts. The particulars of the battle of Bunker's Hill reached him at New York, and increased his anxiety to hasten forward. He arrived at Cambridge on the 2nd of July, and assumed the command next day. The army, including sick and wounded, amounted to about 17,000 men, collected on the spur of the moment, occupying a range of posts disproportioned to their numbers, and almost under the guns of the enemy. There were few stores, no military chest, and no general organization. And the new commander discovered with astonishment that there was not powder enough in the camp to supply nine cartridges for each man. There was much discontent among the general officers on account of the manner in which the appointments had been made by Congress, and the subordinate officers and privates formed themselves into parties. Referring their complaints to Congress, Washington proceeded to mature his plans. The army was formed into six brigades of six regiments each; the troops of the same colony were, whenever it was practicable, brought together and placed under a commander from that colony. All the officers were commissioned anew by Congress, and by degrees a continental army was formed. He kept up an uninterrupted correspondence with Congress, which, though tardily, adopted all his important suggestions. He corresponded also with the heads of the provincial governments, and subsequently with the governors and legislatures of the several states. He thus became not only the creator of the American army, but the sole channel of communication between it and the numerous and complicated depositories of power in the United States.

The army was at first distributed into three grand divisions of two brigades each: the division forming the left wing was stationed at Winter Hill, under Major-General Lee; the centre division at Cambridge, under Major-General Putnam; the right wing at Roxburgh, under Major-General Ward. The head-quarters of the commander-in-chief were with the centre at Cambridge. These positions were maintained with little alteration till far in January, 1776. During that interval the regular army, by the departure of many whose term of enlistment had expired, and in consequence of the slow progress of the recruiting, sunk to 9650 men, to whom were added 15,000 militia, who were to remain only till the middle of January. 'Search the volumes of history through,' Washington wrote at this time, 'and I much question whether a case similar to ours is to be found, namely, to maintain a post against the flower of the British troops for six months together without powder, and then to have our army disbanded and another to be raised within the same distance of a reinforced enemy.' During this time he detached 1100 men, under Arnold (14th September), in the direction of Canada, and equipped and sent out armed vessels from the New England ports. Occasional cannonades and skirmishes took place at the advanced posts. But no decisive blow could be hazarded; and the patience and fortitude of the commander-in-chief were severely tried by the cabals of the officers, the undisciplined habits of the men, and the pragmatical conduct of the civil authorities.

Towards the end of December, 1775, General Howe, who had succeeded Gage in command of the British army, was fitting out part of the fleet in Boston harbour for some secret enterprise. General Lee was despatched to place New York in a state of defence, but the expedition proved to be destined against North Carolina. Washington became impatient to attack Boston, but was twice overruled by a council of war—on the 16th of January and on the 10th of February, 1776. At last, on the 4th of March, the Americans took possession of Dorchester Heights; and on the 17th the British evacuated Boston. As soon as the British fleet had put to sea, Washington set out for New York, apprehensive that the enemy might attempt a landing there. It was the 28th of June before the British forces appeared off Sandy Hook; but the deficient means at Washington's command, and the strength of the royalist party in New York, had materially impeded his preparations for defence. The incompetency of some of Washington's officers enabled the enemy to gain easy possession of Long Island on the 27th of August; and the weakness of his army and fears of the soldiers obliged him in succession to evacuate New York, cross the Hudson, and fall back behind the Delaware. Congress at last saw the necessity of raising a regular army of men enlisted for a longer period than a year, and of investing Washington with dictatorial powers. Thus strengthened he remodelled his troops, recrossed the Delaware on the night of the 25th of December, and broke up and drove back the whole of the enemy's line of cantonments on that river. Having thus relieved New Jersey, he again fell back and established his winter-quarters at Morristown in New Jersey.

The campaign of 1777 did not open till the middle of June; and the operations on both sides led for some time to nothing but a series of skirmishes. Washington had received a supply of arms from France, but he was still uncertain of his new levies. He was also kept in suspense as to the real designs of the British commander. It was clearly an object with the English to maintain the command of the Hudson, keep up the communication between New York and Canada, and isolate the eastern from the western states. But there was also danger in leaving Philadelphia exposed. At last the British landed at the Head of Elk. The Americans were defeated on the Brandywine. Congress undismayed invested Washington with fresh powers. The Americans were again beaten at Germantown in Pennsylvania, on the 4th of October, but a marked improvement was visible in the fighting of part of their troops. The British took possession of Philadelphia after the battle. On the 18th of December Washington began to construct a fortified encampment at Valley Forge. He was at this time harassed by cabals among the general officers. Conway, Gates, and Mifflin, aided by a small party in Congress, conspired to have him removed from the command. The good sense of the majority in Congress frustrated the plot, and the attachment of the soldiers, heightened by the enthusiasm with which Lafayette and von Kalb threw their weight into Washington's scale, kept the army in good temper.

The winter was however a trying one for the troops. Owing to the derangement of the commissariat, the men were inadequately supplied with clothes and blankets, and at times even with food. With the experience of three campaigns, Washington now set himself to plan an entire remodelling of the army. He invited the general officers to state their sentiments on the subject in writing. Congress at the same time appointed a commission to visit the camp, which remained there three months. With great difficulty the commander-in-chief wrung from Congress the promise of half-pay for seven years for the officers, and a gratuity of 80 dollars for each non-commissioned officer and soldier who should continue in the service to the end of the war. The ratification of the treaty with France was celebrated in the camp with great solemnity on the 6th of May. The British in Philadelphia, though only twenty miles distant from the American camp, allowed the winter and spring to pass without making any attempt to assault it. These concurring circumstances enabled Washington to bring his troops into the field in 1778 in tolerable spirits. A defensive campaign was however determined on by the council of war. Howe evacuated Philadelphia on the 18th of June, and Washington crossed the Delaware with his whole army. He attacked the enemy at Monmouth on the 28th; night put an end to the attack, and under its cover the British continued their retreat. Washington advanced to the Hudson, and crossing it at King's Ferry, encamped near White Plains. Count d'Estaing, with a French fleet of twelve ships of the line and four frigates, arrived about the same time off Sandy Hook. The American army was engaged for four months in arrangements for the defence of New England; during which interval the English laid New Jersey waste. Washington in December retired into winter-quarters—distributing his troops in line of cantonments around New York extending from Long Island Sound to the Delaware.

During the whole of 1779 Washington retained his position in the highlands of the Hudson, and remained on the defensive. An expedition fitted out to chastise the Indians was successful. The British burned a number of towns on the coast, but Washington covered New Jersey. Baron Steuben effected an improvement in the discipline and evolutions of the American army.

Lafayette returned from a visit to France before the end of April, 1780, with the intelligence that the French government had fitted out an armament of land and naval forces which might soon be expected in the United States. Rochambeau arrived at Newport, Rhode Island, on the 10th of July. A plan of combined operations against the British in New York was concerted by Washington and the French commanders. The naval superiority of the English however prevented anything being done, and the year wore away unmarked by any incidents, except the treason of Arnold and the execution of André. Congress, yielding at last to Washington's representations, decreed that all troops to be raised in future should be enlisted to serve during the war, and that all officers who continued in service to the end of the war should be entitled to half-pay for life. The army went into winter-quarters towards the end of November at the Pennsylvanian line near Morristown, the New Jersey regiments at Pampton, and the eastern troops in the Highlands, while the head-quarters were at New Windsor, on the Hudson.

The year 1781 opened with a mutiny in the Pennsylvania and Jersey troops, which was subdued by the promptitude and self-possession of Washington. He was now strengthened not only by a French auxiliary army, but by liberal supplies from France. The main source of his weakness was the utter want of a civil government to support him. The Congress, which made war, declared independence, formed treaties of alliance, sent members to foreign courts, emitted paper currency, and pledged the credit of all the states for its redemption, 'ventured,' says Mr. Sparkes, 'only to *recommend* to the states to raise troops, levy taxes, clothe and feed their naked and starving soldiers.' Tilly with the French fleet entered the Chesapeake in February, but returned without injuring Arnold's squadron. Lafayette, whom Washington had detached at the same time with 1200 men to Virginia, held Cornwallis, who had advanced from North Carolina, in check. Washington had repeated interviews with the French commanders to concert a plan of campaign. On the 4th of July he encamped near Dobb's Ferry, and was joined on the 6th by the French army under Count Rochambeau. A fruitless attempt on New York, and a letter intimating that De Grasse, who commanded the French fleet, could not remain on the coast after October, decided him to relinquish the siege of New York and advance into Virginia with all the French troops and as many of the American as could be spared from the defence of the posts on the Hudson and in the Highlands. Washington and Rochambeau reached Lafayette's head-quarters at Williamsburg in Virginia, on the 14th of September. De Grasse had previously entered the Chesapeake and landed 3000 men from the West Indies, who united with Lafayette. Cornwallis took possession of York Town and Gloucester on the opposite side of York river in Virginia. The American and French generals advanced from Williamsburg and completely invested York Town on the 30th of September. Cornwallis proposed a cessation of hostilities on the 17th of October, and signed the articles of capitulation on the 19th. Two thousand continental troops were marched to reinforce General Greene in the south; the French army remained in Virginia, its head-quarters were at Williamsburg; the American forces were marched into winter-cantonments in New Jersey and on the Hudson.

Hitherto Washington had to struggle against the apathy engendered by fear; now he had to check the remissness which sprung from an over-estimate of success. 'Whatever,' he said, 'may be the policy of European courts during this winter, their negotiations will prove too precarious a dependence for us to trust to. Our wisdom should dictate a serious preparation for war, and, in that state, we shall find ourselves in a situation secure against every event.' Congress concurred in these sentiments. The commander-in-chief addressed circular letters to the governors of all the states, urging them to make strenuous exertions for carrying on the war. In the middle of April he joined the army and established his head-quarters at Newburgh. Little progress was made by the states in filling up their quotas, and on the 8th of May he was obliged to remonstrate with them in energetic terms. Great discontent prevailed in the army, on account of the treatment it had experienced, and a wish spread that Washington should establish a monarchy in the United States. In the meantime negotiations for peace were commenced, the French army withdrawn, and the American army, after an inactive summer, was sent back into winter-quarters. The winter passed in an angry correspondence between the officers of the army and Congress. An address from Washington (15th March, 1783) was required to restore the good temper of the officers. Having pacified them, he became their advocate with Congress, and obtained the concession of their demands. On the 8th of June he addressed his last official communication, a circular letter to the governors of the states, urging upon them:—an indissoluble union of the states; regard to public justice; the adoption of a proper military peace-establishment; and mutual concessions on the part of the different states. On the 25th of November the British evacuated New York. On the 4th of December Washington took a solemn farewell of the officers of the army. And on the 23rd of December he resigned his commission to Congress.

We must pass briefly over the interval which separates the epoch of Washington the soldier from that of Washington the statesman—the few years which elapsed between the resignation of his command in December, 1783, and his election as first president of the United States in February, 1789. It was for him no period of idleness. In addition to a liberal increase of hospitality at Mount Vernon, and indefatigable attention to the management of his large estates, he actively promoted in his own State schemes of internal navigation, acts for encouraging education, and plans for the civilization of the Indians. He acted as delegate from Virginia to the Convention, which framed the first constitution of the United States. We now turn to contemplate him as President.

Washington left Mount Vernon for New York, which was then the seat of Congress, on the 16th of April, 1789. His journey was a triumphal procession. He took the oath of office on the 30th of April, with religious services, processions, and other solemnities, which the ultra-republican party have since done away with.

The new president's first step was to request elaborate reports from the secretary of foreign affairs, the secretary of war, and the commissioners of the treasury. These reports he read, and condensed with his own hand, particularly that of the treasury board. The voluminous official correspondence in the public archives, from the time of the treaty of peace till the time he entered on the presidency, he read, abridged, and studied, with the view of fixing in his mind every important point that had been discussed, and the history of what had been done.

His arrangements for the transaction of business and reception of visitors were characterized by the same spirit of order which had marked him when a boy and at the head of the army. Every Tuesday, between the hours of three and four, he was prepared to receive such persons as chose to call. Every Friday afternoon the rooms were open in like manner for visits to Mrs. Washington. He accepted no invitations to dinner, but invited to his own table foreign ministers, officers of the government, and others in such numbers as his domestic establishment could accommodate. The rest of the week-days were devoted to business appointments. No visits were received on Sunday, or promiscuous company admitted; he attended church regularly, and the rest of that day was his own.

The organization of the executive departments was decreed by act of Congress during the first session. They were the departments of foreign affairs (afterwards called the department of state, and including both foreign and domestic affairs), of the treasury, and of war. It devolved upon the president to select proper persons to fill the several offices. Jefferson was appointed secretary of state; Hamilton, secretary of the treasury; and Knox, secretary of war. Randolph had the post of attorney-general. The appointments to the supreme court cost him much anxious scrutiny. Jay was made chief-justice. After making these appointments he undertook a tour through the eastern states, and returned to be present at the opening of Congress, in January, 1790.

In his opening speech he recommended to the attention of the legislature—a provision for the common defence; laws for naturalising foreigners; a uniform system of currency, weights, and measures; the encouragement of agriculture, commerce, and manufactures; the promotion of science and literature; and an effective system for the support of public credit. The last topic gave rise to protracted and vehement debates. At last, Hamilton's plan for funding all the domestic debts was carried by a small majority in both Houses of Congress. The president suppressed his sentiments on the subject while it was under debate in Congress, but he approved the act for funding the public debt, and was from conviction a decided friend to the measure. The foreign relations of the country, though not complicated, were in an unsettled condition. Washington despatched Gouverneur Morris as a private agent to ascertain the views and intentions of the British ministers. He reluctantly commenced an Indian war, which lasted during the greater part of his administration. For the first year of his presidential term, however, he was chiefly engaged in ascertaining the actual position of the United States in the system of nations.

The second session of Congress was mainly occupied with debates on the erection of a national bank. The two great sections of public opinion, which have under different names divided the Union since the constitution of 1788, had in some measure taken up their respective grounds on the question of funding the debts. Their organized hostility became more apparent in the debates on the project of a national bank. Both parties were represented in the cabinet: Knox and Hamilton advocated the establishment of the bank; Jefferson and Randolph denounced it as unconstitutional. The contest ended in the establishment of a bank, with a capital of ten millions of dollars, of which eight millions were to be held by individuals, and the rest by government. Again the president avoided showing a leaning to the one or other party, although friendly to the creation of a bank. He requested from each member of the cabinet a statement of his reasons in writing, examined them attentively, and affixed his signature to the act.

The session of 1791 produced the laws for apportioning the representatives, establishing a uniform militia system, and increasing the army. It now became apparent to the most unreflecting that two great parties were in the process of formation. The opponents and supporters of the measures enumerated were, with few exceptions, the opponents and supporters of the funding system and the national bank. The opponents were jealous of anything that might encroach upon democratic principles; the supporters were distrustful of the power of institutions so simple as those of the United States to preserve tranquillity and the cohesion of the state. Jefferson was the head of the democratic, Hamilton of what was afterwards called the Federalist party. Washington endeavoured to reconcile these ardent and incompatible spirits. His own views were more in accordance with those of Hamilton; but he knew Jefferson's value as a statesman, and he felt the importance of the president remaining independent of either party. The two secretaries however continued to diverge in their political course, and ultimately their differences settled into personal enmity.

The president's term of office was drawing to a close, and an anxious wish began to prevail that he should allow himself to be elected for a second term. Jefferson, Hamilton, and Randolph, who did not exactly coincide with either, all shared in this anxiety, and each wrote a long letter to Washington, assigning reasons for his allowing himself to be re-elected. He yielded; and on the 4th of March, 1793, he took the oath of office in the senate-chamber.

The first question that came before the cabinet after the re-election rendered more decided the differences which already existed. The European parties, of which the court of St. James's and the French Republic were the representatives, were eager to draw the United States into the vortex of their struggle. The president and his cabinet were unanimous in their determination to preserve neutrality; but the aristocratic and democratic sections of the cabinet could not refrain from displaying their respective biases and their jealousy of each other. It having been agreed to receive a minister from the French Republic, Hamilton and Knox advocated a qualification in the terms, implying that the relations of the two countries were altered; Jefferson and Randolph opposed it. The proclamation of neutrality was published on the 22nd of April, 1793.

This wise act was bitterly assailed by the partisans of France. Foreign affairs were mingled with domestic politics, and the Democratic and Federalist parties became avowedly organized. Washington was for a time allowed to keep aloof from the contest—not for a long time. Genet, the French minister, gave orders to fit out privateers at Charleston to commit hostilities against the commerce of nations at peace with America. The government of the United States issued in August a declaration that no privateers fitted out in this manner should find refuge in their harbours. In June, and again in November, the British cabinet issued orders to their cruisers to stop and make prize of all vessels laden with provisions for any parts of France or the French colonies. A report was made by the secretary of state near the beginning of the session of 1793-4 respecting the commercial intercourse of the United States with other countries. Two methods were proposed for modifying or removing restrictions: first, by amicable arrangements with foreign powers; second, by countervailing acts of the legislature. Soon after the secretary of state resigned, and was succeeded by Randolph. Mr. Jefferson's report gave rise to Mr. Madison's celebrated commercial resolutions. In them the friends of the administration from which Jefferson had seceded imagined they saw hostility to England and under-favour to France. The opposite party deemed them no more than necessary for the protection of the country. Mr. Madison's plan, with some modifications, passed the House of Representatives, but was rejected in the Senate by the casting vote of the vice-president.

A circumstance insignificant in itself increased the bitterness of the contest out of doors. Democratic societies had been formed on the model of the Jacobin clubs of France. Washington regarded them with perhaps exaggerated alarm, and the unmeasured expression of his sentiments on this head subjected him to a share in the attacks made upon the party accused of undue fondness for England and English institutions.

Advices from the American minister in London representing that the British cabinet was disposed to settle the differences between the two countries amicably, Washington nominated Mr. Jay to the Senate as envoy-extraordinary to Great Britain. The nomination, though strenuously opposed by the democratic party, was confirmed in the Senate by a majority of two to one. The treaty negotiated by Jay was received at the seat of government in March, 1795, soon after the session of Congress closed. The president summoned the Senate to meet in June to ratify it. The treaty was ratified. Before the treaty was signed by the president it was surreptitiously published. It was vehemently condemned, and public meetings against it were held to intimidate the executive. The president nevertheless signed the treaty on the 18th of August.

When Congress met in March, 1796, a resolution was carried by a large majority in the House of Representatives, requesting the president to lay before the house the instructions to Mr. Jay, the correspondence, and other documents relating to the negotiation. Washington declined to furnish the papers; a vehement debate ensued; but in the end the majority hostile to the treaty yielded to the exigency of the case, and united in passing laws for its fulfilment.

The two houses of Congress met again in December. Washington had published on the 15th of September his farewell address to the United States. He now delivered his last speech to Congress, and took occasion to urge upon that body the gradual increase of the navy, a provision for the encouragement of agriculture and manufactures, the establishment of a national university, and of a military academy. Little was done during the session; public attention was engrossed by the president's election. Adams, the federalist candidate, had the highest number of voters; Jefferson, the democratic candidate, who was consequently declared vice-president, the next. Washington's commanding character and isolation from party had preserved this degree of strength to the holders of his own political views; his successor Adams being a party-man, by his injudicious identification of himself with the federalists turned the scale in favour of the democrats. Washington was present as a spectator at the installation of his successor, and immediately afterwards returned to Mount Vernon.

He survived till the 14th of December, 1799, but, except when summoned in May, 1798, to take the command of the provincial army on the prospect of a war with France, did not again engage in public business.

The character of Washington is one of simple and substantial greatness. His passions were vehement, but concentrated, and thoroughly under control. An irresistible strength of will was the secret of his power. Luckily for his country this strong will was combined with a singularly well-balanced mind, with much sagacity, much benevolence, much love of justice. Without possessing a spark of what may be called genius, Washington was endowed with a rare quickness of perception and soundness of judgment, and an eager desire of knowledge. His extremely methodical habits, which in a person engaged in less important matters would almost have appeared ridiculous, enabled him to find time for everything, and were linked with a talent for organization. During the War of Independence he was the defensive force of America: wanting him, it would almost appear as if the democratic mass must have resolved itself into its elements. To place Washington as a warrior on a footing with the Cæsars, Napoleons, and Frederics, would be absurd. He lost more battles than he gained, and he lost them from defective strategy. But he kept an army together and kept up resistance to the enemy under more adverse circumstances than any other general ever did. His services as a statesman were pretty similar in kind. He upheld the organization of the American state during the first eight years of its existence, amid the storms of Jacobinical controversy, and gave it time to consolidate. No other American but himself could have done this: for of all the American leaders, he was the only one of whom men felt that he differed from themselves. The rest were soldiers or civilians, federalists or democrats, but he was Washington. The awe and reverence felt for him was blended with affection for his kindly qualities, and except for a brief period towards the close of his second presidential term, there has been but one sentiment entertained towards him throughout the Union—that of reverential love. He is one of those rare natures whom greatness followed without his appearing to seek for it.

Jefferson's sketch of Washington's character, quoted by Tucker, with the remark that it 'has every appearance of candour, as it praises without extravagance, qualifies its commendations with caution and moderation, and does not blame at all,' is valuable as coming from one who long enjoyed opportunities of close personal observation, was a shrewd judge of character, and the leader of the party opposed to Washington's general policy. It is as follows:—

'His mind was great and powerful, without being of the very first order; his penetration strong, though not so acute as that of a Newton, Bacon, or Locke, and, as far as he saw, no judgment was ever sounder. It was slow in operation, being little aided by invention or imagination, but sure in conclusion. Hence the common remark of his officers, of the advantage he derived from councils of war, where hearing all suggestions, he selected whatever was best; and certainly no general ever planned his battles more judiciously. But if deranged during the course of action, if any member of his plan was dislocated by sudden circumstances, he was slow in a re-adjustment. The consequence was, that he often failed in the field, and rarely against an enemy in station, as at Boston and York. He was incapable of fear, meeting personal dangers with the calmest unconcern. Perhaps the strongest feature in his character was prudence, never acting until every circumstance, every consideration was maturely weighed; refraining, if he saw a doubt, but when once decided, going through with his purpose, whatever obstacles opposed. His integrity was the most pure, his justice the most inflexible I have ever known; no motives of interest or consanguinity, of friendship or hatred, being able to bias his decision. He was indeed in every sense of the word a wise, a good, and a great man. His temper was naturally irritable and high-toned· but reflection and resolution had obtained a firm and habitual ascendency over it. If ever however it broke its bonds, he was most tremendous in his wrath. In his expenses he was honourable, but exact; liberal in contributions to whatever promised utility; but frowning and unyielding on all visionary projects, and all unworthy calls on his charity. His heart was not warm in its affections; but he exactly calculated every man's value, and gave him a solid esteem proportioned to it. His person was fine, his stature exactly what one would wish; his deportment easy, erect, and noble; the best horseman of his age, and the most graceful figure that could be seen on horseback. Although in the circle of his friends, where he might be unreserved with safety, he took a free share in conversation, his colloquial talents were not above mediocrity, possessing neither copiousness of ideas nor fluency of words. In public, when called on for a sudden opinion, he was unready, short, and embarrassed. Yet he wrote readily, rather diffusely, in an easy and correct style. This he had acquired by conversation with the world, for his education was merely reading, writing, and common arithmetic, to which he added surveying. His time was employed in action chiefly, reading little, and that only in agriculture and English history. His correspondence became necessarily extensive, and with journalising his agricultural proceedings occupied most of his leisure hours within doors. On the whole his character was in its mass perfect, in nothing bad, in a few points indifferent; and it may truly be said, that never did nature and fortune combine more perfectly to make a man great, and to place him in the same constellation with whatever worthies have merited from man an everlasting remembrance. For his was the singular destiny and merit of leading the armies of his country successfully through an arduous war for the establishment of its independence; of conducting its councils through the birth of a government new in its forms and principles, until it had settled down into a quiet and orderly train; and of scrupulously obeying the laws through the whole of his career, civil and military, of which the history of the world furnishes no other example.'

(Jared Sparkes, *Life of Washington;* Judge Marshall, *Life of Washington;* George Tucker, *Life of Thomas Jefferson; The Writings of George Washington*, edited by Jared Sparkes.)

WASHITA, or ONASHITA. [MISSISSIPPI, River.]

WASP, the name familiarly applied in English to insects of the genus *Vespa*, of which there are several native species. The hornet, *Vespa Crabro*, is the largest, and in Britain occurs only in the southern counties, building its nest in trees, and working night and day. It passes the winter in deep holes, which it excavates in decayed trees towards the end of autumn. Of the other indigenous species, the *Vespa vulgaris* is the most common. It is a ground-wasp, as is also the *Vespa rufa*, a rarer species, making smaller nests and associated in less populous societies. Of tree-wasps we have *Vespa holsatica* of Linnæus, which is the *Vespa Anglica* of Leach, and the *Vespa Britannica* of the last-named author. A new British species has been described under the name of *Vespa borealis*, by Mr. Frederick Smith, in an interesting paper on British wasps, in the 'Zoologist' for June, 1843. It lives in fir-woods in Yorkshire and in the north of Scotland.

Wasps live in societies, composed of females, males, and neuters or workers, which are essentially females, but have the reproductive organs undeveloped or passive. The females are usually largest, but of them there are two sizes—one very much larger than the neuters, and laying eggs which produce two sexes, while the other is about the same size, and lays only male eggs. The larger kind are produced later than the workers, and come forth to be queens and to found new colonies in the following spring. Destined to become the monarch of a populous state, the queen-mother is at first an outcast and alone. Industry effects her greatness. With instinctive ambition, ere her subjects are born, she lays the foundations of the metropolis of her kingdom, building the first houses herself. She then gives birth to their first inhabitants, whom she feeds and nurses without assistance. 'At length,' to quote the animated description of Kirby and Spence, 'she receives the reward of her perseverance and labour, and, from being a solitary, unconnected individual, in the autumn is enabled to rival the queen of the hive in the number of her children and subjects, and in the edifice which they inhabit—the number of cells in a vespiary sometimes amounting to more than 16,000, almost all of which contain either an egg, a grub, or a pupa, and each cell serving for three generations in a year; which, after making every allowance for failures and casualties, will give a population of at least 80,000. Even at this time, when she has so numerous an army of coadjutors, the industry of this creature does not cease, but she continues to set an example of diligence to the rest of the community. If by any accident, before the other females are hatched, the queen-mother perishes, the neuters cease their labours, lose their instincts, and die.'

The community of wasps and its nest are called a vespiary. There are several hundred females in a large vespiary, few of which survive the winter. The survivors fly about in spring actively engaged in preparations for their future colonies. Once established, they never quit the nest. In their youth they emerge from the pupa towards the end of August, and at the same time with the males. They pair in September and October. The males are about equal in number with the females. Their habits are industrious, and not, like those of drones, luxurious and lazy. They are the street-sweepers and undertakers of their city. They carry off the rubbish and the bodies of the dead, which, if too heavy for their strength, they quarter and carry away piecemeal. Their lives are peaceful, and they die a natural death at the close of the year, when the cold destroys both them and the workers.

The neuters are the most numerous and busiest class of the vespine community. They are the architects, soldiers, and commissaries of the state. They build the nest, gather provisions, regulate the nurseries, and revenge insults. They ramble everywhere with impunity, and all provisions are to their taste. They levy contributions wherever they can, and fight for their spoil if disturbed. Robbers and ferocious enemies of the rest of the world, they are faithful servants of the commonwealth of which they are members. The food they collect is shared among all with impartial justice. The worker having brought home his spoil, perches on the top of the nest amid his assembled compatriots, and disgorging the sweets he has collected, fairly distributes them. When not occupied on foraging expeditions, the neuters are employed in the enlargement and repair of the nest. Celerity and order prevail in all their operations. Each of the masons has his allotted space, an inch or an inch and a half in extent, wherein he conducts his plastering occupation, his mouth serving as a hod, carrying a ball of ligneous fibre, previously torn by his powerful jaws from gateposts, woodblocks, and neighbouring trees. This fibre, kneaded together and moistened with saliva, is made into a paper, of which are constructed the combs, each made up of a number of hexagonal cells opening downwards. The outside of the whole nest is coated with foliaceous layers. It is probable that the substance of the comb is made from the scrapings of sound wood; that of the envelope, from a mixture of sound and decayed. The nests of tree-wasps are finest and closest in texture, which is necessary, since they are so much more exposed to the vicissitudes of the weather than those which are buried in the ground. Some foreign species construct their nests of a solid and thick pasteboard, impenetrable to the rain; others diversify the outside of their habitations with conical knobs of various shapes and sizes, supposed to be defences against their larger enemies, and construct pent-roofs to protect the entrance from the wet, the entrance-hall being so twisted as to prevent the invasion of hostile insects. The cells of the comb of the common English wasp are brown, and coarse in texture; but where the larvæ have spun their cocoons, they are found lined with a white and semitransparent paper, fashioned on the mould of the cell, and probably made by the larvæ themselves.

Many years ago Azara stated that there are wasps in South America which collect honey. This was at first doubted, but afterwards was confirmed by M. Auguste St. Hilaire, who found near the river Uruguay nests of a wasp constructed like those of the European species, containing honey of an agreeable taste, but poisonous quality; and Mr. Adam White has recently given a detailed description of a South American species, named by him *Myrapetra scutellaris*, which stores up honey in its combs. (See 'Annals of Natural History,' for June, 1841.) In our own country the wasps are fond of honey, but obtain it by plundering the bee-hives, which, being the more powerful insects, they are enabled to do by main force. The bees, suffering from the cold in the mornings and evenings of the latter end of the season, retire into the snugger and warmer recesses of the hive among the honeycomb, when the wasps, not so delicate in constitution, take advantage of the unguarded entrances of the hive and enter to levy contributions. Running up the inside, they make for the honey, and carry away all they can. Hornets, still more impatient, attack the bees when laden with their treasures in going homewards, and carry them off prisoners, to whom no quarter is shown. Both wasps and hornets display great sagacity when the body of the captive is too heavy for their strength, by cutting off the head and limbs to lighten the weight.

Wasps have sentinels placed at the entrances of their nest to give an alarm in case of danger. If these guards are seized and destroyed, the rest do not attack. Mr. Knight observed that if a nest of wasps be approached without alarming the inhabitants, and all communication be suddenly cut off between those out of the nest and those within it, no provocation will induce the former to defend it and themselves. But if one escapes from within, it comes out angrily, as if commissioned to avenge the wrong, and will sacrifice its life in defence of the community. Mr. Smith, in the paper referred to, has made some interesting observations which tend to confirm this statement. He writes: 'I was curious to try the experiment, but in several instances I could not detect any wasp apparently on duty; however, in Plumstead wood, last summer, I saw a wasp at the entrance of a nest, sometimes walking an inch or two from the hole, and then going a little farther in. This I thought very like the actions of a sentinel, so I got a piece of paling, and, watching my opportunity, suddenly pushed it in an oblique direction into the ground, so as to cut off effectually all communication. The sentinel flew at me, but I captured him in a little time, as he was most perseveringly charging and recharging upon me, and seemed determined to conquer or to die: the latter was his fate. When I returned to the nest, a number of wasps had collected, and they were in no way inclined to let me approach unheeded, but flew around me to all appearance intent on revenge. Perhaps the supposed sentinel, in his wide circumvolutions while attacking me, had communicated the alarm.'

For full accounts of the habits of these interesting insects, consult the writings of Réaumur, and Kirby and Spence's 'Introduction to Entomology.' For the characters of the family to which they belong, see VESPIDÆ.

WASSELONNE. [RHIN BAS.]

WASTE (from the Latin *vastum*) is the committing of any improper spoil or destruction in houses, lands, &c., by tenants for life or for years, to the damage of the heir or of the person entitled in reversion or remainder. Waste is either *voluntary*, which is an act of commission, or *permissive*, which is a matter of omission only.

Voluntary Waste chiefly consists—

1. In felling timber-trees. This kind of voluntary waste is where a tenant fells trees coming within the description of timber [TIMBER], except for estovers, because they are considered not as part of the annual produce of the land, but as belonging to the owner of the inheritance. Lopping timber-trees or doing anything which causes them to decay, and stubbing up or destroying young germins or shoots, all come within this description of waste. Tenants for life may however cut down coppices or underwoods at seasonable times, according to the custom of the country, without being guilty of waste.

2. In pulling down houses. If a lessee razes a house and builds a new one, if it be not so large as the former it is waste, and if it be larger than the former it is still waste, on the ground that the new house will be more chargeable to the lessor to repair. (1 *Inst.*, 53, a.) Pulling down a partition or permanently altering any part of a house comes within this description of waste. If glass windows, though put in by the tenant himself, be broken or carried away, it is waste; and so it was held with respect to wainscot, benches, doors, furnaces, or the like, whether erected by the lessor or reversioner or the tenant. (1 *Inst.*, 53, a.) But the rule which establishes that whatever is once annexed to the freehold becomes part of it, and cannot be removed without doing waste, has been relaxed both as between land

lord and tenant, and between the tenant for life and the remainder-man or reversioner. As between the landlord and tenant it is now settled that the latter may at any time during the currency of the lease take away all such chimney-pieces, wainscot, &c., vessels and other things necessary for trade, as he has himself erected, provided he do not thereby leave the house or building in a worse condition than when he entered: but he cannot do so after the expiration of the term without being guilty of trespass. The same doctrine appears to be established as between the tenant for life and the remainder-man; but as between the heir and the executor the old rule of law seems still to hold. (See Amos and Ferard *On Fixtures.*)

3. In opening mines or pits. Tenants for life of lands cannot dig for gravel, lime, clay, brick-earth, stone, or the like, unless for the repair of buildings or manuring the land, without being guilty of waste: nor can they open a new mine, though they may work such as are open. But if a person has mines on his land, and leases it with the mines for life or for years, the lessee may work the mines, that being the only way in which he can derive advantage from the grant. (1 *Inst.*, 53 b.; 5 *Rep.*, 12.)

4. In changing the course of husbandry. The conversion of one kind of land into another, as the changing of meadow-land into arable, is waste, because it changes not only the course of husbandry, but the evidence of the estate. (1 *Inst.*, 53 b.) The latter reason can apply only to an unenclosed country.

5. In destruction of heir-looms. The destruction of those chattels which, under the name of heir-looms, are considered as part of the inheritance, is waste. Thus the tenant for life of a park, warren, fish-pond, or dove-house, who kills so many of the deer, game, fish, or doves, as not to leave them sufficiently stored, is guilty of waste. (1 *Inst.*, 53 a, b.) [Tenant for Life; Term of Years.]

Permissive Waste consists chiefly in allowing the buildings upon an estate to go to decay. If a house was ruinous at the time when the tenant came into possession, he is not punishable for allowing it to fall down, for in that case he is not bound to repair it; but it is waste to pull it down, unless he rebuilds it. (1 *Inst.*, 53 a.) It is a general rule that the waste which arises from the act of God is excuseable, as if a house falls in consequence of a tempest. But if the destruction of the house by the tempest has been owing to its being out of repair, the tenant is guilty of waste: and so he will be if he do not repair a house which has been uncovered or damaged only by tempest. In the same manner, if the banks of a river, while in a state of proper repair, are destroyed by a sudden flood, the tenant is not answerable. (1 *Inst.*, 53 a, b.) The rule applies also to the case of a house burnt down by accident. (6 Ann., c. 31, s. 6.) But in these and all similar cases the tenant will still be bound to repair or rebuild, if he have entered into a general covenant to repair. [Tenant and Landlord.]

Tenants in tail, as they have estates of inheritance, are entitled to commit every kind of waste; but this power continues and can be exercised only during the life of the tenant in tail. Thus if trees growing on the land, and sold by the tenant in tail, are not cut during the life of the vendor, they will descend as part of the inheritance. So tenants in tail after possibility of issue extinct, are not impeachable for waste, but, like tenants for life when their estates are given without impeachment of waste, may be restrained from wilfully destroying the estate. (2 *Cha. Ca.*, 32.) A mortgagee in fee in possession has a right at law to commit any kind of waste, being then considered as the absolute owner of the inheritance, but he will be restrained by a court of equity, which will direct an account of timber cut down, and order it to be applied in reduction of the mortgage debt. (2 Vern., 392.) Tenants by courtesy and tenants in dower are, like any other tenants for life, prohibited from committing any kind of waste. Copyholders also cannot, unless there be a special custom to warrant it, commit any kind of waste, and every species of waste not warranted by the custom of the manor operates as a forfeiture of the copyhold. (13 *Rep.*, 68.) Bishops, rectors, parsons, vicars, and other ecclesiastical persons, being considered in most respects as tenants for life of the lands which they hold in right of the church, are disabled from committing any kind of waste.

The original remedy for waste was that under the statute of Marlbridge, 52 Hen. III., c. 24, which gave to the owner of the inheritance an action of waste against the tenant for life, in which he was entitled to recover full damages for the waste committed. But as this remedy was often found inadequate, it was enacted by the statute of Gloucester, 6 Edw. I., c. 5, that the place wasted should be recovered, together with treble damages for the injury done to the inheritance. No person was entitled to an action of waste against a tenant for life under these statutes, except him who had the estate of inheritance immediately expectant on the determination of the estate for life; so that if there were an existing estate of freehold interposed between the estate for life and that of inheritance, the right of action was suspended. (1 *Inst.*, 53, b.) The action of waste had long given way to the much more expeditious and easy remedy by an action of trespass on the case in the nature of waste, which may be brought by the person in reversion or remainder for life or for years, as well as in fee, and in which the plaintiff is entitled to costs, which he could not have in an action of waste (2 Saund., 252, n. 7); and the writ of waste is now finally abolished by the 3 and 4 Wm. IV., c. 27, s. 36. It seems that there was formerly no remedy for mere permissive waste after the death of the tenant, though if the estate of the tenant was benefited by the injury inflicted, as if money was derived to it from the sale of trees cut down, an action for the value of the property might have been sustained against the executor. (Cowp., 376.) Now however, by the 3 and 4 Wm. IV., c. 42, s. 2, remedies by action of trespass or trespass on the case are given against the executors of any deceased person for any wrong committed by him in his lifetime against the real or personal property of another within six months of his death, provided the action be brought within six months after the personal representatives have taken upon themselves the administration of the estate.

But the most complete remedy in cases of waste is that in the Court of Chancery, which, upon application to it by bill, will not only direct an account to be taken and satisfaction to be made for the damage done, but will interpose by way of injunction to restrain the commission of future waste. The Court of Equity will grant its assisttance against the commission of waste wherever the case appears to require it, and though the plaintiff is not in a condition to maintain an action at law. (3 Atk., 91, 211, 723.) Thus when there are trustees to preserve contingent remainders, the Court of Chancery will not allow waste to be committed by collusion between the tenant for life and the owner of the next vested estate of inheritance, to the prejudice of persons not *in esse;* and where the tenant for life was also the owner of the next existing estate of inheritance, subject to contingent remainders in tail, the court has interfered to prevent him from committing waste to the prejudice of intermediate contingent remainder-men. (Cruise, *Dig.* tit. 2, c. 7.) On the other hand, where the tenant in possession has no power to cut timber, and it appears that it would be beneficial to the persons entitled to the inheritance to cut down timber on the land, the court sometimes directs it to be done. [Timber and Timber-Trees.] It will also grant an injunction against waste *pendente lite;* and in such cases it is not necessary that the plaintiff should wait till waste is actually committed; it is sufficient if an intention to commit waste appears, or if the defendant insists upon his right to do so. (2 Atk., 182.)

It has long been usual when estates for life are expressly limited, to insert a clause declaring that the tenant shall hold the lands 'without impeachment of waste.' These words were originally intended merely to exempt the tenant from the penalties of the statute of Marlbridge, but it has long been settled that they enable him to cut down timber and to convert it to his own use. The powers of the tenant for life under this clause are, however, so far restrained in equity, that he is not allowed to commit malicious waste so as to destroy the estate, nor to cut down timber serving for shelter or ornament to a mansion-house, nor timber unfit to be felled. (2 Vern. 738; 3 Atk. 215.) This is what is called the doctrine of Equitable Waste. But in these cases the court will not give satisfaction to the remainder-man for timber already cut down. (2 Ab., *Eq.* 759.) The privilege of the tenant for life under the words 'without impeachment of waste' are annexed in privity to his estate, and determine with it. Thus it seems that if a lease were made to one for the life of another without impeachment of waste, with remainder to him for his own life, he would become punishable for waste, the first estate being merged in the second. (11 Rep., 83, b.) Some cases which have arisen where partial powers to commit waste had been given, have been treated by the court upon the same principles as those in which the estates were given generally without impeachment of waste.

It has been stated that ecclesiastical persons, being considered in the light of tenants for life, are disabled from committing waste, though, like them, they have the right to take from the land materials for necessary repairs. They may not only fell timber and dig stones for that purpose, but have even been allowed to sell timber or stone, when the money was to be applied in repairs; also, though they cannot open mines, they may work those already open. (Amb., 176.) By the statute 35 Edw. I. it is declared that parsons shall not presume to fell trees growing in the churchyard, but when the chancel or body of the church requires reparations; and it is said by Coke that dilapidation of ecclesiastical places, houses, and buildings is a good cause of deprivation (3 *Inst.*, 204.) Ecclesiastical persons may be proceeded against for waste in the civil as well as the ecclesiastical courts. It has been held that an action on the case will lie against them for dilapidations, and may be brought by the successor to a benefice either against his predecessor or his personal representatives. (3 Lev. 268; 2 *T. R.* 630.) It seems doubtful whether the courts of common law have any power to issue a prohibition against the commission of waste by ecclesiastical persons. (1 Bos. and Pull., 105.) But there is no doubt as to the jurisdiction of the Court of Chancery to grant an injunction against any ecclesiastical person whatsoever to stay waste in cutting down timber, pulling down houses, or opening quarries or mines on the glebe. The proper person to make the application is the patron of the living, or, when the living is in the crown, or the application is made against a bishop or a dean and chapter, the attorney-general on behalf of the crown. (3 Mer., 421.) The patron of the living in such cases has no right to an account, for he cannot have any profit by the living. (Amb., 176.) An injunction has been granted against waste by the widow of a rector during the vacancy of the living. (2 Bro., cc. 5, 62.) By the 56 Geo. III., c. 52, the incumbents of benefices are enabled to cut down timber on the glebe-lands for the purposes of the statute (55 Geo. III.) enabling them to exchange their parsonage-houses or glebe-lands.

(See Bacon's 'Abridgement,' art. *Waste.*)

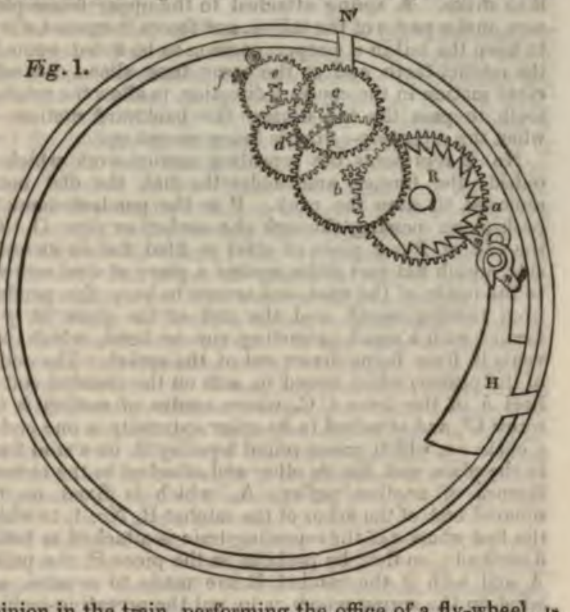
WASTE LAND. [BARREN LAND.]

WAT TYLER. [RICHARD II.]

WATCH. [HOROLOGY.]

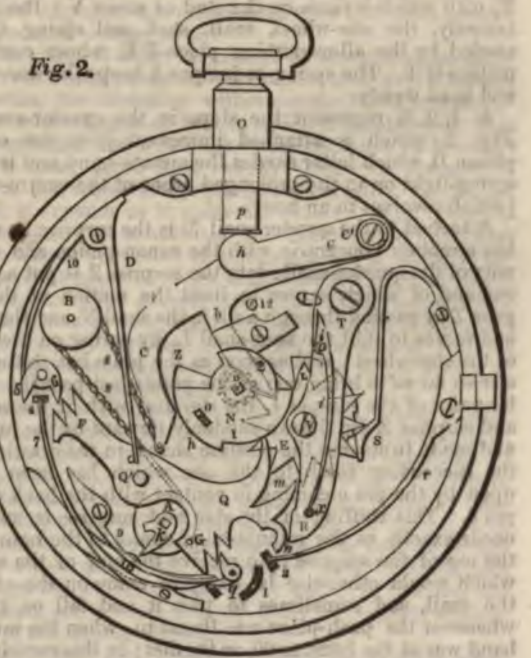
WATCH, REPEATING, or REPEATER, a term applied to those watches which, in addition to showing the time on the dial, are supplied with mechanism by putting which in action the wearer is enabled at any time to ascertain the time within certain limits. In the article HOROLOGY, under the description of an eight-day spring-clock, we have shown how the number of blows given by the hammer to the bell was made to correspond with the hour denoted by the hand of the clock, and we have also shown that by pulling a string the clock would at any time repeat the hour last struck; but this would not be the case where the minute-hand had approached within about ten minutes of 60, or 12 o'clock, for from that time till the hand comes to 60 the clock is on the warning, and, as will be seen by referring to the plate, is in such a position that it cannot strike at all. This defect is remedied in clocks and watches made on the principle of the repeater. It now remains to show the mechanism of a repeating-watch, which, in the common acceptation of the term, means a watch which is capable of striking either on a bell or other substance the hours and quarters; but there are other repeaters which also strike the minutes, and these by way of distinction are called minute-repeaters. It must here be borne in mind that those wheels and pinions which are placed between the frame-plates of a watch constitute what is called the going-train. That collection of wheels and pinions which is placed outside the frame-plates, and generally under the dial in a common watch, serves the purpose of communicating the motion from the centre wheel to the hands or pointers, and is called the motion-work. These wheels and pinions contain such numbers as will cause each hand or index to revolve in its proper time. A repeating motion in addition to the foregoing comprehends all those parts necessary to transmit the motion from the last-named train of wheels to the hammers which are to strike the hours and quarters. In a repeater there is an additional train of wheels between the frame-plates, called the runners, or little wheel-work; sometimes it is called the repeating train. This train of wheels serves the purpose of regulating the rapidity with which the successive blows shall be given to the bell or other substance on which the watch strikes, and consists generally of five wheels and five pinions *a*, *b*, *c*, *d*, *e*, *f* (*Fig.* 1): the last pinion in the train, performing the office of a fly-wheel, is generally called the fly-pinion, and (when the striking is regulated to its ordinary rate) makes about 200 revolutions to each blow of the hammer.

Fig. 1.



In the following description *Fig.* 1 represents the repeating-train between the frames; and *Fig.* 2, the under side of the same frame-plate, on which the motion-work is planted.

Fig. 2.



The arbor of the first wheel, *a*, *Fig*. 1, of the repeating-train, has in it a hook which takes hold of the inner end of the repeating main-spring, the outer end of which is secured to the side of a barrel, which is fixed immoveably to the upper frame-plate, which is removed to afford a view of the wheel-work; the arbor is also attached immoveably to another wheel called the ratchet, R, under which is attached to it a smaller ratchet, into the teeth of which a click is forced by a spring. The click and spring being fixed to the wheel *a*, so that when the arbor is turned (by the repeating motion-work) in the direction to wind up the spring, the ratchet R turns without the wheel *a*, but in its effort to get back to its original position it brings the wheel *a* with it, and consequently gives motion to the whole of the repeating-train and also to the motion-work. In the return the teeth of the ratchet R catch *m*, a small moveable raising piece forming the tail of the hammer H, and cause it to strike. A spring attached to the upper frame-plate acts on the part *n* of the tail *m*, and forces it against a stop to keep the tail in a proper position to be acted upon by the ratchet-teeth, and at the same time allows of a sufficient motion in the contrary direction, to allow the ratchet-teeth to pass the tail during the backward motion, or when the repeating-spring is being wound up.

No. 2 represents the repeating motion-work which is outside the frames, and under the dial, the dial being removed to show the work. P is the pendant-shank or push-piece, passing through the socket or pipe O. On the end of P is a piece of steel *p*, filed flat on its under side, which flat part slides against a piece of steel screwed to the inside of the case, and serves to keep the pendant from turning round. and the end of the piece at *p* is formed with a small projecting rim or bead, which prevents it from being drawn out of the socket. The end *p* of the pusher, when forced in, acts on the rounded end or heel *h* of the lever C C, whose centre of motion is the screw C′, and attached to its other extremity is one end of a chain *s s*, which passes round a pulley B, on a stud fixed in the plate, and has its other end attached to the circumference of another pulley, A, which is fixed on the squared end of the arbor of the ratchet R, No. 1, to which the first wheel *a* of the repeating-train is attached as before described; so that by pushing in the piece P, the pulley A and with it the ratchet R are made to revolve, and wind up the spring which is to put the repeating-train in motion; and the arm *b* of the lever C C limits the distance to which C C can be pushed, by coming in contact with one of the 12 steps in the snail L, which regulates the numbers of ratchet-teeth in R, *Fig.* 1, which are to pass the hammer-tail or raising-piece *m*, in order that on their return, by the reaction of the spring, they may cause the hammer to strike the required number of blows.

The snail L, *Fig.* 2, is firmly screwed to the star-wheel E, with which it turns on the stud or screw V; the whole (namely, the star-wheel, snail, stud, and spring, *i*, *i*, *x*) carried by the all-or-nothing piece T R, whose centre of motion is T. The spring or jumper S keeps the star-wheel and snail steady.

h, 1, 2, 3, represent the steps in the quarter-snail N, *Fig.* 2, which is attached immoveably to the canon-pinion D, which latter carries the minute-hand and is fixed spring-tight on to the prolonged arbor of the centre-wheel (which revolves in an hour).

Attached to the quarter-snail N is the surprise Z, which has a motion concentric with the canon-pinion and extremity of the quarter-snail: into the surprise Z is put a pin *o*, one end of which serves to limit the motion of the surprise Z by passing through a slit in the snail N, and the other end serves to shift the hour-snail L, by acting on the teeth of the star-wheel; and as soon as the pin *o* has shifted the star so far as to bring one of the points just past the angular point of the jumper *s*, the star and with it the snail L and surprise Z are thrown suddenly forward by the jumper, and made to assume the position shown in the drawing, by the succeeding tooth to the one which has been acted upon by the pin *o* coming in contact with the back of the pin *o*. This shifting of the star and surprise is made to occur exactly as the minute-hand comes to the hour, and the use of the surprise is to receive the end of the arm *b*, which would otherwise be likely to come on the edge of the snail, and sometimes to pass it and fall on step 3 whenever the push-piece was thrust in, when the minute-hand was at the hour, or 60, on the dial; by this contrivance the change from hour to hour is made instantaneously.

Q is the quarter-rack, whose centre of motion is Q′, having teeth at the extremities F and G, for the purpose of striking double blows for the quarters, for which purpose there is another hammer N′, seen in No. 1, called the quarter-hammer. K is a piece fitted on over the pulley A to the square end of the arbor of the first wheel *a*, *Fig.* 1, of the repeating-train, and serves to bring back the quarter-rack Q, *Fig.* 2, to its original place by acting on the pin G by that part of it which is formed by a straight line drawn to the centre of A, and which does not take hold of the pin G until all the blows of the hammer denoted by the hour-hand and determined by the hour-snail have been given. It will easily be seen how by the action of this piece K on pin G the teeth at F and G are made to act in rapid succession on the two pieces *q* and 6, which are attached to the prolonged axes of the hour and quarter hammers, and are acted on by springs 9 and 10, so as to allow the teeth of the quarter-rack to pass them when it falls against the quarter-snail, which latter determines the number of quarters to be struck, according as the rack falls on the steps 1, 2, and 3, into which positions the rack is thrown by a spring D. When the arm *k* by acting on G brings back the quarter-rack, the part *m* presses against the all-or-nothing piece T R, giving it, together with the star-wheel, a small degree of motion concentric to T, the quantity of motion being limited by a stud fixed in the frame-plate, and passing through a small opening or hole in T R at *x*, T R being kept in its proper position by a spring *i x* fixed on T R acting against the stud in the plate. The hour-hammer has in it a pin, 3, coming up through an opening, 3, in the plate; the spring *r* acts on this pin, and causes the hammer to strike; it has also another pin, 2, coming through the plate, on which the piece *q* acts to make it give blows for the quarters; the quarter-hammer has a similar pin coming through opening 4, on which spring 7 presses for a similar purpose. When the quarter-rack is brought back to its original position, namely, that which it had before the push-piece P was thrust in, the part *m* will have passed beyond the end R of the all-or-nothing, which in its passage *m* will have pressed outwards: when *m* has passed the end R, T R is brought back to its place by *i x*, and prevents the return of the quarter-rack: *n* is another part of the quarter-rack, which, when the rack is brought home, acts upon the raising piece or tail *m* (No. 1), through the medium of the pin I, which is fixed in it, and turns it into such a position that it shall not engage with the teeth in the ratchet R (No. 1): thus, it will be seen that the all-or-nothing piece serves the important purpose of preventing any blows from being struck unless the push-piece is pushed quite home, so that the arm *b* comes in contact with the hour-snail L, and gives motion to the all-or-nothing T R, which, by releasing the quarter-rack, frees it from the pin I and allows the raising-piece in No. 1 to take the proper position for engaging with the teeth in the ratchet R (No. 1): 12 is a stud to carry the minute-wheel, which, as well as the hour-wheel, is omitted to prevent confusion. It must also be remarked that, when that quarter of the circumference of the quarter-snail which is marked *h* is in such a position as to receive the end of the quarter-rack upon it, the hour only can be struck, as it does not admit of sufficient motion in the quarter-rack to allow the teeth at F and G to come into action with the hammer-tails, and this position occurs immediately after the star-wheel has been shifted by the pin *o* and the surprise thrown into the position with regard to the quarter-rack shown in the figure, and which it retains until the pin *o* comes in contact with another tooth in the star-wheel, by which it is moved under the first quarter of the snail, where it is retained until the next shifting of the star, thereby enabling the three-quarters to be struck till the very moment that the shifting takes place, which is at the hour, or 60 by the minute-hand, when the surprise flies forward, and, should the watch be struck immediately, would receive the end of the quarter-rack, and prevent any more than the hour being struck.

WATCH AND WARD is the antient provision for the maintenance of the public peace and of property in towns: *watching* relates to the night, *ward* to the day.

The duty of keeping watch and ward no doubt prevailed in Anglo-Saxon times, although it is usually stated to have been imposed by the statute of Winchester (13 Edward I., c. 4). The words of the statute are:—‘ And henceforth it is commanded that watches be made as formerly they were accustomed to be; that is to say, from Ascension-day to Michaelmas-day, in every city by six men at each gate, in every borough by twelve men, in every open town by six or four men, according to the number of inhabitants; and that they watch all the night from sunset to sunrise. And if any stranger pass by them, he shall be arrested until morning; and if no [cause of] suspicion be found, he shall go quit.' Then follow provisions for delivering him to the sheriff if the watch find cause of suspicion, and for raising the hue-and-cry on him from town to town if he escape. A subsequent act (5 Edward III., c. 14) extends to the dey these powers of arresting suspected persons; and in reciting the previous act, this later statute treats it as applying to the country generally; but seems to limit the power of arrest to constables. The statute 5 Henry IV., c. 3, extends to the sea-coast the provisions of the statute of Winchester, and (like it) seems only to revive an antient custom which had fallen into disuse.

The duty of keeping watch is imposed upon every inhabitant of a town in turn, at the call of the constable. The watchman must be suitably armed, and women or infirm persons must find substitutes. Not to keep watch in his turn, or not to find a sufficient substitute, is an offence for which the party may be indicted at the sessions of the peace, and may be punished by fine and otherwise.

Another class of watchmen, having like powers and duties to the former, is that appointed by the justices for the preservation of the peace. [CONSTABLE.]

To kill a watchman in the performance of his duty is murder; and the personal representatives of a watchman or other person killed in attempting to arrest a burglar or housebreaker, are entitled by the act 5 Anne, c. 31, s. 2, to 40*l*., to be paid by the sheriff out of the county funds. [POLICE.]

WATCHET. [SOMERSETSHIRE.]

WATEEOO is said to be the largest island of a small group situated in the Pacific between the two larger groups of the Society Islands on the east and the Friendly Islands on the west. This small group has been called by Krusenstern Cook's Isles, as the greater number of the islands belonging to it were discovered by Captain James Cook. It lies between 18° and 22° S. lat. and between 157° and 160° W. long. Wateeoo occupies nearly the centre of the group, being traversed by 20° S. lat. and 158° 5′ W. long.; it is about 18 miles in circumference. The surface is composed of hills and plains, and the soil is light and sandy along the beach, but better farther inland. The shores are lined with reefs or rocks, which extend to different distances into the sea, where they end like high steep walls, so that it cannot be approached by vessels. It has abundance of cocoa-palms, bread-fruit, plantains, and sweet potatoes; and of animals, especially hogs. A great part of it is covered with trees. The number of inhabitants is perhaps about 4000, and that of the whole group is estimated at 16,000. They resemble in size, colour, and form the inhabitants of the Society Islands, and their language does not differ much from that of the neighbouring groups. They had also arrived at the same stage of civilization when the missionaries, about twelve years ago, went there from the Society Islands. It is stated that since that time they have advanced considerably in civilization. (Cook's *Third Voyage; Missionary Reports.*)

WATELET, CLAUDE HENRI, receveur-général des finances, was born at Paris in 1718. Watelet is distinguished as one of the best French critical writers upon art and he was also an excellent amateur painter and copper-plate etcher. He was the son of Henri Watelet, receveur-général des finances de l'Orléanois, and was educated at the college of Harcourt. He visited Germany and Italy in his youth, and spent some time at Rome, where he formed a friendship with the French painter Pierre, and became one of the pupils of the French school at Rome. He returned to France, and after spending a short time in society in Paris, he retired to the country-seat of Moulin-joli, belonging to Madame Le Comte. Here he wrote his didactic poem, 'L'Art de Peindre,' which was published in 1761. In the same year he was elected a member of the French Academy. He published also, near the same time, the first part of a work entitled 'De l'Origine et de la Destination des Arts Libéraux:' the second part was never published. After this time he paid a second visit to Italy, in company with his friend Madame Le Comte and the Abbé Copette, having previously visited Holland and Belgium. He was everywhere well received on his journey, and was much noticed by the king of Sardinia and the pope Rezzonico, Clement XIII. He was made member of the academies Della Crusca and of Cortona, and of the Institute of Bologna. After his return to France a second time, he published, in 1774, his 'Essai sur les Jardins;' and in 1784 was published a 'Recueil de quelques Ouvrages de M. Watelet.' This collection contains several dramas, some of which have been acted. He died in 1786, falling apparently into a quiet sleep. His éloge was read a few days after his death, at a public sitting of the Société Royale de Médecine, by M. Vicq-D'Azyr, the secretary of the Society, of which Watelet was an associé libre. He was also an honorary member of the French royal academies of painting and architecture, and a member of the academy of Berlin.

The chief work of Watelet's life was his 'Dictionary of the Arts of Painting, Sculpture, and Engraving,' which was not published until after his death—'Dictionnaire des Arts de Peinture, Sculpture, et Gravure,' 5 vols. 8vo., Paris, 1792. Watelet left the work incomplete, and it was finished by M. Levesque, of the French Academy of Inscriptions and Belles-Lettres. Watelet etched many plates: Huber, in his 'Manuel des Amateurs,' &c., enumerates 27 portraits in 4to. of himself and his friends, after pictures by Cochin—among them portraits of D'Alembert and Madame Le Comte; also 14 pieces in imitation of Rembrandt, and about 50 others in various styles from various masters, and from some of his own designs.

WATER, in its liquid, aëriform, or solid state, is universally diffused through nature. It was once considered as one of the four elements, and is in common language still frequently so termed. Water, however, on evidence which we shall presently adduce, is now known to be a compound substance, consisting of hydrogen and oxygen, in the proportion of two volumes of the former gas and one volume of the latter; or by weight it is composed of 1 equivalent of hydrogen, 1, + 1 equivalent of oxygen, 8, = 9, its equivalent: it is in fact a protoxide of hydrogen.

We shall first treat of the properties of water in its fluid state, as being that in which it is most familiar and most important to mankind. Water is colourless, transparent, inodorous, and insipid; it is an imperfect conductor of heat and electricity; it is very slightly compressible, yielding only about 46·65 millionths of its bulk to the pressure of the atmosphere. Its specific gravity is 1, being the unit to which the density of all liquids and solids is referred, as a convenient standard, on account of the facility with which it is obtained in a pure state. A cubic inch of water at 62° Fahr., and 30 inches barometric pressure, weighs 252·458 grains, and as a cubic inch of atmospheric air weighs 0·31 grains, it is rather more than 815 times heavier than an equal volume of air.

Water, like all other fluids and substances, expands by exposure to an increase of temperature, and, with a curious exception, the dilatation within certain limits is proportionate to the degree of heat to which it is subjected. It is however found that water a few degrees above its freezing-point is more dense than exactly at it: for example, if water at 40°, which is the point of its greatest density, be cooled, it expands as it cools till reduced to 32°, when it solidifies, and this constitutes the exception to the law of contraction by reduction of temperature. If water at 40° be heated, it expands as the temperature rises, and this is conformable to the general law. This expansion of water by cold produces very important effects in the economy of nature; for if it increased in density, the frozen portions would sink down successively, and thus large bodies of water would become masses of solid ice.

When water is heated to a certain point, which is arbitrarily fixed on the scale of Fahrenheit's themometer at 212°, it acquires the greatest volume it is capable of assuming; it then boils, and is converted into vapour. A little before ebullition commences a slight noise is heard, which is commonly called simmering; this arises from the formation of small bubbles of vapour or steam at the bottom of the vessel, which ascend, on account of their lightness, into the upper and colder portion of the water; in this they are condensed, and the noise results from the sudden condensation of the bubbles of vapour.

Steam at 212° occupies about 1700 times as much space as the water does from which it is generated. It is upon the elastic force of steam communicated by heat, and the instantaneous annihilation of it by cold, that the working of the steam-engine depends. Though water under the average atmospheric pressure acquires when subjected to heat no higher temperature than 212°, when heated under pressure it acquires a much higher degree of heat; and it is a curious fact that the steam issuing from what is termed a high-pressure boiler does not scald when received on the hand: which is probably attributable to two causes; first, the mingling of the steam with cold air; and secondly, to the conversion of free into latent heat by expansion. When the temperature of water is reduced to 32° of Fahr., it is well known that it is rendered solid, or freezes and crystallizes: if indeed water be kept perfectly still, it may be reduced below this temperature and yet retain its fluidity, but by agitation solidification ensues, and the temperature rises to 32°. The force with which water assumes the solid state is so great, that iron vessels of great thickness have been burst by it; and glass vessels or lead pipes are well known to be destroyed in winter time from the same cause. Ice is lighter than water, its density being 0·94, and hence it floats on water.

The subject of the discovery of the composition of water has lately excited considerable discussion; we are however of opinion that the claim of Mr. Cavendish as the author of this great discovery, and which has been for some years assigned to him without dispute, is rightly so attributed.

WATER. Several of the uses of water having been already stated, either under the article Bathing or that of Food, it is intended to treat here of what may be termed the natural history of water, both simple and mineral, embracing some of the applications of these, especially of the latter. Water is commonly divided into certain heads, according to the source whence it is obtained, viz. into atmospheric water, including rain and dew; and into terrestrial water, comprising spring, river, well, lake, marsh, and sea water, and, lastly, mineral waters. Following the order now given will afford convenient opportunities of stating the peculiarities of each, after some general statements of the properties common to all. Pure water is a colourless, transparent, tasteless, and odourless compound, liquid at the ordinary temperature of the air (except near the poles and the summits of lofty mountains), having neither an acid nor alkaline re-action, and being assumed as the standard, of the specific gravity 1·000. It is seldom found in a state of perfect purity, but, from its great solvent and absorbent power, it is impregnated with a variety of saline substances, gases, and animal and vegetable substances, either living or undergoing a process of decomposition. The effect of these is to communicate different properties, and generally give it a peculiar taste, and not unfrequently an odour, which, if not cognizable by the blunted senses of man, is so by animals, especially the camel, which can scent water at a great distance in the desert. The specific gravity is often much increased, especially that of sea-water and of mineral waters, from the saline ingredients, and of some of the great rivers, from the quantity of mud and other matters which they contain.

Rain-water is commonly reckoned the purest; but it is by no means so free from accidental impregnations as is generally supposed. Whatever foreign ingredients exist in the atmosphere of any place are brought to the ground by the first rain that falls—thus, it often contains traces of muriates, of free muriatic acid, nitric acid, carbonic acid, and of carburetted hydrogen gases; minute quantities of iron, nickel, and manganese; as well as of a peculiar organic substance, chemically different from the extractive matter and the gluten of plants and animals, called pyrrhine. (Daubeny, *Report*, p. 1.) Occasionally phosphoric acid is found in it, especially when the wind blows from the north-west. Much more important is the presence of ammonia, insisted on by Liebig (*Chemistry in its Application to Agriculture*, p. 75, 2nd edit.) as the chief source of the nitrogen found in plants. Rain-water, from its great purity, has high solvent powers, which fit it well for the part it has to perform in the economy of nature, and also for many operations in the laboratory. In this respect it is nearly equal to distilled water. When collected in the neighbourhood of towns however, it requires to be boiled and strained; and is always contaminated with some soluble and generally dangerous salt of lead, when collected from leaden-roofs or transmitted through leaden pipes or cisterns. [Lead.]

Dew differs little from rain, save in containing more atmospheric air. [Dew.] Ice-water differs, when first obtained, from rain, in being destitute of atmospheric air, and hence it cannot sustain respiration in fishes; it is for the same reason mawkish and insipid; but by exposure to the air it speedily absorbs a due proportion. Snow-water is nearly similar. It has been accused of causing goître; but this charge seems unfounded; and the occurrence of that complaint is due to the calcareous salts which the snow-water in its descent from the mountains dissolves in large quantities.

Spring-water is of various degrees of purity, according to its source and the strata through which it passes. (See Mrs. Marcet's *Conversations on Land and Water*.) Its most common source is rain, which percolates through some of the superficial strata, and, meeting with some obstacle, is forced up to the surface. Hence it contains most of the ingredients found in rain-water, and frequently also various saline principles, especially chloride of sodium and salts of lime; when these last are abundant, the water is what is termed *hard*, though this quality is derived in some cases from other saline principles. 'Large springs are in general purer than small ones, and those which occur in primitive countries, and in siliceous rocks or beds of gravel, necessarily contain the least impregnation.' (Dr. Paris.) Such is the great purity of some springs, that they have been reckoned *mineral* waters, and resorted to as such. The chief of these is Malvern, the specific gravity of which is only 1·0002, and which contains a smaller proportion of foreign ingredients than any other water. Some of the springs of Matlock are likewise very pure. Those of them which are *thermal* have their powers increased by the higher temperature; but their beneficial effects, like those of Malvern and Holywell in Flintshire, are mainly owing to their extreme purity; which shows how conducive to health pure water is, compared with that which is impure or contaminated. Many springs have their waters largely impregnated with carbonic acid gas. These are sparkling and pleasant to the taste, and when fresh-drawn produce some slight intoxication; and some of those in London, such as Holywell near Shoreditch, were resorted to for this effect, as those of Pyrmont and Spa are by the peasantry in their vicinity.

Water charged with much free carbonic acid should never be conveyed through leaden pipes, but through those of zinc or block-tin.

River-water mostly originates in springs, augmented by rain-water. If it flows over sand or granite, it is found very pure, depositing in its course many earthy salts, especially the calcareous ones, from the escape of carbonic acid. This circumstance renders the water vapid, and less pleasant to drink than spring-water. It possesses however the property of absorbing much oxygen; hence the surface-water both of rivers and the ocean holds more oxygen than the atmospheric air, to the amount even of 29·1 per cent. (Daubeny, p. 6.) This contributes both to the maintenance of the respiration of fishes and growth of aquatic plants. The abundant supply of water furnished by large rivers offers a great temptation to procure thence the immense quantity required for the use of the inhabitants of towns on their banks. This may or may not be a wise proceeding, according to the nature of the water. If hard, it can only be rendered fit for domestic purposes, such as cooking and washing, by chemical processes, or by long boiling in appropriate boilers. When, in addition to its saline impregnations, numerous adventitious ones, many of a disgusting and most revolting nature, are found, it is clear that such water is very unfit for the use of man. This is unhappily the case with some of the water furnished to the inhabitants of London; and the benevolent and wise proposal of Mr. Martin, as explained in his 'Thames and Metropolis Improvement Plan,' however advantageous in other respects, would only get rid, at most, of some of the adventitious and mechanical impurities, several of which can be removed by filtering, and leaves unaffected the causes of the hardness of the water, which has a less obvious but still very serious influence on the health and comfort of the inhabitants. This is clearly and convincingly shown in the evidence before the Commission on the Health of Towns, particularly that of Professor Clark of Aberdeen, whose simple process, if adopted by the various water-companies, would remove almost every one of the inconveniences, and while costing little, would be attended with a vast saving of soap, soda, and labour, along with a diminution in the tear and wear of linen and everything required to be washed in it.

Well-water is generally obtained from a greater depth than spring-water. It is also generally hard, or is apt to become so if kept in a reservoir lined with bricks, unless they be coated with an insoluble cement. The water from old wells is more pure than from recent ones, the soluble particles being all gradually washed away. The pump and well waters in and about London, and chalky districts in general, are mostly hard. (Prout, *On Stomach and Renal Diseases*, p. 210, 4th edit.) Not so that of the Artesian wells, which is of unusual softness. This renders water from these wells proper as a beverage for persons with a tendency to certain forms of calculous complaints, to whom hard waters are most hurtful. The causes of hardness in water and of the injurious influence of it on the health of many persons, is scarcely sufficiently understood. Filtration only removes mechanical impurities, and even long boiling only precipitates certain of them, while in some instances it renders it even harder. This different result depends upon the nature of the ingredients present: 'The most material are earthy salts, salts of lime, and salts of magnesia. There are also usually present common salt, and sometimes bi-carbonates of soda and potash. The most important of the earthy salts is bi-carbonate of lime. The saline principles may be divided into two parts, the neutral portion and the alkaline portion. The alkaline portion consists entirely of bi-carbonates; those of lime and of magnesia, which are the earthy bi-carbonates; and in some waters those of potash and soda, which are the alkaline bi-carbonates. The neutral portion consists of the neutral salts of earths and alkalies, such as gypsum and common salt. Salts of iron occur also occasionally in waters that are in use. Such salts impart an inky taste to the water, and they give a yellowish tinge to linen washed in it. Carbonic acid, when it is present in greater proportion than is requisite to form the bi-carbonates existing in the water, also makes it hard.

'The earthy salts and those of iron are the principal cause of hardness.' (Their presence may be detected by a solution of soap and gallic acid.) 'Long exposure to the air softens water, but only slowly and slightly when the hardness is owing to the earthy bi-carbonates. Boiling softens very materially such water as contains earthy bi-carbonates, by decomposing them; but when the earthy salts are neutral, it hardens the water, inasmuch as, if any of the water is allowed to escape in the form of steam, the salts are concentrated in the water that remains. It is therefore a most material point in treating of water, to be aware not only of the amount of the hardness, but how far that hardness is due to neutral earthy salts and how far to alkaline earthy salts.' (*Evidence before the Commission on the Health of Towns.*) Professor Clark's plan of adding a solution of recently slaked lime to the water, in proportions dependant on the amount of hardness, nearly removes this quality, from whichever cause it arises. The extremely alkaline nature of much of the water of London is probably a chief cause of the debility which prevails among the inhabitants of the metropolis, and aids in producing various diseases of the kidneys.

Lake-water varies much in its composition. The main difference depends on the lake possessing an outlet or being destitute of one. The water of the former generally corresponds with that of the rivers which flow into it; but the flow becoming slower, there is more scope for the development of animal and vegetable, and for the decomposition of organic remains. Those destitute of an outlet are mostly *salt-water* lakes, containing the same ingredients as the ocean, but in a more concentrated state. (Daubeny, p. 6.) Some lakes abound in *tincal*, such as the borax-lakes of Thibet.

Marsh-water is stagnant, and abounds in animal and vegetable remains, either in a state of decomposition or passing into new combinations, generally of a low grade, as the lowest members of the vegetable kingdom and those of each section of the animal are mostly aquatic. These waters are for the most part unwholesome, both from the gases they emit and also when used as drink. The amount of unwholesome gases may be greatly diminished by substituting an active vegetation for an effete one. [ANTISEPTICS.] (See also Russiger's 'Travels in Egypt.') If these be of a bitter and astringent kind, such as bog-bean and tormentil, it greatly lessens the tendency to disease in the cattle which drink them. [ANTHELMINTICS.] Previous to employing them as drinks for human beings, steeping different plants, or rubbing the sides of the vessels with bitter seeds, renders them, if not quite pure, at least less noxious. Thus the tea-plant is used by the natives of China and Japan, the Strychnos potatorum by those of India, and the bitter almond by those on the banks of the Nile. [STRYCHNOS NUX VOMICA.]

Impure or putrid water may be rendered pure by adding alum or recently prepared charcoal, or by simply pouring it from one vessel to another in the sun.

Water of the ocean abounds in saline matters so much, that it is unfit for use internally, except in small quantity as a medicine. The quantity of salt is not uniform, since the water of the Southern ocean contains more salt than the Northern, while the proportion present in the water at the equator holds the middle place between the two. (Daubeny, p. 4.) Sea-water may be rendered fit for drinking by pressure, filtration, and freezing, or simply by boiling it, and condensing the steam as it arises.

Distilled Water.—For many chemical, pharmaceutical, and even dietetical purposes, water must be of greater purity than it is generally found. For this end it is directed to be distilled, in which process never more than two-thirds of the water put into the still should be allowed to pass over.

Toast-Water.—This is water boiled and poured on toasted bread, which in some degree lessens the vapid taste. An agreeable and beneficial degree of sapidity may be communicated to water which has been long boiled, by adding, previous to drinking it, a little of the common soda-water, which is merely carbonic acid gas diffused through the water under strong pressure.

Mineral Waters.—Dr. Gairdner, in his *Natural History of Mineral and Thermal Springs*, has endeavoured to generalize the connection between the composition of mineral waters and the rock formations from which they flow:—

'1. The salts held in solution in mineral waters have often no connection with the acid, saline, or earthy matters which enter into the composition of the rocks which they traverse in their passage to the surface of the earth, which seems to be the first index that such waters cannot derive their origin from these formations.

'2. The mineral waters of the primitive formations are almost all thermal, and generally possess a very high temperature. Their predominant impregnation is usually sulphuretted hydrogen gas, free carbonic acid gas, carbonate of soda, and in general salts with a base of soda, silica, few calcareous salts, except the carbonate of lime in some peculiar situations, and but a small quantity of iron.

'3. The waters of the transition and older secondary formations participate in those belonging to the primitive rocks. They are generally of a lower temperature, though some of them are still very hot; free carbonic acid is much less common, and sulphuretted hydrogen is almost entirely absent. Salts of soda still predominate, but the carbonate is not so common, and the sulphate of lime is found in the greater number of these waters. Silica exists in two or three examples.

'4. The waters of the newer secondary and tertiary formations are as distinctly characterized as those of the primitive rocks, placed at the other extremity of the series. They are all cold. Free carbonic acid is almost entirely absent. Their predominating ingredients are the carbonate and sulphate of lime, sulphate of magnesia, and oxide of iron.

'5. The trachytic and basaltic formations, and modern volcanic rocks, present in their mineral waters many of the circumstances of temperature and composition which are found in the waters of the granite and other primitive rocks. Sulphuretted hydrogen, carbonic acid, carbonate of soda, carbonate of lime, and silica reappear, and many contain the free sulphuric and muriatic acids. The sulphate of lime, magnesian salts, and oxide of iron are again wanting. Thus, even in the present imperfect state of the science, the phenomena of mineral waters coincide with other geognostic observations, in placing below the granite the origin of the volcanic formations.

'6. It is often found that the mineral waters of a district have almost the same composition, in which case they generally issue from the crystalline and independent formations. In other cases they are subject to great varieties within a comparatively limited space, so that waters of a totally different composition rise close to each other, when they emerge from sedimentary rocks.' (Gairdner, p. [illegible]

Mineral waters, though generally characterized by possessing some principle different from what is found in common water, or some of the ordinary principles in unusual proportion, yet among these are reckoned certain springs which have no claim to repute beyond what is due to their extreme purity, such as Malvern and Holywell; or to having a higher temperature throughout the year, than the mean of the latitude where they are situated. These last are classed among the *thermal* springs, which are properly divided into two sections, the *mineralized hot* springs and the *unmineralized*, among which are some only tepid, such as Matlock, where some springs are 66°, the lowest of the class in Britain, and others cold, presenting this peculiarity, that the tepid springs arise from fifteen to thirty yards above the level of the river Derwent, whilst those which arise either above or below this rangeare cold.

For practical purposes mineral-waters may be classed under four heads, each susceptible of secondary heads, according as they are hot or cold, or have other peculiarities, viz.: saline, alkaline, chalybeate, and sulphureous. It will not be possible to mention more than a few of the most important of each.

Saline aperient springs: of these some are hot, others cold. The chief are Carlsbad, Marienbad, Egra, Kissingen, Wiesbaden, Baden-Baden, Seidlitz, and Saidschutz, with Pullna, in Germany; Cheltenham, Leamington, and Harrowgate in England; Dunblane, Pitcaithly, and others in Scotland.

Alkaline waters, owing their properties to different saline principles, are found at Carlsbad, Marienbad, Kissingen, Pullna, Saidschutz, Ems, Töplitz, and Wiesbaden, in Germany; Vichy and Mont d'Or, in France; Harrowgate, Scarborough, and other Yorkshire springs, Cheltenham, Leamington, Bath, and elsewhere, in England.

Chalybeate waters: with these acidulous waters are often reckoned, as the iron is often associated with much free carbonic acid gas. Some of the chief are Spa, Pyrmont, Schwalbach, Marienbad, Aix-la-Chapelle, and Seltzer in Germany; Tonbridge, Harrowgate, and Brighton, in England, and Peterhead, in Scotland.

Sulphureous waters: Aix-la-Chapelle, in Rhine Prussia, Bareges, and other Pyrenean springs, are hot; Harrowgate, Askern, and others in Yorkshire, cold; Moffat and Strathpeffer, in Scotland, also cold.

Ioduretted and other waters. Many springs have of late been found to contain a notable quantity of iodine or bromine, others contain both: Creuznach, in Germany, contains both, but most iodine; Llandrindod and Bualt in Radnorshire, the springs issuing from the lias at Leamington, Gloucester, Tewkesbury, and Cheltenham, contain iodine; bromine, but not iodine, exists in small quantity, in the saline aperient waters near London, such as Epsom, also in the springs from the coal-formation of Ashby-de-la-Zouch, Newcastle-on-Tyne, and Kingswood, and Bonnington near Edinburgh: Woodhall, near Ashby-de-la-Zouch, contains most iodine of any British springs yet investigated.

Organic matters, termed *Baregine*, *glairine*, *zoogene*, &c., have been found in many springs. Of these an account may be found in Dr. Lankester's *Askern* and its mineral springs, p. 103.

(See Osann, *Darstelling der bekannten Heilquellen Europas*; Gairdner, *On Mineral and Thermal Springs*; Daubeny, *Report on Mineral and Thermal Waters*; Vatter, *Theoretisch-pracktisches Handbuch der Heilquellenlehre*; Heidler, *Marienbad et ses Moyens Curatifs*; *British and Foreign Medical Review*, vol. xiv., p. 310; Wetzlar, *Mineral Springs of Aix-la-Chapelle*; Lankester's *Askern*; *Report of Commission on Health of Towns*; Clark's *New Process of Purifying Wells.*)

WATER AND WATERCOURSES. The right of conducting water through one estate for the use of another is an incorporeal hereditament of the class of easements, and was known in the Roman law by the name of the *servitus aquæ ductus*. The right of taking water out of the well or pond belonging to another person is an incorporeal hereditament of the class of profits called in the civil law the *servitus aquæ haustus*. (Domat, *Civil Law*, l. 1, t. 12.) These rights, in our law, must be either derived from a grant or established by prescription. [Prescription.]

It is the settled law of England that water flowing in a stream is originally *publici juris*, that is to say, a thing the property of which belongs to no individual, but the use to all. *Primâ facie* the proprietor of each bank of a stream is the proprietor of one half of the land covered by the stream, but there is no property in the water. Every proprietor has an equal right to use the water which flows in the stream, and consequently no one can have the right to use the water to the prejudice of any other without his consent. No proprietor can either diminish the quantity of water which would otherwise descend upon the proprietors below, nor throw back the water upon the proprietors above, so as to overflow or injure their lands. For the same reason no proprietor has a right so to use the water of a stream as to injure its quality to the detriment of other proprietors.

The only modes in which a right to the use of running water in a manner inconsistent with the common law rights of others can be established, are either proof of an actual grant or licence from the persons whose rights are affected, or proof of an uninterrupted enjoyment of such a privilege for such a period as the law considers sufficient to constitute a right by prescription. The period of twenty years had been generally fixed upon by the courts of law and equity for this purpose, and the same period has been adopted in the late Prescription Act (2 & 3 Wm. IV., c. 71, s. 2), which converts what was formerly only a presumptive into an actual right. [Prescription.] But where water had been left unappropriated, it seems that the person first appropriating and rendering it useful acquires a right, and for a violation of such right an action may be maintained on an enjoyment of less than twenty years. Thus it has been decided that after the erection of works and the appropriation by the owner of the land of a certain quantity of the water flowing over it, if a proprietor of other land afterwards take what remains of the water before unappropriated, the first-mentioned owner, however he might before such second appropriation have taken to himself so much more, cannot do so afterwards. (6 East, 219.) The privilege of a watercourse is not necessarily confined to private individuals. It may be vested in a corporation, or may be prescribed for by the inhabitants of a township or parish. If land with a run of water upon it be sold, the water *primâ facie* passes with the land; but it is laid down by Coke that if a person grants *aquam suam*, the soil will not pass, but only a right of fishing in that water; for the proper words in that case to pass the soil would be, so many acres of land *aquâ coopertas*; whereas the word *stagnum*, or pool, will pass both water and land. (1 *Inst.*, 4, b.) The exclusive right to a flow of water once acquired can only pass by grant as an incorporeal hereditament, and a licence, by parol or otherwise, to use or take the water at any place, may be revoked even without an express power of revocation being reserved, unless where works have been constructed and expenses incurred upon the faith of it. (5 B. & Ad., 1.)

When the owners of property have by long enjoyment acquired special rights to the use of water in its natural state as it was accustomed to flow, by way of particular easement to their own properties, and not merely as a use, which is common to all the king's subjects, an action may be maintained for a disturbance of the enjoyment; but where the injury, if any, is to all the king's subjects, the only remedy is by indictment. The mere obstruction of water which has been accustomed to flow through a person's lands does not in itself afford a ground of action. The plaintiff in such an action must be enabled to show either that some benefit arose to him from the water going through his lands, of which he has been deprived, or at least that some deterioration was occasioned to the premises by the subtraction of the water; but where the proprietor of the lands can prove that he is injured by the diversion of the water, it is no answer to his action to show that the defendant was the first person who appropriated the water to his own use, unless he has had twenty years' undisturbed enjoyment of it in its altered course. Where the injury occasioned by the diversion or obstruction of water is of a permanent nature and injurious to the reversion, an action may be brought by the reversioner, as well as by the tenant in possession, each for his respective loss.

The diversion of watercourses or injury to their banks so as to cause inundation are nuisances against which a court of equity will protect parties by injunction; and if there be a question as to the right to the flow of water, an issue will be directed to try it. Although a court of equity will not in terms decree the banks of rivers, watercourses, or navigable canals to be repaired, the effect of such an order may be obtained by an order that parties shall not be at liberty to use them while out of repair, or against their impeding the use of them by the obstructions consequent upon a state of disrepair. An injunction may also be obtained against conducting the water from one man's tenement on to that of another, to the injury of the latter, by drains or otherwise, in a manner in which it has not been accustomed to flow. And it may be laid down generally, that, with respect to water and watercourses, the aid of the court of equity may be obtained for the purpose either of restraining injury or of quieting possession. (Fonblanque, *On Equity*.)

WATER-COLOURS (in Italian, *Acquerella;* French, *Aquarelle;* and German, *Wasser-Farben*). By painting in water-colours is signified now what was formerly called limning in its strictest sense, a corruption probably of illumining or illuminating, from the Latin word *illuminare*, to illustrate. Till within the last hundred years or so all painters were called limners in this country.

The term water-colour painting is now confined to drawing in water-colours upon paper, vellum, and ivory, but formerly, when nearly all painting was done in water-colours, the particular style was designated according to the vehicle or binder used with the water, or according to the method of applying the colours. Fresco (*al fresco*), gouache (*a guazzo*, with gums), and distemper (*a tempera*), are all water-colour painting; so also were some of the methods of encaustic employed by the antients, for wax and resins can be rendered water-colour vehicles by being mixed with a soluble mineral alkali; soda is the most efficient, but it must be used as a nitrate, or some colours will be affected by it: nitre, or nitrate of potash, will do nearly equally as well. Oil-colours, which have now nearly superseded water-colours, were not used for imitative art until the fifteenth century, when Van Eyck, by boiling linseed, poppy, and nut oils with certain resinous mixtures, obtained a vehicle so much better adapted than any then in use, for working, for effect, and durability, that it was generally adopted by the artists of the period when it became known. What these mixtures were which Van Eyck used is not now known, but Vasari calls them a *varnish* which all painters had long desired. From this time what is called oil-painting became general, and the various methods in water-colour were proportionately neglected or employed only where oil-painting was a less convenient mode, as for theatrical and similar decorations, for which distemper (*a tempera*, that is, with an egg, yolk and white together) is better adapted: water-colours are also better adapted for miniature painting, and illuminating books and manuscripts. For the latter methods different vehicles or media are required from those used in distemper. For distemper, glue, egg, milk, and serum of blood may be used; in miniature and in water-colour drawing the media are more numerous—egg, gums, as gum-Senegal, Arabic, ammoniac, and tragacanth, isinglass, and borax. One-quarter of an ounce of gum tragacanth dissolved in one quart of a cold saturated solution of borax in water, makes an excellent vehicle for miniature painting: a medal was awarded to Mr. J. H. Jones, by the Society of Arts, &c., for its discovery. Animal gall and alcohol are also used in water-colour painting: the former, to attach the colours to the ground; the latter, as an antiseptic, to preserve them from frost, mildew, and putrescence. Saccharine substances should be avoided in water-colours, as they are attractive of damp and disposed to acid fermentation with gum. The artist should use only *distilled water* or *filtered rain-water*, for, says Mr. Field in his treatise on colours, 'in all hard and impure waters, colours are disposed to separate and curdle, so that it is often impossible a clear flowing wash or gradation of colour should be obtained with them.'

Of all the methods however of painting in water-colours *fresco* is the principal, and the only style of painting well adapted for an adequate representation of important historical events or for a due display of the merits and beauties of a work of high art. Fresco-painting was known to the Egyptians, and to the Greeks and Romans. Works in this style have lately been discovered in Egypt which may be now 3000 years old, and yet their colours are quite brilliant. There are also in Italy frescoes which are 400 years old, and are still brilliant in colouring. Whereas oil-paintings not only darken, but have been known to go to pieces a few years after they were executed. The celebrated picture of the Last Supper, by Lionardo da Vinci at Milan, was quite decayed 50 years after it was painted. If the wall and the plaster (which should be upon the solid wall) are good, frescoes never crack, and they bear cleaning well. There are various methods of cleaning them, the most simple is with bread; and in case of necessity they can also be easily removed from the wall and transferred upon canvas. Frescoes, being painted upon the wet plaster, require simply water (distilled or boiled) as a vehicle; the lime itself, as it dries, binds them. The mixture of lime and sand for the *intonaco*, or fine and last coat for painting upon, must be prepared and kept moist some months before it is used, otherwise it destroys the colours. But for adequate and interesting details relating to the practice of fresco-painting, both of the old Italian and the modern German masters, the reader is referred to the Appendix to the 'Report of the Commissioners on the Fine Arts, presented to both Houses of Parliament by command of her Majesty,' in 1842. All pigments, as those prepared from animal and vegetable substances, cannot be used in fresco-painting on account of the lime in the ground, which destroys them; yet so many can be used, that the fresco-painter has a sufficient choice for every purpose. The following are the colours used by Professor Hess, the eminent German fresco-painter: *white*—lime which has either been long kept or rendered less caustic by repeated manipulations and drying: *yellow*—raw sienna and all yellow ochres: *red*—all burnt ochres, burnt sienna, oxides of iron and lake-coloured burnt vitriol: *green*—terra-vert, cobalt green, and chrome green: *blue*—ultramarine, pure and factitious, and cobalt: *brown*—burnt and raw umber and burnt terra-vert: *purple*—burnt vitriol, cobalt, and lake-coloured burnt vitriol.

The following are the most permanent colours, and therefore most valuable to the water-colour painter: *blues*—ultramarine, French ultramarine, cobalt, indigo, and smalt: *reds*—Indian red, light red, Venetian red, scarlet vermilion, carmine, pink madder, rose madder, purple lake, and red orpiment: *yellows* - cadmium yellow, gamboge, yellow ochre, Indian yellow, mars yellow, lemon yellow, Roman ochre, brown ochre, mars orange, raw sienna, Italian pink, gallstone, and king's yellow: *purples* – purple madder, Indian purple, and burnt carmine: *browns*—burnt sienna, brown pink, burnt umber, Vandyck brown, sepia, mars brown, Cologne earth, bistre, and madder brown: *greens*—emerald green, olive green, and green oxide of chromium: *blacks*—ivory black, blue black, neutral tint, and British ink: *whites*—oxide of zinc or Chinese white, and sulphate of barytes or constant white.

The following works upon the nature and qualities of pigments, &c. may be consulted with advantage:—Tingry, 'The Painter and Varnisher's Guide; or, a treatise, both in theory and practice, on the art of making and applying varnishes; on the different kinds of painting; and on the method of preparing colours both simple and compound,' &c., 8vo., London, 1816: translated from the French;—Field, 'Chromatography, or a treatise on colours and pigments, and of their powers in painting,' 8vo., London 1841: and the small 'Hand-book of Water-colours,' by Messrs. Winsor and Newton, artists' colour-makers to her majesty, which is a brief treatise on the qualities and effects of colours when employed in water-colour painting.

WATER-CRESS. [SISYMBRIUM.]

WATER-CROW, one of the English names for the WATER-OUZEL.

WATER-GUT. [ULVACEÆ.]

WATER-HEN. [RALLIDÆ, vol. xix., p. 282.]

WATER, HOLY (in French, *Eau bénite*, or blessed water; but in Italian, *Aqua santa*, as in English), is water blessed by the priest, which is used in many ceremonies of the Roman Catholic church, as in the offices of baptism and burial, and in various parts of the mass or ordinary service. There is commonly a font of holy water in the porch of Roman Catholic churches, into which the congregation as they enter the church dip their fingers, and then make the sign of the cross upon their foreheads. The holy water is mixed with salt; and this is said to have been first done by Pope Alexander I., in the beginning of the second century. Some make Pope Alexander to have been the inventor of holy water altogether. Protestant writers have been accustomed to trace the holy water of the Romish church to the pontifical lustrations of the pagan Greeks and Romans; but both the pagan and the Christian practice may perhaps be more correctly referred to the natural feeling which points out water as the symbol of purification. In the antient churches, in the middle of the Atrium, or square plot of ground between the porch and the church, was commonly a fountain or cistern of water, in which the people washed their hands and faces before they entered. 'The writers of the church of Rome, Baronius, and others,' observes Bingham (*Origines Ecclesiasticæ*, lib. viii., c. 3, § 7), 'commonly derive and defend the use of their holy water from this antient custom; but Du Fresne seems to speak more properly when he says their lustral water rather succeeded in its room.' Bingham is himself inclined to deduce the modern custom 'from a worse fountain, the περιῤῥαντήρια, or sprinkling with holy water' (properly, sprinkling-vessels), 'so often spoken of among the heathens;' and he quotes a passage from Sozomen, where that ecclesiastical historian, speaking of the emperor Julian's going into a temple in Gaul to sacrifice, with Valentinian attending him, says, 'the priest sprinkled them with water as they went in, according to the heathen custom;' upon which his editor, Henry Valesius, has observed that the reading in some copies is 'according to ecclesiastical custom,' the more modern transcribers having thought that the true expression. (See also chap. x., § 5.) Holy water is also used in the Greek church, but without salt. The mixture of the salt and water is interpreted by some Roman Catholic divines as typifying what is called the hypostatic union of the nature of Christ, the salt being the emblem of his divinity, the water of his humanity.

WATER-LILY, the common name of several plants remarkable for their beauty, belonging to different genera of the natural order Nymphæaceæ. All the species of the genera *Nymphæa* and *Nuphar* are called Water-Lilies. The genus *Nymphæa* has a calyx of four sepals girding the base of the torus. The petals, 16 to 28, adnate to the torus, elevated about the ovary and covering the same, and therefore at first sight appearing inserted into it. The stamens are numerous, disposed in many series, and inserted in a similar way above the petals. There are upwards of twenty species of this genus described. They have all large floating leaves, with white, red, or blue flowers, which appear at the surface of the water.

N. cærulea, Blue Water-Lily, has peltate nearly entire leaves without dots, glabrous on both surfaces, and 2-lobed at the base, the lobes free; the anther with an appendage at the apex; the stigmas 16-rayed. This plant is a native of Lower Egypt in rice-grounds and canals about Rosetta, Damietta, and Cairo. The flowers are very fragrant, and from its frequent representation in the sculptures of Egypt, it appears to have been regarded as a sacred plant by the antient Egyptians.

N. edulis, the eatable Water-Lily, has peltate, broad, oval, entire leaves, with the under surface pubescent. This plant is a native of the East Indies, in wet fenny districts. Its flowers are small, and white or reddish. Like all the species, it has large pear-shaped roots, which contain an abundance of starch, and they are consequently used as articles of diet. The seeds also of a species nearly allied to this, the *N. rubra*, which has deep-red flowers, are also used as an article of diet. Its flowers also are held in superstitious veneration by the Hindus in the districts of the East Indies in which it grows.

N. pubescens has peltate, sharply-toothed leaves, orbicularly reniform, with the under surface pubescent and spotted, and the lobes roundish. It is a native of the East Indies, Malabar, Moluccas, Tranquebar, Ceylon, Java, and has been also found at Waree and Acra on the western coast of Africa. This plant is called *Lotos* throughout India, and is held sacred by the Hindus. Its flowers are of a beautiful white. They expand during the day and close at night and exhale a strong vinous odour.

N. Lotus, the Egyptian Lotos, has peltate leaves, sharply serrated; the under surface is pilose at the nerves, and pubescent between them. This plant is a native of Egypt, and grows in slow-running streams, especially in the Nile near Rosetta and Damietta, and is found in rice-fields during the time they are under water. It has large white flowers with the sepals red at the margins. The roots are large, tuberous, and eatable. The seeds dried were made into a bread by the antient Egyptians, and the roots were employed in the same manner. This plant is regarded with superstitious veneration by the Egyptians. It resembles the *Nelumbo* of the Hindus, a plant belonging to the same natural order, and called the true or East Indian Lotos. The latter has always been regarded as the emblem of fertility. *Lotos* is applied to various plants by the antients. The Lotos of the Lotophagi was the Zizyphus Lotos; that of Homer and Dioscorides, a species of *Lotus* or Trifolium. The Lotus of Hippocrates is the *Celtis australis;* and the Italian Lotos is the *Diospyrus Lotus.*

N. alba, the common White Water-Lily, has cordate, quite entire leaves; the stigmas 16-rayed, the rays ascending. This plant is a native of ditches, ponds, and lakes throughout Europe, and is abundant in Great Britain. The flowers are white, and, according to Linnæus, open themselves in the morning at seven o'clock, and close them at four o'clock in the evening. This plant is very deservedly highly esteemed as the most beautiful of European plants. It is frequently accompanied with the yellow water-lily, and the two together give an exceedingly graceful appearance to the waters they occupy. The roots of the white water-lily contain an astringent principle, which renders them useful in dyeing. They also contain starch, and on this account swine feed on them, although other animals reject them. The whole plant was at one time regarded as medicinal, but is now seldom employed by medical men, although it has a popular reputation as a remedy in many diseases. There is a variety of this plant occasionally met with, called *minor*, which has smaller flowers and leaves than the species.

N. odorata, Sweet-scented Water-Lily, has cordate, quite entire leaves, with the nerves and veins on the under surface very prominent; the stigmas 16 to 20 rayed; the rays erect, inflexed at the top. This plant is a native of North America from Canada to the Carolinas; it is found in deep ditches and slow-running rivers. This plant is often confounded with the European Lily, but it is quite distinct. Its flowers are white tinged with red, very fragrant, and opening in the morning, close at noon. The roots of this plant are also astringent, but much more powerful than the last species. It contains tannin and gallic acid, and a decoction of the roots gives a black precipitate with sulphate of iron. The roots are used by medical men in America as astringents, and popularly are employed for making poultices.

The genus *Nuphar* has a calyx composed of five or six petal-like sepals; the petals 10 to 18, much smaller than the sepals; the stamens indefinite, which, as well as the sepals and petals, are inserted into the base of the torus, so that the fruit appears as if it were superior. The stigmas are from 10 to 18, and radiated. Carpels 10 to 18, enclosed within the torus. The species, like those of the last genus, are elegant aquatic plants, and differ from them in appearance by their yellow flowers. There are several species growing in various parts of Europe and America. Of these the *N. lutea*, Yellow Water-Lily, is the most common. It has a calyx of 5 sepals; the stigmas are entire, 16 to 20 rayed, deeply umbilicated; the leaves ovato-cordate; the lobes approximate; the petioles triquetrous with acute angles. This plant is a native throughout Europe and in Siberia, and is also found in North America. The flowers have a strong smell, like that of brandy, and in many parts of the country the fruits are called brandy-bottles. There is a species very much resembling this in all points, except that it is about half the size; it is called *N. pumila*, Dwarf Yellow Water-Lily. It is a native of the North of Germany, Lapland, Norway, and Scotland. There are five or six other species, all of them natives of ponds and ditches of fresh-water. There is a North American species, *N. advena*, which grows in salt-water as well as fresh, and is very plentiful about Philadelphia and also in Canada.

One of the most beautiful productions of the vegetable kingdom is closely allied to the genus Nymphæa, and has been called by Lindley, in honour of the queen, *Victoria regia*. This splendid plant, in the dimensions of its leaves, their colour, the colour, size, and fragrance of its flowers, may deservedly be called the queen of flowers. The following is the account of its discovery by Mr. Schomburgk:—'It was on the 1st of January, while contending with the difficulties nature opposed in different forms to our progress up the river Berbice, that we arrived at a point where the river expanded and formed a currentless basin: some object on the southern extremity of this basin attracted my attention; it was impossible to form any idea what it could be, and animating the crew to increase the rate of their paddling, we were shortly afterwards opposite the object that had raised my curiosity—a vegetable wonder. All calamities were forgotten: I felt as a botanist, and felt myself rewarded;—a gigantic leaf, from five to six feet in diameter, salver-shaped, with a broad rim, of a light green above and a vivid crimson below, resting on the water. Quite in character with the wonderful leaf was the luxuriant flower, consisting of many hundred petals, passing in alternate tints from pure white to rose and pink. The smooth water was covered with the blossoms, and, as I rowed from one to the other, I always observed something new to admire.' No specimens of this plant have been yet seen alive in this country, but seeds have been received from Mr. Schomburgk, and it is hoped that this splendid plant may yet flourish in our gardens. The leaves are very large, measuring 5 or 6 feet in diameter. They have an orbicular form, the upper surface is bright green, and they are furnished with a rim round the margin from 3 to 5 inches in height; on the inside the rim has a green colour, and on the outside, like the under surface of the leaf, it is of a bright crimson; they have prominent ribs, which project an inch high, radiating from a common centre; these are crossed by a membrane, giving the whole the appearance of a spider's web; the whole leaf is beset with prickles, and when young is convolute. The stalk of the flower is an inch thick and studded with prickles. The calyx is 4-leaved, each sepal is 7 inches in length and 4 inches broad. The corolla covers the calyx with hundreds of petals; when first opened it is of a white colour, but subsequently changes to pink; it is very fragrant. Like all other water-lilies, its petals and stamens pass into each other, a petal often being found surmounted with half an anther. The seeds are numerous, and embedded in a spongy substance. This plant has by some botanists been placed in the genus Euryale, whilst Lindley thinks it is nearer Nymphæa, from which it differs in the sepals and petals being distinct, the papilla of the stigma being prolonged into a horn, and the changing colour of its petals. Of this genus there is but one species at present described.

In the cultivation of water-lilies, those brought from warm climates should be grown in large pots or pans of water, with several inches of rich loamy soil in the bottom, which should be placed in a warm part of the stove. The hardy species may be planted in ponds, cisterns, canals, or lakes, with a rich loamy soil at the bottom. They may be propagated by seeds, or dividing their roots or tubers, which may be thrown into the water wherever they are intended to remain. A due supply of water should be ensured for their growth, as they will not prosper after being exposed to the atmosphere or cold.

(Don's *Gardener's Dictionary*; Lindley's *Monograph on Victoria regia.*)

WATER-MEADOWS. [IRRIGATION.]

WATER-NUT. [TRAPA.]

WATER-OAK. [QUERCUS.]

WATER-OUZEL. [CINCLUS.]

Generic Character. [MERULIDÆ. vol. xv., p. 122.]

The *Cincli* haunt the banks of clear streams, rejoicing in the vicinity of some tumbling cascade hurrying over a rocky declivity. They go into the water till they are quite submerged, walk on the bottom of the stream, and there seek their insect food. M. Temminck states that when in this situation they open their wings and constantly agitate them. Their feathers are, he says, furnished with an oily matter for this purpose, like the feathers of ducks; and adds, as an *on dit*, that when thus walking they appear surrounded with air-bubbles, which render them very brilliant.

The following are European:—

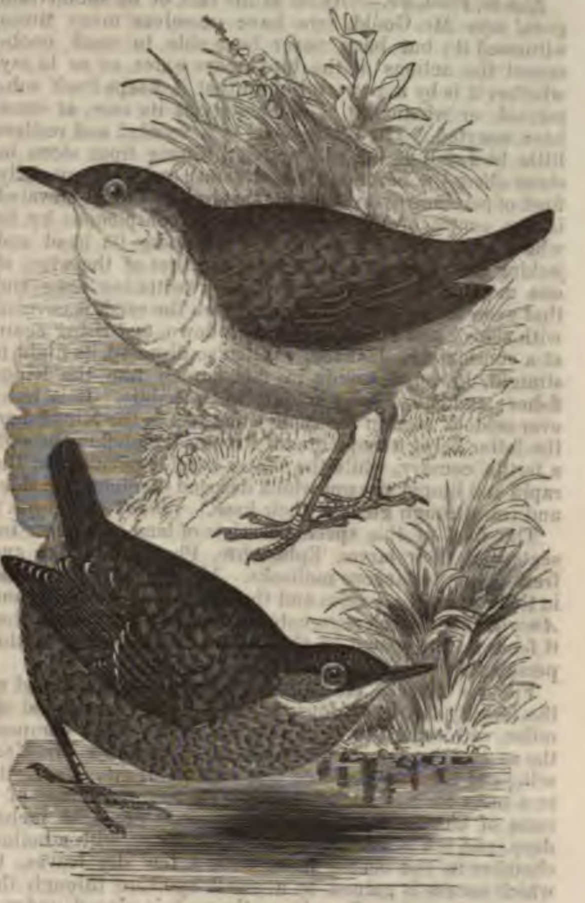
Cinclus aquaticus, *Cinclus melanogaster*, and *Cinclus Pallasii*. M. Temminck expresses a doubt whether the second is a distinct species; and refers, with some slight doubt, *Cinclus Pallasii* of the Himalaya Mountains to the third. He states the geographical distribution of *Cinclus Pallasii* to be the Crimea, and other parts of European Russia, and says that it is very common in Japan, where it is named *Kawagaras*.

We select as an example the first of these.

Description.—Male.—Upper parts deep brown, tinted with ash-colour; throat, front of the neck, and breast pure white; belly rusty; bill blackish; iris pearl-grey; feet horn-colour. Length rather more than seven inches.

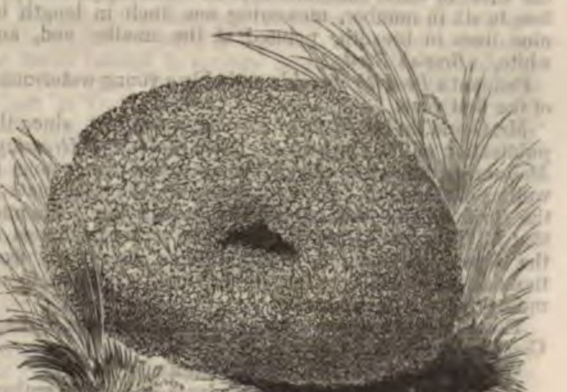
Female.—Upper part of the head and back part of the neck ash-brown; less white upon the breast; lower parts yellowish rusty.

Young of the Year distinguished by the grey feathers which cover the head and the nape; feathers of the back and rump fringed with blackish; those of the wings with white towards the end; the white of the lower parts extends to the middle of the belly and towards the abdomen; but all these white feathers are finely varied with brown and ash-colour.



Water-ouzel.

Adult and Young of the Year.



Nest of Water-ouzel. (Yarrell.)

This is the *Lerlichirollo* and *Merlo aquatico* of the Italians; *Tordo de agua* of the Spaniards; *Merle d'eau* and *Aguasière à gorge blanche* of the French; *Watnstare* of the Swedes; *Povodni Koss* of Scopoli; *Fosse Fald*, *Fosse Kald*, *Quærn Kald*, *Stroem-Stær*, and *Bække Engl* of the Norwegians; *Wasser-amsel*, *Bach-amsel*, and *Der Hochköp-*

fige mittlere und Nordische Wasserschwätzer of the Germans; *Waterspreeuw* of the Netherlanders; *Mwyalchen y divir* of the antient British; and *Water-ouzel*, *Water-crow*, *Water-pyet*, *Water-piet*, *Dipper*, and *Bessy-ducker* of the modern British.

Geographical Distribution.—Sweden, Scandinavia, Siberia, Russia, Germany, the Alps, the Pyrenees, Holland (rare), Spain, Italy, England, Scotland, Wales, and Ireland. Trebizond.

Habits, Food, &c.—'As far as the fact of its submersion goes,' says Mr. Gould, 'we have ourselves many times witnessed it; but have never been able to mark unobserved the actions of the bird under water, so as to say whether it is by a powerful effort that it keeps itself submersed, or whether it is completely at its ease, as some have asserted. The Water-ouzel is a spirited and restless little bird, full of life and activity, flitting from stone to stone along the borders of the streams; and it is especially fond of perching upon any rock that happens to be elevated in the centre of the current, where, conspicuous by its white breast, it may be observed dipping its head and jerking its tail in a manner not unlike that of the wren, at one moment pouring forth a lively twittering song (and that even in the depth of winter, when the earth is covered with snow), and at the next diving down, and rising again at a considerable distance. When so disposed, its flight is straight, low, and rapid; in fact, much like the Kingfisher; and it is equally solitary in its habits. It is however seldom seen in the same situations as the Kingfisher, the latter being a frequenter of streams which flow through a fertile country, while the Water-ouzel is peculiar to the rapid and limpid streams which descend the mountain sides and run through glens at their base.' (*Birds of Europe.*)

The food of this species consists of land and water insects and their larvæ, Ephemeræ, Phryganeæ, &c., and fresh-water testaceous mollusks. Mr. Macgillivray found in their stomachs beetles and the animals of *Lymnææ* and *Ancyli*. The Scotch persecute it under the impression that it feeds on the spawn of the salmon. The justice of this persecution has been doubted.

Fissures of rocks, crags, and rough stones are selected as the locality for the curious nest, which is domed, and similar, with regard to materials, to those which compose the nest of the wren. 'It builds early,' observes Mr. Yarrell, 'and conceals its large nest with great art. If a cavity in a moss-covered rock is chosen, the nest is formed of a mass of closely interwoven moss, seven or eight inches deep, and ten or twelve inches in diameter, with a hollow chamber in the centre lined with a few dry leaves, to which access is gained by a small aperture through the moss on one side. Sometimes the nest is placed under a projecting stone, forming part of a cascade, and behind the sheet of water that falls over it. The eggs are from four to six in number, measuring one inch in length by nine lines in breadth, pointed at the smaller end, and white.' (*British Birds.*)

Pennant's *Penrith Ouzel* is probably a young water-ouzel of the first year.

Mr. Gould, in his *Birds of Europe*, states that, since the publication of his *Century of Birds from the Himalaya Mountains*, he had received specimens of the young as well as of the adult, in consequence of which his plate in the *Birds of Europe* is rendered more complete. He adds that M. Temminck had favoured him with specimens of the Japan water-ouzel, which differed so slightly from those killed in India, as not, in Mr. Gould's opinion, to admit of their being separated.

There is an American species, *Cinclus unicolor*, Bonap., *Cinclus Mexicanus*, Sw.

WATER-PLANTAIN. [ALISMACEÆ.]

WATER-PLANTS are those plants which live entirely in water, or which require a preponderating quantity of water as the medium of their existence. The families of plants, like the families of animals that live in the water, are found to belong to all classes into which the whole have been divided, although those belonging to the lower classes are by far the most prevalent. Many of the families of plants having the highest organization have members belonging to them which are inhabitants of the water: of this the Ranunculus aquatilis is an example, in the natural order Ranunculaceæ. All the species of the orders Nymphæaceæ, Callitrichaceæ, Ceratophyllaceæ, and Podostemaceæ, belonging to the class Exogens, grow in water. Among Endogens, the orders Butomaceæ, Naiadaceæ or Fluviales, Pistiaceæ, Alismaceæ, &c. consist entirely of water-plants; whilst one of the largest of the few families into which cryptogamic plants are divided, the Algæ, consists almost entirely of plants which live in the water.

For the purpose of studying the distribution of the vegetable kingdom, water-plants are distributed into several groups. One of the first divisions that suggests itself in the study of their forms is derived from the composition of the waters in which they grow. Thus we have those which grow in the saline waters of the ocean, and those which grow in the fresh waters inland. Most of the plants which grow at the bottom of the ocean or float in its waters belong to the family of Algæ, and in the article SEA-WEEDS we have given an account of their forms. There are however many plants not belonging to this order which require the influence of salt-water on the soil on which they grow for their production. Thus species of the genera Salsola, Anabasis, Salicornia, and Glaux will not grow but where they can feel the influence of salt-water: hence they have been called *plantæ salinæ*. These plants are found not only where the sea washes, but wherever salt-springs find their way to the surface of the earth. There is another group of plants which have their existence determined by saline waters, but are always found near the sea or on the banks of rivers to which the sea has access. Such are species of Chenopodium, Heliotropium, Vitex, Eryngium, Samolus, and the Mangrove (Rhizophora). These are called *plantæ littorales, seu maritimæ*.

The largest proportion of *fresh-water* plants belong also to the natural order Algæ, although by far the most conspicuous specimens belong to the tribes of Exogenous and Endogenous plants. As the sea claims nearly all the species of the genus *Fucus* and its allies, so the fresh-water claims the majority of the species of the old genus *Conferva* and its allies. The genus *Ulva* [ULVACEÆ] has its species in both sea and fresh-water. The division of the natural order Algæ containing plants resembling the Conferva are called *Algæ Confervoideæ* by Harvey, and constitute his second division of that order. All the plants belonging to this division are composed of filaments, and are really or apparently articulated: hence some writers call them *Algæ articulatæ*. We here subjoin the characters of the principal tribes into which this division of the order is subdivided.

The *Ectocarpeæ* are olivaceous or green marine plants; their fructification is monœcious and the capsules external, and the globules placed between swollen ramuli. It contains the genus *Ectocarpus* and two others. The tribe *Ceramieæ* is closely connected with the preceding; the colour of the species however is never green—mostly red or purple, and sometimes brown. The fructification is double, the capsules and globules being situated on different plants, and not on the same, as in the preceding tribe. It contains six genera, one of which is the Griffithsia, a plant named after Mr. S. Griffiths, who has done much to advance the knowledge of the order Algæ in Great Britain. The most extensive genera in this tribe are Calathamnion and Polysiphonia. Most of the species belonging to these two tribes are natives of the sea, and are found attached to rocks, and to shells, stones, and corallines which are thrown up by the waves. Many of them are also found parasitic upon the larger sea-algæ, as the various species of Fucus and others.

The *Confervæ* are for the most part green plants, but sometimes pink or brown; the fructification consists of a granular-coloured internal mass, which assumes various forms.

The genus *Conferva*, although still containing numerous species, has been much reduced by the formation of new genera. It has however still an indefinite character, on account of the comparatively little attention which the order Algæ has received from botanists. The 'filaments are articulated, free, distinct, uniform, simple or branched. Fruit (?), an internal, coloured, granular mass (endochrome). Colour green, rarely purple or orange.' The species of Conferva are found wherever there is water. In running streams they attach themselves to the stones at the bottom, and are so abundant frequently in stagnant ponds and pools as to conceal everything else. Some few of them are found in sea-water, and some on dry land. Some of the species have been found developing their peculiar forms under the influence of the ingredients of different

ineral-springs; and one, the Conferva thermalis, is only
und in thermal-springs. Under favourable circumstances
ney sometimes go on developing to an immense extent in
akes or ponds in which they grow. They are generally
t first green, but as they ascend to the surface of the
ater, and are exposed to the air, they become whitish.
he rapidity of the growth of these plants is sometimes
ery extraordinary, and lakes, and even the ocean itself,
e covered for several miles with floating masses of Con-
rvæ several inches in depth. Of the various species of
onfervæ, the *C. fracta*, the *C. crispata*, and *C. rivularis*
e most abundant in this country. These plants are fre-
uently called crow-silks, and in some parts of the coun-
y, when dried, they have been used for the purpose of
uffing beds, also as wadding for stuffing garments. Dr.
ightfoot says he has seen at Edinburgh a kind of paper
anufactured from the fibres of *Conferva fracta*. The
ægagropila, globe crow-silk, or moor-ball, is found with
filaments rolled up into the form of a ball, so that it
s the appearance of the balls of hair occasionally found
the stomachs of animals. It is an inhabitant of lakes,
t is rarely found. It is not fixed to anything, but floats
out at the mercy of the waves. The balls vary in dia-
eter from half an inch to four inches.

The genus *Hydrodictyon* has filaments which form a
twork with regular polygonal meshes, and viviparous
ticulations. There is but one species, the *H. utriculatum*,
mmon Water-net, which is a rare plant, and found only
ditches and pools in the middle and southern parts of
gland. It is a beautiful plant, forming a tubular net,
ich floats freely in the water. The meshes of the net-
rk are pentagonal or hexagonal, and vary in diameter
m half a line to half an inch, and the filaments from the
dth of a human hair to that of the coarsest hog's-bristle.

The genus *Mougeotia*, named after J. B. Mougeot, a
rman botanist, has articulated simple filaments, which
finally united by transverse tubes. The endochrome
granular, at length forming roundish globules at the
int of conjugation. This is one of the genera of con-
void plants whose filaments are said to unite before
roduction takes place. That this conjugation does take
ce previous to their granules possessing any reproduc-
e power, in many of the species, there can be no doubt.
t there are many species of Confervæ which belong to
conjugate group of genera, in which the phenomenon
conjugation does not take place previous to reproduc-
n. These exceptions occur more particularly in the
nus Zygnema. [ZYGNEMA.] Several species of *Mou-*
otia are found in Great Britain; the most common is
M. genuflexa, which is abundant in pools and ditches,
metimes covering a space 30 or 40 feet in diameter, and
ving a yellowish-green or dull yellow colour. The fila-
ents are exceedingly fragile.

The genus *Tyndaridea* has simple filaments, inoscu-
ting by transverse tubes. The endochrome is in two
undish masses, which after conjugation unite to form a
gle globule. The species are found in ponds and
tches, mostly commencing their existence at the bottom
the water, and after a little time rising to the surface,
here they form masses varying in size, of a yellowish and
llowish-green colour.

The tribe *Oscillatorieæ* is composed of plants which are
een or brown in colour, with continuous tubular fila-
ents, seldom branched, though often joined together so
to appear branched. The fructification consists of an
ternal mass divided by transverse septa, finally sepa-
ting into roundish or lenticular sporidia. This tribe of
ants, like the others, is found wherever there is water,
d is more abundant in fresh water than in the sea.
ere are however many of them found in the sea, and
o in mineral-waters. Many of the species, especially of
cillatoria, are endowed with a power of moving so ap-
rently spontaneous, that some naturalists have placed
em among animals, as well as the more minute forms
plants belonging to the order Algæ. [ZOOCARPES.]
ptain Carmichael, who devoted much attention to this
bject, has made the following observations, which were
blished from among his MSS. by Mr. Harvey:—'I have
en induced to bestow considerable attention on such of
e species as fell under my notice, on account of the sin-
lar motion remarked in the filaments by various natu-
lists; and I do confess that the result is something like
nviction that they belong rather to the animal than to the vegetable kingdom. This motion or oscillation has been attributed to various causes:—to the rapidity of growth, to the action of the light, or to the agitation of the water in which the specimens were immersed for inspection; but none of these affords a satisfactory explanation. The last may be put to the proof by a very simple contrivance. Let a small portion of the stratum be placed in a watch-glass nearly filled with water, and covered with a circular film of talc, so that its edge may touch the glass; the water will be rendered as fixed as if it was a piece of ice. The glass may now be placed under the microscope, and the oscillation of the filaments viewed without any risk of disturbance from the agitation of the water; by following this course it will be speedily perceived that the motion in question is entirely independent of that cause. The action of light as a cause of motion cannot be disproved, because we cannot view our specimens in the dark; but indirectly there is nothing easier. If a watchglass charged as above be laid aside for a night, it will be found that by next morning not only a considerable radiation has taken place, but that multitudes of the filaments have entirely escaped from the stratum; both indicating motion independent of light. Rapidity of growth will show itself in a prolongation of the filaments, but will not account for this oscillation to the right and left, and still less for their travelling in the course of a few hours to the distance of ten times their own length from the stratum. This last is a kind of motion unexampled, I believe, in the vegetable kingdom. There is another point in the natural history of the Oscillatorieæ, which favours the opinion that they are animalcules. It is the extremely limited term of their existence. The community, if I may so call it, lives for several months; but the individuals die off, and are succeeded by others with a rapidity to which there is no parallel among genuine plants. If a small portion of stratum, say one-fourth of an inch in diameter, be left for three or four days in a watch-glass filled with water, the whole area of the glass will be found covered with a thin transparent pellicle or incipient stratum, derived from the filaments that had successively radiated and died in the course of that short period.'

There are several genera in the tribe of Oscillatorieæ. *Stigonema* has cylindrical, cartilaginous, branched, inarticulate filaments, including granules ranged in transverse dotted rings. *Scytonema* has branched, flaccid, tough, continuous, tubular filaments, with brown or olive-coloured endochrome, which is transversely striated, and at length separates at the striæ into lenticular sporidia. *Calothrix* has erect, tufted or fasciculate filaments destitute of a mucous layer, fixed at the base, somewhat rigid, without oscillation. The tube is continuous, and the endochrome is at length dissolved into lenticular sporidia. Many of the species of Calothrix are parasitical on other plants. It is to this genus that the *Conferva nivea* of Dillwyn belongs. It is the *Calothrix nivea* of Agardh. This plant is remarkable for its habitat in springs impregnated with sulphuretted hydrogen. It was first found in the sulphur-springs of Croft in Yorkshire, by Dr. Willan, and has since been found by other observers. Dr. Daubeny found it in many of the sulphur-springs of the Continent, and Dr. Lankester collected specimens at Moffat, Harrowgate, Askern, and other places where there were springs impregnated with sulphuretted hydrogen. The decomposition of this plant, probably mixed with the remains of other organic beings inhabiting the springs, has led to the supposition that the springs in which it was found contained a pseudo-organic matter which has been called by the names of baregine, zoogene, and glairine. This was the opinion of the late Professor Anglada; but Dr. Lankester, having been able to form glairine by the decomposition of the filaments of *Calothrix nivea*, renders it probable that there are no compounds in mineral-waters, except the salts, which have not been derived from plants or animalcules inhabiting the waters. ('Annals of Nat. Hist.,' 1841: 'Notice of Plants and Animals found in Sulphureous Waters,' by E. Lankester, M.D.) The genus *Lyngbya* has free, flexible, elongated, continuous, decumbent filaments, destitute of a mucous layer; the endochrome densely annulated, and separating at the annuli into lenticular sporidia. This genus was named after H. C. Lyngbye, a Danish botanist, and author of a work on the Algæ of Denmark. Some of the species are very common. The *L. muralis* is found almost on every damp wall or walk, forming an intensely green stratum of indefinite extent, which is very conspicuous after a shower of rain. Other species are parasitic upon some of the Fuci, and are found in the sea.

The genus *Oscillatoria* has rigid, elastic, oscillating, simple, continuous filaments, which are invested by a common mucous matrix. The species are very numerous, but many of them are very difficult to distinguish. They are not all found immersed in water, but always occupy damp places. The *O. tenuissima* is an inhabitant of the warm-springs of Bath, occupying broad velvet-like patches of a dark green colour. Its singular appearance, Sir J. E. Smith observes, 'arises from the filaments being collected together into little ascending tufts, apparently rooted in the muddy deposit of the water. Each tuft proves, on examination, to consist of simple, reniform, even filaments, crowded together, and quite pellucid and equally destitute of joints and branches; their diameter is not more than an eighth or ten thousandth part of an inch.'

The next tribe of the Confervoid Algæ is the *Byssoideæ*. These plants cannot be called water-plants, although generally a large quantity of moisture is necessary for their production, and some of them live entirely in water. They are plants of doubtful affinity, and are perhaps as nearly related to many of the Fungi as to the Algæ. They have articulated filaments, which are either transparent or coloured. Their fructification consists of granules, which are scattered among the filaments or capsules. They are found in a variety of positions: some on rotten wood, others on glass or in chemical solutions; a few inhabit fresh-water, and one or two the sea. The following genera have been constructed for them. The number of species refers to those which inhabit Great Britain:—

Byssocladium. Filaments arachnoid, radiating from a centre, with scattered external granules. One species found on windows and damp glass.

Mycinema. Membranaceous, opaque, tenacious, coloured filaments. Four species, all resembling fungi in their characters.

Chroolepus. Rigid, subsolid, opaque, erect, minute filaments, falling to powder: with joints, often contracted. Eight species, mostly found on the stems of decaying trees.

Trentepohlia. Minute, tufted, erect, coloured, articulated filaments, with hyaline dissepiments. Two species.

Protonema. Subarticulated, branched, rooting, mostly green filaments. Five species, found on damp earth, &c., and are suspected to be degenerate or rudimentary mosses.

Hygrocrocis. Hyaline filaments interwoven into a uniform membrane or gelatinous mass. Seven species, few of which have been found more than once, and then in various chemical solutions, as rose-water, solution of muriate of barytes, ink, Maderia wine, &c.

Leptomitus. Hyaline filaments, erect, and parasitical. Three species, one of which is found on fishes and dead flies.

The remaining tribes of Algæ which inhabit the water entirely, and about the real nature of which there is still much doubt, are described under Zoocarpes.

The remaining water-plants, with the exception of the less important species, will be found described under the names of their various genera. Nearly all the Confervæ live quite under the water, and are called *plantæ submersæ*. To the same class must also be referred the species of Chara, Naias, and Ceratophyllum. Those which float about and are carried by streams and tides, are called floating plants (*plantæ natantes*), to which the Lemna, Pistia, and many of the Confervoid Algæ belong. The plants inhabiting lakes are called *plantæ lacustres*, and to these belong the species of Nymphæa, Scirpus, Arundo, Stratiotes, Utricularia, Potamogeton, Trapa, Sagittaria, Pontedera, &c. Many of the species of these genera are also inhabitants of ditches and standing water, and others again of brooks and streams.

(Meyen, *Grundriss der Pflanzen-geographie*; Burnett's *Outlines of Botany*; Hassall's Papers *On the Algæ*, in *Annals of Natural History*, 1842-43; Smith's *English Flora*, vol. v., part i.)

WATER-RAIL. [Rallidæ, vol. xix., p. 283.]

WATER-SPANIEL. [Spaniel.]

WATER-SPOUT. [Spout, Water.]

WATER-WAGTAIL. [Wagtails.]

WATER-WHEELS. [Hydraulics.]

WATER-WORKS, WATER-PIPES. In an extended sense the term water-works is applied to all machines and engineering works for the purpose of raising, retaining, conducting, or distributing water, and also to contrivances for obtaining motive power from falls or currents of water. It would thus embrace aqueducts, canals, sluices, fountains, pumps, water-wheels, and hydraulic engines generally; but as many of these are treated of elsewhere, the chief object of the present article will be to notice the contrivances employed for the collection, purification, and distribution of water for domestic or manufacturing purposes, referring to Aqueduct, Canal, Embankment, Sluice, Fountain, Tank, Sewers, Draining, Irrigation, and Hydraulics, for information on other subjects embraced under the general denomination of water-works.

The importance of an ample and regular supply of pure water for domestic purposes, especially in large towns, where the rapid accumulation of filth of every kind renders frequent ablution of the person and apparel, as well as of houses and streets, essential to the preservation of health, cannot be too strongly insisted on; especially as, notwithstanding the extent and comparative excellence of the means employed in this country for affording it, the poorest and most crowded districts of our large towns are often lamentably deficient both in their supply of water and in the means of removing impurities by underground drainage. The absolute necessity of a supply of water for alimentary and other domestic purposes has indeed occasioned this department of the economy of towns to be more attended to, in both antient and modern times, than many others. The existing remains of antient aqueducts show that no trouble or expense was spared for its accomplishment in former times; and, although their different character may render them less prominently apparent, the water-works of modern times present equally striking evidence of the importance attached to a copious supply of pure water; yet a minute investigation of the condition of the humbler classes of the inhabitants of London and the great manufacturing towns will show that very much remains to be accomplished in the more perfect distribution of water among the dwellings of the poor, in order to encourage habits of cleanliness. Of the evils arising from the want of such habits, and which might be greatly ameliorated by improvements in the supply of water and of sewerage, abundant evidence may be found in the reports of several recent parliamentary committees on the sanitary condition of the labouring classes.

It has been repeatedly asserted that the antients were unacquainted with the principle, so important in modern water-works, by which water will find the same level at the two ends of a continuous pipe, unless prevented by confined air or some other impediment, notwithstanding any depressions or changes of level in its intermediate course; but, as shown in the article Fountain, vol. x., p. 388, this assertion is incorrect. The want of suitable materials for pipes of large capacity, when exposed to the pressure of a head of water, is sufficient to account for the fact that they did not attempt, on any important scale, to conduct water *up-hill*, and that they always drew their supply from an elevated source, conducting it by a nearly uniform and moderate slope to the point where it was delivered for use. In order to effect this, they erected costly aqueducts across such valleys as it was necessary to cross, and, as mentioned under Aqueduct, vol. ii., p. 204, they were sometimes compelled to conduct them in a serpentine direction, in order, by increasing their length, to render the slope sufficiently moderate. A list of the aqueducts built for the supply of the city of Rome is given under Rome, vol. xx., p. 102; and under Fountain is a notice of the arrangements adopted by the Romans for distributing the water brought to the city by them.

The modern engineer, instead of being compelled to erect such gigantic works for the conveyance of an artificial stream, is enabled, by the possession of materials suitable for the construction of pipes of any required size and strength, to convey a current of water in any direction, and to vary its level according to circumstances, rising or falling with equal facility, provided that the elevation of the highest portions of his pipe be somewhat less than that of the reservoir from which the supply is drawn. The same circumstance, coupled with the command of unlimited moving power for the propulsion of water along a system of pipes, enables him to extend the supply to points situated at a higher level than the source whence the water is procured, or even to supply a town or district entirely with water taken from a lower level. Referring to HYDRODYNAMICS, vol. xii., p. 389, for the means of determining the necessary size and strength of pipes for delivering a given quantity of water at any required distance, under given circumstances of direction and pressure or head of water, we proceed to notice a few of the points involved in the construction of such water-works as have for their object the convenient distribution of water for household purposes.

The most simple case for the construction of water-works is that where the source of supply is situated at a greater elevation than any of the points at which the water is to be delivered. In such a case, unless there be a natural reservoir of sufficient capacity, one or more must be formed artificially, being rendered water-tight by puddling or other means, and from this reservoir large pipes, or *mains*,* are laid to conduct the water into the principal parts of the town. Branch pipes, opening into the larger mains, are added to convey the water into the minor streets, and smaller leaden service-pipes, each having a stop-cock to prevent the escape of water when not required, complete the distribution by conducting the water into individual habitations. When the supply of water at the original source is plentiful, no further apparatus is necessary, as the mains may be kept continually charged, and consequently water will flow from the service-pipes whenever the stop-cocks are opened; but where the water is not so abundant it may be distributed more economically by a provision for closing the passage of some of the mains, dividing the town into districts, and allowing the mains in one district to be charged at one time, and those of another district at another time. This arrangement involves the necessity of using cisterns or butts in connection with the service-pipes, which may be filled with the water while the mains are charged, and form small reservoirs for the use of individual households during the time in which the water is diverted to another part of the town. In this case the service-pipe, instead of being fitted with a stop-cock to turn by hand, has a self-acting cock or valve, usually of the construction called a *ball-cock*, which is a cock having on its axis a slender rod from nine to twelve inches long, the free end of which carries a thin copper ball of four or five inches diameter. The whole is so fixed that when there is little or no water in the cistern the weight of the ball causes it to descend as far as a fixed stop attached to the axis of the cock will allow it, and thereby to open the cock ready for the admission of water whenever it may be turned on to the main; but so soon as the cistern becomes filled to a certain height, the buoyancy of the copper ball causes it to rise with the surface of the water, until it has turned the axis of the cock so far round as to prevent the passage of more water, when it of course remains stationary until the gradual sinking of the water, as it is drawn off for use by the ordinary stop-cock attached to the cistern, allows it again to fall so as to open the cock for a fresh supply. Ingenious as this apparatus is, it is very liable to derangement, and a little stiffness in the working of the cock, such as may arise from remaining out of use for a time, occasions its action to fail, and either prevents the admission of water at the proper time, or, more commonly, allows the cock to remain open after the cistern is filled, and so causes serious inconvenience and waste of water. To remedy this, several plans have been proposed. Hebert (*Engineer's and Mechanic's Encyclopædia*, vol. ii., p. 838) mentions a very simple contrivance by Mr. Darnall, in which the end of the service-pipe is turned vertically downwards, and terminates in a valve-seat, into which a valve is raised by the action of a float connected with it by a vertical rod. This does not however appear to be so effectual as the contrivances in which leverage is employed to aid the action of the valve, or those in which the pressure of the water in the service-pipe is employed for the same purpose. A very ingenious apparatus of the former kind, contrived by Mr. Crockford, is described in the 52nd volume of the 'Transactions' of the Society of Arts (part i., p. 84). It also has a conical valve, which is pressed upwards against its seat by a lever connected with a hemispherical copper float; but it is distinguished from other ball or float-valves mainly by the addition of a ratchet and click apparatus which retains the lever and float in the lowest position to which the subsidence of the water allows them to fall, and consequently keeps the valve fully open, until the water rises to the required level, when, by the buoyancy of a second and smaller float, the click is released so that the main float rises, and closes the valve. As the main float is, when the cistern is fully charged, entirely submerged, the whole of the power derivable from its buoyancy is applied to the closing of the valve. This apparatus has the merit of working in a smaller vertical space than most others, so that it is well adapted for shallow cisterns; but while it is perhaps the most perfect contrivance of its kind, it is too complicated for general use. Referring the reader to the volume above cited for a fuller description, with cuts of the apparatus, we therefore proceed to describe a more simple and very effectual contrivance invented by Mr. Bullock, of which there is an account in the thirty-eighth volume of the same work (p. 57). *Fig.* 1 is a representation of this apparatus *a* being a bent tube, the upper extremity of which is tapered for insertion into the end of the leaden service-pipe, and which has at its lower extremity a curved bar *b*, to support the fulcrum of the lever *c d e*. The tube is represented in section, in order to show the form and position of the inverted conical valve, which is raised so as to allow a free discharge of water from the pipe. The separate figure *f* shows the form of the opening at the lower end of the tube *a*, with the ring which serves as a guide for the vertical stem or tail of the valve, and also the form of the bar *b*; and at *g* is a separate representation of part of the lever, showing the form of the swivel-joint by which it is attached to *b*: *b* has two shallow holes, which receive the points represented in the separate figure *g*; and the joint may be made tighter or looser at pleasure by turning the thumb-screw *d*, which carries one of the swivel-points. When the cistern is nearly full, the ball *c* is borne up by the water, and consequently the shorter end of the lever falls, allowing the valve to descend by the combined action of its own weight and the pressure of the water above it. In another float-valve on the same principle, contrived by Mr. Magson, and described in the forty-fourth volume of the Society's 'Transactions' (p. 93), the fulcrum of the lever is placed immediately below the valve, and the shorter arm of the lever is curved in such a way as to increase the efficiency of its action. *Fig.* 2 represents, on a larger scale than the preceding cut, the most important part of this apparatus; the valve and lever being left white to distinguish them from the stationary parts. The valve is shown open, as it would be when the float is depressed, but the dotted lines show the position of the lever when the float is elevated, and the valve is allowed to fall into its seat. The float con-

Fig. 1.

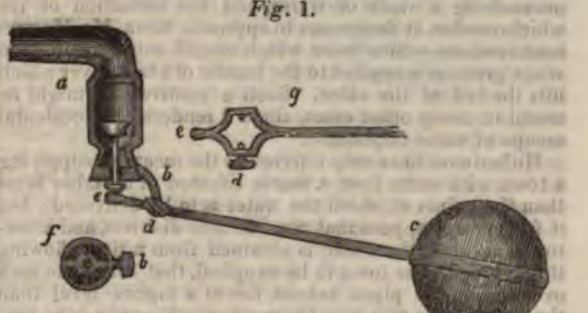
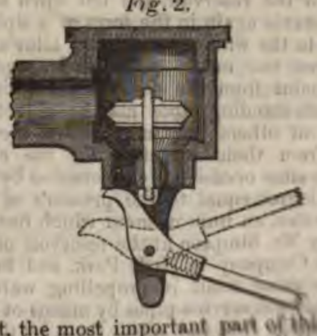


Fig. 2.



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* The precise meaning of the terms *main* and *service-pipe* does not appear to be very accurately defined. The former name evidently applies to the great trunk pipes of the distributive system, but it is also sometimes given to the collateral or branch pipes, from which the small leaden pipes for individual buildings branch out; and the name of service-pipes, while commonly given to the small leaden pipes above mentioned, is sometimes extended to the iron branch pipes into which, in ordinary streets, they open.

sists of a flat round piece of wood, which may be attached to the long arm of the lever simply by a screw, or better by a joint which will allow it always to assume a horizontal position, whether the lever be raised or depressed. In addition to its greater certainty of action, it is stated that this valve will inject a supply of water into a cistern in half the time required by the common ball-cock; that it effects a saving of twenty-five per cent. in first cost; and that, as it is made of cast-iron, it does not afford the same temptation to thieves as the ordinary brass cocks and copper balls. Mr. Magson's valve had been found to act satisfactorily under the pressure of a column of water of more than seventy feet. In the same paper is described an improved stand-pipe, with a valve of the same character as that just described, for use in frosty weather, when many cisterns and private service-pipes are rendered useless by ice. The common stand-pipe is simply a wooden pipe inserted into a plug-hole connected with the main, and fitted with a faucet and spigot, or sometimes with a common cock; but as such pipes, when set up in a common street, are very liable to be left open from carelessness or mischief, thereby occasioning a waste of water, and the formation of ice which renders it dangerous to approach them, Mr. Magson contrived one with a valve which should only remain open while pressure is applied to the handle of a bent lever which lifts the tail of the valve. Such a contrivance might be useful in many other cases, since it renders the accidental escape of water impossible.

Hitherto we have only referred to the means of supplying a town with water from a source situated at a higher level than the points at which the water is to be delivered; but it frequently happens that considerable districts, and sometimes, as when the water is obtained from a river flowing through or by the town to be supplied, that the whole area over which the pipes extend, lies at a higher level than the source. In this case the most usual course is to construct one or more reservoirs at a suitable elevation, and to supply them with water through ascending pipes or mains by means of force-pumps, which may be worked by any suitable prime-mover. In old water-works the pumps were frequently set in motion by means of water-wheels, driven by the stream from which the supply was derived; but in those more recently established the steam-engine forms the principal source of power. The reservoirs may, in such cases, be formed upon elevated ground, or, in the absence of any more convenient site, upon the tops of high buildings; and from them the distribution is effected in the same way as when the water is originally obtained from a high level. Sometimes also it is desirable to supply houses at a higher level than the most elevated reservoir, and this object may be effected either by employing a separate pumping-engine to propel the water from the reservoir along the pipes which lie too high to be charged in the ordinary way; or, in some cases more economically, by closing for a time the passage between the reservoir and the force-pumps by which it is supplied, and opening a connection between the ascending mains and the 'high-service' pipes. To prevent the danger which might arise from the application of too great a pressure by the pumping-engine, a vertical pipe, sometimes called a 'standing-pipe,' should be connected with the pipes for the high delivery, and carried up to an elevation equal to that of the highest point to be supplied. This pipe, which may be erected in the reservoir, and left open at the top, or turned downwards again in the form of a siphon, acts as a safety-valve to the whole system, and allows the water to overflow when too much pressure is applied, thereby saving the mains from the danger of bursting. In some situations such standing-pipes may be objected to as unsightly, and in others they may prove inconvenient or dangerous, from their attraction for the electric fluid. They are therefore occasionally superseded by safety-valves loaded to a degree equal to the pressure of the required column of water, an improvement which has been carried into effect by Mr. Simpson at the reservoir of the Chelsea Water-works Company in Hyde Park, and in some other places. The same mode of propelling water along the ordinary mains and service-pipes by means of force-pumps, instead of causing it to flow along them by the hydrostatic pressure of an elevated reservoir, is sometimes adopted to a limited extent in supplying a town directly from a river or other low source.

The repeated investigations by commissioners and parliamentary committees, especially within the last fifteen years, into the state of the supply of water to the British metropolis, and the various means suggested for its improvement, have elicited much curious and valuable information on the subject of water-works generally, but especially on the various measures that have been tried and proposed for obtaining an ample supply of water in a state of the greatest possible purity. The most important matter contained in the voluminous papers submitted to parliament on this subject may be consulted in a much more convenient form in an interesting pamphlet, the title of which is given below,[*] and to which we are indebted for valuable assistance in this part of the present article. Without regarding the grossly exaggerated assertions that have been made in support of the clamour raised against the use of Thames water, it must be admitted that whenever a river is exposed to the impurities consequent upon the drainage of an extensive and densely inhabited district, every precaution should be observed in taking water for the supply of the mains from situations the least exposed to vitiating causes, and every practicable means should be adopted for removing such impurities as may be pumped up with the water, before it is distributed for use. The repeated agitation of this important subject has led to the adoption, by such of the metropolitan water companies as derive their supply from the Thames, of measures by which the water of that river is rendered unobjectionable for all practical purposes; and it is worthy of recollection that, other circumstances being alike, a large river forms, from its great body of water, a source of supply less likely to be affected, either in quantity or quality, by the vicissitudes of droughts and floods, and less likely to be obstructed by ice, than can be obtained from minor streams, either natural or artificial. The latter inconvenience has been seriously felt by the New River Company during severe winters; and it has been urged by way of objection to some plans for supplying part of the metropolis with water brought from a considerable distance in other open channels resembling that of the New River, that, in addition to the great expense of the land required for their construction, the water is liable to impurity from the banks being washed down by rain, or trodden in by cattle, and from the stream being used for bathing, washing dogs, &c., nuisances which it is impossible fully to guard against. A plan proposed in 1824 by Mr. Philip Taylor, for taking a supply from the Thames at a point some miles above London, where the water would be unpolluted by sewage and tide-water, suggested a means of avoiding these evils by the construction of a subterraneous channel or tunnel, six feet in diameter, with a sufficient slope to cause the water to flow freely along. The channel proposed by Mr. Taylor was to be nine miles and a quarter long, commencing at a point between Brentford and Richmond, and terminating under Hampstead Hill, the summit of which is stated by him to be 437 feet above low-water mark at Hammersmith; and reservoirs were to be formed on the surface at the end of the aqueduct, and at any other elevated points from which it might be desirable to distribute the water, which was to be raised into them through vertical shafts by steam pumping-engines. By this means the power of the steam-engine would be applied much more economically than in the usual method of forcing the water through a great length of iron piping, up inclined planes, and frequently along a tortuous course. The friction and resistance thus occasioned is so great that, according to Mr. Taylor's statement, the duty performed by the ordinary water-works engines did not amount to more than lifting eighteen millions of pounds one foot high for every bushel of coals consumed, while a duty of seventy-four millions of pounds per bushel had been attained by some of the Cornish engines employed in raising water by a direct perpendicular lift. The pamphlet above alluded to states that Mr. Taylor's estimates of saving in the expense of engine-power by this arrangement have been recently confirmed by the complete success attending the erection of a Cornish engine at the East London water-works, under the superintendence of Mr. Wicksteed, as the engine referred to was, in March, 1840, 'performing a duty of seventy-four millions of pounds, being fully *four* times as much as is usually done by water-works engines, and consequently effecting a saving to the company of *three-fourths* of the fuel previously expended.'

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[*] 'A Brief Description of the various Plans that have been proposed for Supplying the Metropolis with Pure Water,' Weale, London, 1840.

In some of the schemes for improving the metropolitan supply, it has been proposed to obtain water from the Thames at or above Teddington Lock, or to remove the lock now situated at Teddington to Richmond, and to take the supply from the portion of the river which would thus be cut off from the influence of the tides; but in addition to the expense of an artificial aqueduct, whether open or covered, of the length necessary for such a scheme, it would have the disadvantage of injuring the navigation by the abstraction of an enormous body of water. In Mr. Martin's plan for bringing water from Teddington Lock, it was proposed to raise the weir so as to give it a fall of six feet, and to erect water-wheels at the weir, by which the water abstracted from the river might be forced up to an elevated reservoir in Richmond Park, from which it should be conducted in large pipes, either under or over the surface, to Earl's Court, between Kensington and Brompton, where the pipes of the various companies which supply the western part of London should receive their respective supplies from the aqueduct.

In addition to plans for obtaining water from the upper part of the river Thames, or from minor streams, such as he Colne, the Verulam, and the Wandle, various schemes ave been brought forward for procuring water by boring r sinking wells in or in the immediate neighbourhood of London. In some of these it has been proposed to sink wells or tanks of considerable depth near to the banks of he Thames; but as the greater part of the water entering such excavations must find its way by infiltration from the iver, such a plan offers few, if any, advantages for general doption beyond that of purifying water which has been aken directly from the river by allowing it to settle so as o deposit the grosser impurities, and then causing it to ercolate through an artificial filtering medium. Somehing of the kind has however been done successfully by he West Middlesex Water-works Company, who have ormed extensive reservoirs on the banks of the river at arnes, and find that the pressure of the river, especially t high-water, forces a quantity nearly sufficient for one ay's supply through the gravelly bed and bank. A flood-ate opening into the upper part of the reservoir affords e means of admitting a supply direct from the river, hen the quantity admitted by infiltration proves insuffiient. Proposals for supplying the metropolis from wells ored to such a depth, and in such situations, as to be holly independent of the Thames, have attracted much ttention. The object proposed by such borings is to btain water from the sandy strata which lie beneath the npervious London clay, such water being originally colected at the points where the pervious strata rise to the rface at the boundaries of the great basin in which the etropolis is situated. As the nature of these borings is xplained under ARTESIAN WELLS, vol. ii., p. 412, it will e sufficient to refer to the question whether the supply btainable from them would be sufficient in quantity for he use of the whole metropolis, or even of any considerble portion of it, a point which has been shown to be xceedingly doubtful. Mr. Webster, in a course of lecures delivered at the Russell Institution in 1839, after dverting to other cases of failure in the sinking of Artesian ells, and to some in which the sinking of one well has rawn away the water from another in its vicinity, thereby roving that the supply from the pervious strata is far om unlimited, alluded to an experiment made by the ew River Company, who sunk a large shaft or well at eir reservoir in the Hampstead Road, and, after being ompelled to pass, with the aid of iron pipes, through a ratum of sand and water, and sinking to the chalk below , at a total expense of about 12,000*l*., could not obtain ore than 650,000 gallons of water per week, and were nly able to keep their pumps for raising it at work oneird of their time, on account of the slow percolation of ater through the chalk. 'Upon the whole,' according to e report published in the 'Athenæum,' 'Mr. Webster ave it as his opinion, that proper and sufficient data had ot yet been collected, to establish, upon good authority, he existence of water in sufficient abundance to afford a onstant supply to the metropolis, or even to a considerble district, by raising it in a single place from below the London clay, notwithstanding borings or Artesian wells, dispersed through London, fulfil their object in furnishing manufactories and many private houses with water.' Very bold assertions have nevertheless been made as to the possibility of obtaining an ample supply by this means, and attempts have been made to make the published opinions of Telford, who, toward the close of his useful career, was engaged in inquiries respecting the improvement of the metropolitan water-supply, appear to favour such an idea; in answer to which it may suffice to quote observations made by him before the parliamentary committee of 1834, when he said that he 'had no idea of supplying a great city by pumping through gravel,' and that such a supply would be 'very inadequate and very uncertain.'

While however schemes for obtaining water from sources entirely distinct from the Thames have not been carried into effect to any important extent, the agitation of the subject has led to very important improvements in the works of those companies which derive their supply from that river, some of which may be briefly noticed. The Grand Junction Water-works Company, by which a considerable portion of the west end of London is supplied, observe, in a communication made to a Select Committee of the House of Lords in 1840, that after the first outcry against their water in 1828, they extended their suction-pipe farther into the river, and completed a system which they had previously commenced of depuration by deposit in extensive reservoirs at their works at Paddington. At that time their supply was taken from the river at a point immediately east of Chelsea Hospital, and contiguous to the mouth of the great Ranelagh sewer, although, as they allege, the position of the *dolphin*, or perforated head by which the water entered the suction-pipe of their pumping-engines, was such as to guard against the water taken from the river being influenced by the sewage. They subsequently determined to seek for a less objectionable source of supply, and matured a plan for bringing water from the Colne, which was eventually abandoned because it appeared, from the evidence obtained by the parliamentary committee of 1834, that such a supply, though involving an immense expense, would be inferior to what might be procured from the Thames. At length, in 1835, they obtained an act of parliament empowering them to establish their principal forcing-pumps near Brentford, and to take their supply from the river at a point between 300 and 400 yards above the bridge, on the Surrey side of the stream. From a detailed account in the work previously cited on the supply of water to the metropolis, it appears that the water is received, through a grating 10 feet 6 inches long and 3 feet 6 inches high, into a large semi-cylindrical chamber of cast-iron, which was bedded in the bottom of the river by a diving-bell, so as to lie about 4 feet below low-water mark. From this chamber the water passes along a cast-iron conduit or pipe, 3 feet in clear diameter, which is conducted at a depth of from 3 to 4 feet below low-water mark, towards the bridge for some distance, and then across the river to the works on the north side. The joints of this iron pipe are formed in an ingenious manner so as to be perfectly water-tight without the assistance of packing or lead; the pipes being of what is called the spigot and faucet form (similar to those shown in the subsequent cut, *Fig.* 3), and having a narrow thin collar cast upon the outer rim of the spigot-end, and turned somewhat conically in a lathe. The interior rim of the faucet is turned in a corresponding form, and the turned surfaces are drawn into close contact by nuts and screw-bolts passing through eyes cast upon each end of every pipe. By the adoption of this simple joint the pipes were easily and expeditiously connected under water, by means of the diving-bell, or in part by a coffer-dam of sufficient size to admit three lengths of pipe. From the bank of the river the conduit continued, still in an horizontal direction, and below low-water mark, beneath a wharf and road to a large shaft or well, from which there are communications to the engine-pumps; this subterraneous portion being constructed of brick-work laid in cement. At this establishment are four steam-engines, collectively of about 500 horse-power, two only of which work at one time, and these force the water to the elevated reservoirs of the company at Paddington, a distance of about 6½ miles, along a cast-iron main 1 inch thick and 2 feet 6 inches diameter in the clear. This main is formed in lengths of 8 feet 6 inches to 9 feet, with spigot and faucet joints, run with lead, of which about 1 cwt. is required for each joint. The total cost of laying this main, including the cost of the pipes and lead, and making good the roads, was about 8*l*. per yard; and the whole of the works required in connection with the change in the mode of obtaining a supply of water by this company was nearly 200,000*l*. From the reservoirs at Paddington, which are 86 feet above the works at Brentford, the water is distributed to the districts supplied, with the assistance of additional engines. In addition to the above-mentioned works, the company stated to the committee of 1840 that they were preparing means for filtering their water before delivery.

The West Middlesex Water-works Company, who likewise supply part of the western districts of the metropolis, have also, since the year 1834, formed some extensive works for the improvement of their supply, consisting of large reservoirs on the southern or Surrey side of the river, which have been alluded to in a previous column, and in which the water is allowed to settle and to deposit its grosser impurities before it is conveyed across the bed of the river, by a conduit resembling that of the Grand Junction Company, to the engines and works at Hammersmith. The proprietors of the Chelsea Water-works have also expended upwards of 60,000*l*. in measures for improving their supply, which is taken from the part of the river known as Chelsea Reach, and filtered in extensive reservoirs on the spot. In order to avoid contamination by the sewage which enters the river near the point where their dolphin, which was formed of brickwork and surmounted by a perforated iron structure, was formerly situated, this Company extended their main pipes to the Surrey side of the river, which for a distance of several miles receives no pollution beyond that occasioned by land-drains. On the south side of the river the Vauxhall Company obtain water of great clearness and purity from beneath the third arch of Vauxhall Bridge, a point which had been observed by watermen for its gravelly bottom, which is remarkably free from mud and sediment. From its establishment in 1805, this company has possessed extensive settling reservoirs near Kennington Lane; and in 1831 arrangements were made for filtering the water previous to delivery. The supply of the Lambeth Water-works Company is taken from the Thames at a point a little above Waterloo Bridge, opposite to the works of the company in the Belvidere Road; but it is pumped from those works to an elevated reservoir at Brixton, where a large expense was incurred about 1834 in providing means for its purification by subsidence and filtration.

By the above-mentioned improvements, and others effected by companies which have not been specially referred to, the supply of water to the inhabitants of London has been brought to a state of purity and efficiency which may contrast favourably with its condition at any former period, or perhaps with the supply of any other city in the world. It has been ascertained that mere subsidence will not only free Thames water from its grosser solid impurities, but also, if continued for a sufficient time, will give rise to a degree of fermentation, owing to the presence of animal and vegetable matter, which will free it from much of its soluble impurity; but as it would be impossible, without an enormous outlay of capital in the formation of reservoirs, to allow it to stand still a sufficient time for this chemical action, filtration may be regarded as the most important practical means of purifying the water. Filtration through sand or gravel, by separating all the solid impurities, will produce a perfectly clear and transparent fluid, free from sediment and colour; but such a process cannot free the water from impurities held in solution, or from any taint which it may have acquired from putrid animal or vegetable substances, an object which can only be attained by the use of charcoal.

The Chelsea Water-works Company having determined, about the year 1826, to adopt some means for the purification of Thames water, a series of experiments on filtration was commenced by James Simpson, Esq., their engineer, to whose courtesy we are indebted for information respecting the present state of the apparatus used by the company, as well as for other valuable assistance in the present article. Mr. Simpson's preliminary trials were made upon a superficies of more than a thousand square feet; and in a paper communicated by him to the Appendix to the 'Life of Thomas Telford,' he states as the result of his experiments, that all the modifications of lateral and ascending filters proved disadvantageous; that difficulties were encountered in preserving the various strata in their as
position, according to the sizes of their componen
ticles; and that effectual cleansing could not be a
plished without the removal of the whole mass of the
ing medium. He states also that all devices by cu
and the reaction of water proved either inefficient
convenient and expensive. The mode of filtration e
ally adopted by the Company is by descent, and the
ing medium consists of fine and coarse river sand,
minuted shells and pebbles, and small and large g
These materials, though laid in parallel strata, are s
posed as to form an undulating surface with ridges
eighteen to twenty feet apart, and intervening hollo
valleys, an arrangement which greatly assists the
tion of cleansing, because the grosser particles of th
posited silt slide down into the hollows, whence the
ment may be easily removed. The works connecte
the operation of filtering, which were considerably en
and improved in 1837, now (June, 1843) consist of
large reservoirs, with some minor receptacles, an
filtering-beds, altogether occupying a space of nearly
acres. The water is in the first instance conveyed
the river through a conduit-pipe into the engine
whence it is pumped into the settling reservoirs, whic
elevated about twelve feet above Trinity high-water
Here the water is allowed to settle for twelve hours,
which it is admitted to one of the filtering-beds, wh
about three feet above Trinity high-water mark, the
munication being effected through a small basin si
centrically as regards the reservoirs and filtering-bed
provided with valves for regulating the connectio
tween the various receptacles at pleasure. The filt
beds are formed on a stratum of clay two feet thick,
is laid in a slightly concave form, and covered succes
by six inches of concrete and two inches of pit-sand.
this is laid the first stratum of filtering material, cons
of coarse gravel, the upper surface of which is form
the undulating form above described. At the ridge
stratum is three feet six inches thick, and under each
is laid a brick tunnel, built with cement blocks, and h
some of the joints left open so as to admit the free pe
tion of the filtered water, which is drawn from the b
these channels. Above the coarse gravel are three
of about six inches each, of fine gravel, pebbles, and
and coarse sand respectively; and over all, retainin
same undulating form, is a layer of about three feet
sand. Mr. Simpson observes, in the account append
the 'Life of Telford,' that 'the process was great
proved by the introduction of the small shells, such
usually found at Shellness, the flat surfaces of which
lap and assist in the great desideratum of separatin
sand from the gravel, and thus tending to preserv
free percolation in the lower strata, which is essenti
ensuring filtration sufficiently rapid for water-work
poses.' The water is admitted to the filtering-be
several different points, and is made to flow from the
tures of the pipes into long troughs, which diffuse th
rents as much as possible, and prevent the sand from
disturbed. Whenever the filtration becomes impair
the deposition of impurities to such an extent as t
vent the beds from furnishing the required quant
water, one of the beds is thoroughly drained, and th
face is scraped off with the deposited silt, and from h
inch to three-quarters of an inch in depth of the fine
The intervals at which this operation becomes nec
range from ten to sixty days, according to the state
river, the filtering-beds becoming foul most rapidly d
the prevalence of land-floods; but to render the necess
cleaning less frequent, every possible opportunity is
to promote reaction in the filters by stopping the f
water from them, and suffering the mass of filtering
rials to fill with water, an operation which occasions
of the lighter and more filmy part of the deposit to fl
the surface, and to pass off by the overflow weirs.
found by examination of the upper layer of fine sand
time of removal, which does not take place more
once in twelve months, that although the sedime
matter may penetrate to the depth of from six to
inches, all the grosser impurities remain very ne
surface, while the remainder rather improve than i
the process of filtration, by rendering the interstice
more minute. It is also evident that the process do
consist merely in a fine mode of straining, but that a

of fermentation takes place in the water when it is in contact with the sand, especially when moss or other vegetable matter is present in any considerable quantity, by which the water is greatly purified, while a very perceptible film is thrown up to the surface. By the works above described, from 400,000 to 500,000 cubic feet of water are filtered daily.

The antiseptic properties of charcoal render it a very effectual, though costly, filtering material. Animal charcoal has been applied in France as a purifying medium in portable filters, in which it acts well, though the percolation of water is slow; and filtering on a large scale with wood charcoal has been partially practised with the water of the Seine at Paris. A plan of charcoal filtering is proposed in the appendix to the little work referred to in a note on a previous column, which appears well adapted for use upon an extensive scale. It consists of what may be termed a filtering bank or embankment, on one side of which is the water to be purified, and on the other the reservoir of filtered water, and the charcoal is disposed in the form of a thick wall, with vertical sides, enclosed by a framework of timber, and perforated planking. It is proposed to place the finest portion of the charcoal in the centre, and so cover the top of the wall or embankment with moveable planking, by opening which the charcoal might be removed and renewed at any time without deranging any other part of the apparatus. The other filtering media are large gravel and broken pottery, fine gravel and pebbles, coarse sand with shells, and fine sand, which are laid in four successive inclined layers or strata, at a slope of about 30° or 35°, against the perforated planking on one side of the wall of charcoal, in such a manner that the water must percolate through them before coming in contact with the charcoal. This inclined position of the surface of fine sand would occasion the heavier impurities to slide towards the bottom of the slope, whence they might be removed as often as necessary. It should be observed, that as the fine sand which forms the uppermost layer would, at the top of the slope, lie in immediate contact with the planking, the planks should be close-jointed and left without perforations at that part, to prevent its being washed through. It is suggested that, in order to facilitate the deposition of the grosser impurities before passing through this filter-bank, a simple method might be adopted which has been successfully practised in Switzerland for purifying a stream of water, and which was described by Sir Henry Englefield in 1804, in Nicholson's 'Journal,' vol. ix., p. 15. It consists in causing the stream to pass through a structure of timber or masonry in which a series of transverse vertical partitions are so placed that the water is compelled to pass alternately under some which have openings at the bottom of the stream, but rise and form solid barriers to a level somewhat above its ordinary surface, and over intermediate partitions which are solid at the bottom, but do not rise to the surface of the stream. By the repeated and slow ascent and descent of the water under such circumstances the lighter impurities collect and form a scum at the top, while those which are heavier remain as a sediment at the bottom. The process might be aided by throwing coarse filtering materials, such as broken pottery, or coarse gravel and pebbles, into the intermediate spaces between the walls.

Before quitting this branch of the subject a few remarks may be offered upon the vessels used as cisterns or reservoirs for containing a supply of water for domestic use, since the existence of causes of impurity in these receptacles will defeat or render useless the best measures that can be adopted by the water-works companies; and, in fact, very many of the complaints raised against the quality of the water supplied are clearly traceable to the want of ordinary care or cleanliness on the part of those who have the charge of these domestic reservoirs. Wooden vessels for filtering or containing water are always in some degree objectionable, because the wood, however well saturated or seasoned, invariably imparts some flavour to the water, and frequently such a flavour as to call forth serious objections from the persons using it. The common receptacles in small houses are wooden butts which have been previously used as wine or beer casks, or sometimes as oil casks. When these are charred internally, the objections to their use are not so strong as when they are coated with pitch, which imparts a disagreeable odour to the water in summer, and is an improper material for such a purpose; but it is the opinion of those conversant with the subject that casks which have been used as above described can never be safely employed for keeping pure water. It is very important that all cisterns, butts, and similar receptacles for water be kept carefully covered, and that precautions should be taken to prevent contamination by animal or vegetable substances. The necessity of such is shown by the many anecdotes which the turncocks of the water-companies relate of the offensive matters found by them in open butts and cisterns. Dr. Clark, of Aberdeen, who has taken out a patent for a method of purifying water, states that he has found water much improved by being kept in cool situations, a matter worthy of notice in fixing domestic cisterns, which are not unfrequently situated in warm kitchens. Reference may also be made in this place to an ingenious contrivance submitted to the Society of Arts a few years since by Mr. George Henekey, and described in their 'Transactions,' vol. xlix., part ii., p. 142, for drawing off water or other liquids from the surface of a tank or reservoir, by means of a flexible hose attached to the ordinary cock, the mouth of which is always kept near the surface by a hemispherical copper cap or float, which also, by covering the aperture of the hose, prevents the entrance of any foreign body. This apparatus may be useful for tanks containing water in which carbonate of lime is held in solution by carbonic acid. Such water is hard, and unfit for many domestic purposes, but by exposure to air the excess of carbonic acid flies off, and the carbonate of lime is precipitated, an improvement which begins near the surface of the fluid. By this contrivance also the clearest part of turbid or muddy water may at any time be drawn off without disturbing the sediment.

For the watering of roads, and some other purposes for which large quantities of water are required, it is unnecessary to go to the expense of a perfect system of filtration, excepting where, as in ordinary cases, the supply must be conveyed through the same pipes as those for conducting pure water for domestic use. Since the increasing extent of the supply afforded by the Chelsea Waterworks Company made this consideration a matter of much importance to them, they, in 1842, applied distinct and separate works to the supply of the basin in Kensington Gardens, the Serpentine River, and the other ornamental waters in Hyde Park, St. James's Park, and the gardens of Buckingham Palace, connecting also with these works the supplies for watering the streets and roads in their district. The water for these purposes is obtained from a large land-spring well in their works on the bank of the Thames, assisted by river water roughly filtered. This measure has, we are informed, proved a highly important one, as it relieves the mains by which filtered water is distributed from the serious draughts to which they were subjected during summer for watering the roads, especially as this supply was required during the day-time, when it is of consequence that water-companies should direct all their powers to the supply of dwelling-houses. Another important point has been gained by this plan, inasmuch as it leads to a continual change in those ornamental waters which would otherwise be unhealthy stagnant pools. The Serpentine has been much and reasonably complained of on this ground, its supply having been formerly derived from a stream which in course of time became a common sewer, while, since that nuisance has been destroyed by diverting the sewer, its level has been frequently much reduced by evaporation in a dry season, by which it has been reduced to a state by no means calculated to benefit the health or gratify the senses of the frequenters of the park, and especially of those who make use of it for bathing. The water-works company are now allowed to take any quantity of water from the Serpentine, provided that they do not depress the level more than six inches in any one week, and that they return an equal quantity of water to it through the Kensington Basin. This they frequently do to the extent of 500 tuns daily, which, together with the supply taken by government, who draw water by pipes from the Serpentine for watering the roads and malls in St. James's and the Green Parks, occasions a circulation highly favourable to the salubrity of this sheet of water.

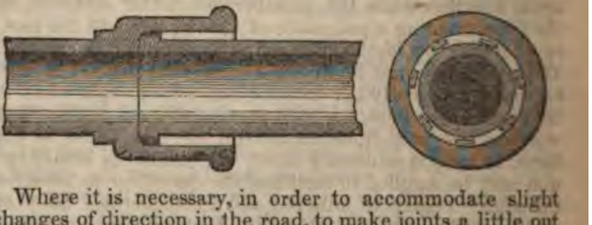
On the subject of water-pipes it is not necessary to say much. The older water-companies used principally rough wooden pipes, formed of whole trunks of suitable size, bored by machinery which was usually connected with the water-works, and joined together in a very clumsy manner by enlarging the bore in a conical form at one end of the pipe, and hewing the end of the adjoining pipe into a taper form so as to drive into the conical cavity. To prevent the socket end of the pipe from bursting by the force applied in hammering up this joint, an iron hoop was frequently driven on to it. Such joints, even if made water-tight at first, which was by no means easy, speedily became defective from the decay of the wood forming the thin or spigot end of the pipe. Perhaps the best method of connecting wooden pipes is that in which the bore is enlarged into a conical cavity at each end of the pipe, and the connection is formed by a short iron tube, cast externally into the form of a double cone, and driven into the adjoining ends of two lengths of wooden pipe. Among the schemes which have been proposed and tried to a limited extent for avoiding the defects of wooden pipes, or for conducting water in a state of greater purity than in those formed of cast-iron, are the use of wooden pipes formed of staves, fitted together and hooped like barrels; of stone pipes, for the formation of which very ingenious machinery has been contrived, capable of cutting several concentric pipes out of a single block of stone by the operation of a series of saws somewhat resembling those known as *trepan* saws [Saw-Mill, *Fig.* 8, vol. xx., p. 481]; or of pipes formed of a kind of pottery or stoneware, which excel all others for keeping water perfectly pure, and which may readily be fashioned into a form convenient for joining, the difficulty of which is a serious objection to stone pipes. To obviate the objection to earthenware pipes on account of their fragility, it has been proposed to use pipes lined with pottery, but formed externally of wood or iron.

While this article is in the press, the newspapers announce the manufacture, in France, of water-pipes formed of coarse glass, and covered externally with bitumen. They are joined together with bitumen, applied in a similar way to the lead or cement used with common iron pipes, and they are said to be considerably cheaper than those of cast-iron, and capable of sustaining a greater pressure.

While however other materials may be advantageously employed to a limited extent, and under peculiar circumstances, cast-iron is the only material at once sufficiently cheap, strong, and manageable, or convertible into the required forms, for extensive water-work purposes. Pipes of this material are cast, usually in lengths of from eight to ten feet, of any required size, from a few inches to three feet or upwards in diameter; and every variety of curved or angle pipes, pipes with fire-plugs, &c., can be readily fabricated. Iron pipes are occasionally joined together by flanges connected by screw-bolts, with an intermediate packing of lead or other soft substance; but this plan is not suitable for adoption to any considerable extent, as it makes no provision for the alteration of length occasioned by the expansion and contraction of the metal. The most usual plan, both for large and small pipes, is to cast an enlarged socket at one end of each length of pipe, to receive the other or smaller end of the adjoining pipe, which is cast with a slightly projecting collar. In noticing, on a previous column, the works of the Grand Junction Company at Brentford, a mode of connecting such pipes without packing has been described; but the more general practice is to run lead into the joint, so as to fill up the cavity left in the socket after the spigot end of the pipe has been inserted, a gasket having been previously inserted and driven tight all round to prevent the lead from running into the pipe, and a temporary clay mould being applied to the collar; or, to effect the same object by caulking with hemp and iron cement, which is a mixture of iron borings or turnings with sulphur and sal-ammoniac, moistened with water as it is rammed in. By the subsequent oxidation of the particles of iron, this composition increases in bulk, and forms a very secure joint. Roman cement has also been used for the same purpose. Another mode of securing the joints of iron water-pipes, which appears to present many advantages, is by the application of a series of wooden wedges to fill the cylindrical cavity of the socket. In a paper communicated by Mr. Thomas Wicksteed, engineer to the East London Waterworks, to the 'Transactions' of the Society of Arts (vol. li., part ii., p. 90, for the session of 1836-7), it is stated that such joints had been used successfully for forty years at the Norwich Waterworks, and for more than half a century in the collieries near Newcastle on Tyne, and that they had been found both cheaper and better than joints secured with lead or cement. The East London Waterworks Company had, at the date of Mr. Wicksteed's communication, used these joints for seven years with the most favourable results. With regard to their durability, in addition to the well known fact that wood is exceedingly durable when protected, as it is in these joints, from the action of air and water, evidence is adduced of their having remained perfectly sound for fifty years; and it is stated that all those made by the East London Company during five years had stood, and that none made with proper care had leaked. They had then 38,558 yards, or nearly 22 miles, of piping laid with wooden joints, the diameter of the pipes varying from three up to eighteen inches; and the repairs had cost much less than with lead or cement. To remove a fear which had been expressed that the wedges might be blown out under a great pressure, Mr. Wicksteed tried joints in pipes of three different diameters under a proving machine, increasing the pressure until it became equal to a column of water 733 feet high, without affecting the joints; and he stopped at that pressure merely for fear that the apparatus might give way. The pipes were, respectively, three inches diameter and three-eighths of an inch thick, five inches diameter and half an inch thick, and eighteen inches diameter with a thickness of barely three-quarters of an inch; and Mr. Wicksteed believes that they would have burst before the joints could have given way.

The wood recommended for forming the wedges is the best Danzig fir, the balks of which should be cut into chocks nine inches long, which are to be riven with an axe into pieces about two inches wide and three-quarters of an inch thick. These pieces are then worked with spokeshaves into the proper curved form, one side being hollowed to fit the outside of the pipe, and the other rounded into a convexity fitting the inside of the socket; and they are made to taper slightly from the middle towards each end, so that when cut transversely in half they form two wedges of four inches and a half long. These wedges are placed in the socket with their edges in close contact, like the voussoirs of an arch, and driven in by a *set* applied to their external ends in succession, the wedges being thus driven in gradually all round, as a cooper hammers on a hoop. When fully driven in, if any of the ends project, they are cut off with a hand-saw. When the workmen have made as many joints as may be required to allow time for filling up the trench and covering in the pipes at the close of the day's work, a bonnet is strapped on to the end of the newly laid line of pipes, and water is admitted to try the joints under the pressure of the mains; or, in new works, where there is no connection with charged mains, under the pressure of a force-pump. The joints are then carefully examined, and wherever any leakage is discovered an incision is made with a chisel, by which a wooden spile is driven in to tighten the wedges. The subjoined cut (*Fig.* 3) gives sectional representations of a joint secured with wooden wedges, the end view showing the manner in which spiles may be inserted at the junction of the wedges.

Fig. 3.



Where it is necessary, in order to accommodate slight changes of direction in the road, to make joints a little out of the straight line, wedges are inapplicable, and the ordinary joints with lead or cement must be substituted. Mr. Wicksteed conceives that the elasticity of the wood gives it a firmer hold on the joint, and consequently renders it less liable to be blown out than either lead or cement; and he mentions, as disadvantages of the latter, that it required time to set before pressure can be safely applied; and that if it should fail, the joint must be made entirely afresh, as it can neither be spiled, like a wood joint, nor *set up*, like one filled with lead. To show the economy of the system recommended, he gives a table of the relative cost of wood, cement, and lead joints for one mile of piping, for every inch from three inches diameter to eighteen inches, from which the following is extracted. The price of lead is supposed to be 20*s*. per cwt.:—

Bore of pipe in inches.	Costs of joints for one mile in		
	Wood.	Iron cement.	Lead.
3	£16 10 2¼	£22 0 3	£34 4 10
6	23 4 8½	38 10 5¼	57 9 6½
9	33 0 4½	56 5 1	86 4 3¾
12	42 16 0½	75 16 5	120 9 1¾
15	51 7 3	115 11 3¾	179 15 4½
18	60 10 8¼	135 14 10½	221 6 11½

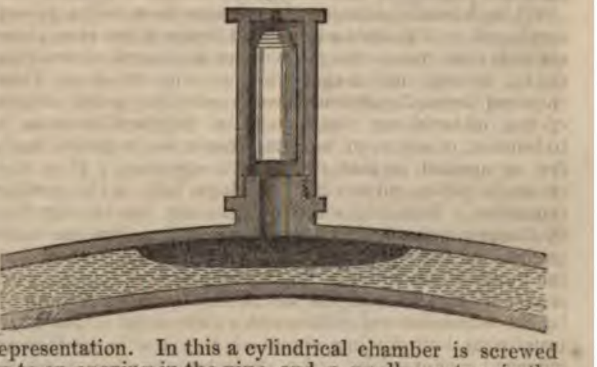
An ingenious flexible iron main was contrived by Watt, in the year 1809, for the purpose of conducting a supply of pure water across the bed of the river Clyde, for the Glasgow Water-works Company, which, by the occasional introduction of a kind of ball and socket-joint, is enabled to adapt itself to the uneven surface on which it lies. The iron pipe is laid upon long frames or beds of timber, with moveable joints corresponding with those of the main itself; and the laying of the whole in its assigned place was effected by hauling or dragging it from one shore to the other, the end of the pipe being, of course, plugged up during the operation. The first main laid down on this principle was two feet in diameter, and as it was found to answer the desired end very satisfactorily, and a greater supply of water became necessary, after a few years a second was added, eighteen inches in diameter. A full description and representation of the apparatus is given in the 'Edinburgh Philosophical Journal,' vol. iii., p. 60.

When the use of cast-iron pipes for water was first becoming common, much prejudice existed against them, occasioned by an idea, which experience has shown to be erroneous, that they would deteriorate the water conveyed through them. A slight degree of oxidation takes place at first, but after a thin crust has thus been formed on the surface of the iron, it affects the water no further, at least not in a way seriously injurious. It has been found that water which contains lime deposits, when passing through iron pipes, a crust which defends the iron from corrosion, and which will not increase beyond a moderate thickness; and this discovery has been usefully applied by sending lime-water through new pipes to form such a crust artificially, when corrosion has been found to take place to such a degree as to render the water unpleasant.

Lead, from the facility with which it may be manufactured, formed one of the earliest materials for water-pipes, having been used for that purpose by the Romans, and at a very early period in the history of modern waterworks. For large pipes it has been entirely superseded by cast-iron; but it is still employed for the small branch-pipes by which water is laid on to private houses, for which purpose its pliability renders it admirably adapted, as these pipes have frequently to be conducted in a tortuous and angular course, in order to conceal them as much as possible where they pass through kitchens, &c. Any joints that may be necessary in connecting two lengths of lead piping, or in joining the pipe to a cock, cisterns, &c., are effected by soldering; the surfaces to be united being made perfectly clean and bright, and the parts being held or fastened together while the plumber pours the solder upon the joint, holding a pad made of ticking beneath the part, to prevent the liquid solder from falling to the ground. This operation must be frequently repeated before the lead becomes sufficiently hot to take the solder; and when it begins to take effect, the workman continues patting and working the semi-fluid metal with the pad held in his hand, to keep it uniformly about the joint. A soldering-iron may be applied to facilitate the operation as soon as the solder begins to adhere; and a considerable body of solder is left round about the joint, forming a thick bulging collar. In soldering pipes laid in the ground, as the operator cannot look directly at the underside of the pipe, a small mirror is employed, to enable him to see when the joint is perfect. It should be borne in mind, in using lead pipes, that their want of elasticity renders them unfit for employment to convey water impelled by the strokes of an engine-pump, because the impulse communicated by the pump caused the pipes to swell, and they do not return to their original dimensions; so that a succession of such impulses will reduce their thickness until they burst.

An important point to be regarded in laying any system of pipes for the passage of water is to keep the waterway as uniform as possible; contractions and enlargements being very objectionable, as affecting the velocity of the current. On this account all such cocks as may occur in the course of a pipe should have a waterway equal to that of the pipe itself, a matter which is not unfrequently disregarded, on account of the expense of large cocks. On the first admission of water to a pipe which has a tortuous course, the passage is sometimes impeded by the lodgment of air in the upper bends of the pipe; to remove which, in the case of leaden pipes, plumbers resort to a very simple expedient. This consists in driving a nail into the pipe at or a little beyond the highest part of the bend; and, while it remains in, hammering up the lead round about it into the form of a little button or spout. The nail is then withdrawn, and the pressure of the water causes the air to rush out violently. When it has all escaped, and water begins to follow it, the hole is closed by a few strokes of the hammer upon the portion of lead beat up about the nail. If the pipe be so situated that air cannot enter at either end, it will, after this treatment, continue to yield a full supply for years. In the pipes connected with waterworks, however, many cases occur in which air has frequent access to the pipes, and then an apparatus must be used which will allow the air to escape wherever the pipe is being charged with water. An air-pipe with a cock to open and close by hand would be troublesome; but in some situations an open air-pipe may be used, rising to a higher level than the mouth of the pipe, in which case the water will rise in the air-pipe to the level of the reservoir from which the pipe is charged, but will not overflow, and the air will rise in bubbles through it. Desaguliers contrived an apparatus for removing air from such bendings, in which, after the escape of the air, the valve was closed by a kind of ball-cock acted upon by water escaping from the pipe into a small cistern adjoining it; and Robison describes a very simple contrivance for the same purpose by the late Professor Russell, of Edinburgh, of which *Fig.* 4 is a sectional representation. In this a cylindrical chamber is screwed on to an opening in the pipe, and a small aperture in the top of the chamber affords means for the escape of the air; while a cylindrical copper float placed in the chamber, with a quantity of soft leather attached to its upper extremity, rises so as to close the aperture as soon as water enters the chamber. Whenever the pressure of the water in the pipe is considerable, such an apparatus should be fixed a little beyond the highest part of the bending, as the water will force the air forward in the pipe; and to insure the removal of all the air, it is sometimes necessary to make the air-box or pipe communicate with the main at more than one point.

Fig. 4.



In addition to the authorities quoted in the body of this article, some information has been derived from Barlow's *Treatise on Machinery and Manufactures*, forming part of the *Encyclopædia Metropolitana*; from Rees's *Cyclopædia*, articles 'Pipes' and 'Water;' and from Robison's treatise on 'Waterworks,' in the *Encyclopædia Britannica*.

As an appropriate appendix to an article on Waterworks, we here present, from the latest complete returns published by parliament, a tabular view of the operations of the several companies by which the metropolis is supplied with water, about the year 1834. As will be seen by the notices of some of the more prominent improvements in the body of this article, very much has been done since that time to improve the supply, and that at very great expense; but the cost of water to the consumers has not generally been raised, the companies looking for their remuneration to an increased and constantly increasing extent of custom. These returns show the quantity of water supplied by the eight companies named to have been about 235,914,761 hogsheads annually; this enormous quantity being distributed among 191,066 houses, factories, and other buildings; the individual supplies to each varying from 100 to 350 gallons daily.

Table showing the Number of Houses, Quantity of Water, &c., supplied by the Metropolitan Water Companies, according to Returns made to Parliament in 1834.

Name of Company.	Houses and buildings supplied.	Total quantity of Water supplied annually.	Average daily supply per house or building.	Average rate per house per annum.			Highest elevation at which water is supplied.	Mean elevation at which water is supplied.	Gross rental.	Estimated current expenditure.*
		Hogsheads.	Gallons.	£	s.	d.	Feet.	Feet.	£	£
New River . . .	70,145	114,650,000	241	1	6	6	145	84½	98,307†	38.000
East London . . .	46,421	37,810,594	120½	1	2	9	107	60	53,061	15,080
West Middlesex . .	16 000	20,000,000	185	2	16	10	188	155	45,500	18.000
Chelsea	13,892	15,753,000	168	1	13	3	135	85	22,906	13,481
Grand Junction . .	8,780	21,702,567	350‖	2	8	6	151·9	100	26,154	11,000
Lambeth	16,682	11.998,600	124	0	17	0	185	55	14,808	6.500
Vauxhall (or South London)	12,046	7,000,000‡	100‡	0	15	0	80	No return.	8,839	4,000
Southwark . . .	7,100	7,000,000	156	1	1	3	60	38	7,850	No return.

WATERFALLS.

WATERFALLS. In the article VALLEYS we have arranged a general view of the main features of the earth's surface, and a series of inferences touching the forces whereby the diversified forms of hills and valleys have been occasioned. But these forms, though on a large scale they appear permanent, because the great modifying agencies which produced them have passed away, are really undergoing continual change from causes in daily operation. The most solid stone is wasted by the feeble but unceasing power of decomposition possessed by the atmosphere. Rain washes away the disintegrations occasioned by varying temperature and chemical processes; the hills lose and the valleys gain, and the balance of decay and renewal of land is only finally adjusted on the shores and in the basin of the sea. Among the phenomena which show this mutability of the supposed solid land with most distinctness, are interruptions to the general uniformity of the inclinations of valleys and the even slopes of hills: for these changes of slope are points of variation of the intensity of the agencies excited by the slope. These interruptions of uniformity are all referrible to the unequal power of resistance which rocks of different hardness, or dissimilar position, or unequal thickness, or unlike modes of association present to external agencies. Thus have been formed round the high limestone hills of the northern counties a series of rocky terraces, not less regular than the escarpments made by military art; and thus the oolitic ranges of the Cotswold show horizontal mounds of sand and cliffs of stone above the broad plains of lias clays and red marls which margin the Severn and the Avon. On these grand features of the earth's surface the action of the atmosphere (including chemical and mechanical operations) produces only slight modifications; but when the terraced slopes in their flexures round the hills turn into the valleys, a new agency is brought to work upon them. Rivulets, however small in quantity, and torrents, even such as are of only temporary energy, exert a positive influence in wasting and transporting away earthy materials; and these effects rise to a maximum wherever, from any of the causes already alluded to, the surface of the earth presents successive points of less and greater power to resist the action of running water. Wherever, in a valley whose slope is considerable, the rocky masses successively crossed by the stream are of very unequal hardness, as, for example, when solid limestone is found resting on soft shale or feebly indurated sandstone, a more than ordinarily rapid current is occasioned over the lower beds of the limestone into the upper beds of the shale. This difference of slope in the running water is of a nature to increase continually to a certain point, depending on the relative firmness and thickness of the hard and soft rocks, the inclination of the valley, the magnitude of the stream, and other less important particulars. Thus rapids and cataracts are formed; and where the conditions combine in the most favourable degree waterfalls are produced.

The character of these varies according to the disposition of the yielding and resisting portions of the rocks. Wherever stratification is absent, as in granite, or concealed, as in some metamorphic slates, the main features of the waterfall are determined by the direction of the natural joints in the stone. Hence the picturesque character of the falls of the Bruar (Highlands), Lodore (Cumberland), and the Rheiddiol (North Wales). In some cases these natural joints yield in parallel lines, and give a deep narrow passage to the water. Scale Force in Cumberland is an example. But the most interesting, if not the most picturesque class of waterfalls, is occasioned by the stratified rocks; and the most curious of them are observed where hard limestones or gritstones rest upon yielding shales or soft clays. By the continual action of the stream the shales, kept constantly damp, crumble and fall away even at considerable heights and distances from the points where they are touched by the water. Thus a hollow space is formed beneath the limestone which crowns the precipice; and this proceeds so far as to reach at last some of the natural joints which divide the rock. Then the limestone falls, the waterfall recedes, and the process of removal and destruction is renewed. Thus on the sides of the hills, in the limestone dales of the northern counties of England, the waterfalls are daily receding up the streams, and thus are the falls of Niagara forced continually farther up the river. The process is by no means slow. Beneath Hardrow Force, in Yorkshire (a fall of 99 feet), the effect since the general valley of the Yore was excavated by other forces, has been to produce a sinuous glen within steep vertical walls of rock, at the foot of which yet lie great heaps of fallen materials, which the feeble stream that formed the glen has not been powerful enough to remove. For an account of the natural processes by which the falls of Niagara have been displaced, and are still undergoing change, the volumes of Mr. Lyell (*Principles of Geology*), which are instructive on all points connected with the operations of running water, may be consulted. Exactly such effects as are here attributed to running streams happen on the sea-coasts where rocks of particular nature occur under analogous circumstances.

WATERFORD.

WATERFORD, a maritime county in the province of Munster, in Ireland, bounded on the south by St. George's Channel; on the east by the æstuary called Waterford harbour, which separates it from Wexford, and by Kilkenny; on the north by Tipperary; and on the west by Cork. Its greatest length, from east to west, is 52 miles; and its greatest breadth, from Blackball Head, near the entrance of Youghall harbour, to the town of Clonmell, is 29 miles. The area of the county, exclusive of the county of the city of Waterford, is 395,690 acres, or 1244 square miles, which is about equal to the twenty-third or twenty-fourth part of all Ireland. The population, in 1831, was 148,235, being 318 to a square geographical mile, which is higher than the mean density of Ireland, but much below that of several counties in each of the four provinces. The number of houses, in 1831, was 24,848, inhabited by 30,191 families, and by above seven persons to each house. The number of persons to each family was 5·8, and dividing the area of the county by the number of families there would be 15·6 acres to each. Waterford city is 84 miles in a direct line from Dublin, or 95 miles by the road through Carlow, Castledermot, Ballytore, Kilcullen, Naas, and Rathcoole; in 52° 16′ N. lat. and 7° 7′ W. long. Hook Tower (lighthouse) at the entrance of Waterford harbour is in 52° 7′ 25″ N. lat. and 6° 55′ 58″ W. long. The county itself lies between 51° 56′ and 52° 20′ N. lat. and 6° 58′ and 8° 8′ W. long.

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* Not including any allowance for necessary works and improvements, as expenses of filtration, &c.

† Exclusive of rents for lands, &c. possessed by the Company.

‡ Estimated.

‖ thirteen gallons per house per day for street watering

Coast-line.—From Blackball Head, near the entrance of Youghall harbour, the western extremity of the coast of Waterford, the general direction of the coast is east for three or four miles, where it trends to the north-east to Helwick Head, the western head of Dungarvan harbour. This harbour does not afford very good anchorage. From the opposite headland the coast runs more directly east to Tramore Bay, which has a level beach three miles in extent. The coast is flat, and very dangerous to shipping, as the tide sets in with great force, and with the south-west winds there is a heavy sea. There are beacons on the eastern and western headlands of the bay. Between Tramore and Dungarvan, a distance of twenty miles, the whole coast is rocky, and often unsafe from the want of shelter. About five miles east is Red Point, the south-western extremity of Waterford harbour; and a mile farther, within the harbour, and about fourteen miles below Waterford, is the port of Dunmore, which has a pier and breakwater, and is the post-office packet station. The width of Waterford harbour is here about two miles. There is a lighthouse on Hook Head, at the entrance of the harbour on the eastern side. There are some remarkable caverns on the coast.

Surface and Geology.—The general character of the county is mountainous. The great mountain-tract which extends from Waterford on the east coast to Dingle Bay on the west, comprehends the whole of the county of Waterford: it is interrupted on a line from Dungarvan to the valley of the Suir, west of Clonmell, by the southern extremity of the great plain which occupies the central part of Ireland. The Cummeragh Mountains, which occupy the part of the county west of Dungarvan, are among the highest and wildest in Ireland: the height of Monavallagh is 2598 feet above the sea. There are four small lakes in the Cummeragh Mountains, two called Cummeloughs and two are Stilloughs, but the area of the largest is only five or six acres: they contain several kinds of trout, and in one char are found. The Waterford mountains contain two varieties of slate: first, the old transition slate, coloured grey, which is quarried at Glenpatrick, and is extensively used for roofing. The second or newer slate rests on the older; the lower portions of its strata consist of alternating beds of brownish-red quartzose conglomerate and coarse red slate. These strata are succeeded by alternations of red and grey quartz rock, red quartzose slate, and clay-slate, the grain becoming gradually finer as the beds accumulate and recede farther from the conglomerate, till at length the upper beds produce varieties of purple, brownish-red, and reddish-grey clay-slate, which are quarried and used as roofing-slate, particularly in the valley of the river Blackwater near Lismore. These strata form successive undulations, the ridges of which have an east and west direction, and the beds always incline towards the valleys of the principal rivers, and thus form troughs, which are filled by indurated sandstone and secondary limestone, whose strata rest conformably on the clay-slate. The newer slate series contains abundance of marine and even vegetable organic remains. The limestone in the valleys contains all the fossils of the carboniferous limestone; and the grey slate, which sometimes alternates with the lower beds of the limestone, also contains fossils similar to those found in the limestone. The subjacent sandstone frequently contains calamites, and other vegetable remains, resembling those which occur in the coal-formation. (Mr. Griffiths, 'On the Geology of Ireland,' in the *Report of the Railway Commissioners.*) The clay-slate district contains several copper and lead mines, some of which, as at Knockmahon, are worked: valuable iron-ore is found at Minehead and Ardmore, and at the latter place copper and lead also. Chalybeate and vitriolic springs exist in several parts of the county.

Hydrography and Communications.—The Suir, which rises in the north-east of Tipperary, after being joined by the Nier, from the Cummeragh Mountains, forms the boundary-line between Waterford and Tipperary and Kilkenny. The united waters of the Suir and Barrow form the æstuary called Waterford Harbour. The Suir is navigable for large vessels up to Waterford city, and to Carrick-on-Suir for those of which the draught does not exceed eleven feet. The Suir is the channel by which the produce of Tipperary, Kilkenny, and the western parts of Waterford are exported. The Blackwater, which rises in the Kerry mountains, enters the county on the west, and runs due east to Cappoquin, where it turns southward, and discharges itself into Youghall harbour, after receiving midway the river Bride. The Blackwater is navigable for vessels of a hundred tons to its confluence with the Bride, and for vessels of seventy tons as far as Cappoquin. The Bride, a sluggish stream, is affected by the tide for the whole of its course within the county, and is navigable for small craft. From Cappoquin to Lismore there is a canal three miles long, made at the expense of the duke of Devonshire. The Lickey, Bricky, Colligein, Mahon, Phinisk, Clodagh, and some others, none of them of importance, except for drainage, fall into the sea at various points of the southern coast.

The mail-coach road from Dublin to Waterford, 75 miles, enters the county within two or three miles of Waterford city. The mail-coach road from Waterford to Cork, 71½ miles, passes through Killmacthomas, Dungarvan, Cappoquin, Lismore, and Tallow, between which place and Youghall it leaves the county, but again touches Waterford before it finally leaves the county a short distance before reaching Youghall. The other roads are—from Dungarvan to Youghall, through Clashmore; also Dungarvan to Youghall, through Pilltown, both over the mountains; one from Cappoquin to the mountains; one from Waterford to Tramore. The above are the roads of most importance. Those to places north-north-east or north-west of Waterford leave the county a very short distance of Waterford, except the Limerick mail-coach road, which runs within the county to Carrick-on-Suir on the Waterford bank of the river, and from Carrick to Clonmell on the Tipperary side.

Agriculture and Condition of the People.—It is estimated that 353,000 acres are cultivated, and 118,000 unimproved. The estimated rental for the county averages about 12*s.* 6*d.*, including extensive districts which scarcely yield any rent, and others which are altogether unproductive. Waterford is the principal dairy county in Ireland. A large part of the best land is occupied in dairy-farms, and the Waterford butter bears a high character. When Arthur Young visited Ireland sixty years ago, not one-thirtieth part of the county was under tillage; but the proportion is now much larger. The Appendix F. to the Irish Poor-Law Inquiry, contains the result of inquiries both into the state of agriculture and the condition of the people in the baronies of Decies-without-Drum and Middlethird; and the following information is chiefly derived from this source.

The barony of Decies-without-Drum contains a large mountainous district, with a great breadth of low undulating ground extending from the hills to the sea-coast. The thin soil on the mountains affords a very moderate pasture to sheep and store cattle; but descending to the more level land, where the soil is deeper and better, attempts are made to bring it into cultivation; and though some wheat is grown, yet, from its elevated situation, oats are the most suitable crop. The fences on these reclaimed lands are very imperfect, and cattle and sheep cannot be kept out of the corn-fields without herding. There are facilities for the erection of dry stone walls, but the general practice is to make the ditches with high banks, the sides and tops of which are planted with furze, and partially faced with stones picked off the tillage land. The lower ground of the barony is chiefly in tillage, but every farmer has also a dairy, and the soil, lying on limestone or gravel, is well suited for either tillage or pasture. Farms of from twenty to seventy acres are a very general size. The old Irish cow is the standard breed in the district, and is now crossed with half-bred English bulls by the dairy farmers. The advantage gained is in the increased size and improved fattening qualities of the animal. The dairy cows are not unfrequently left unhoused a great part of the cold weather. Clover has been partially introduced, but nothing is generally grown for winter food for cattle but hay and potatoes. A few patches of half an acre each of turnips and mangold-wurzel are grown here and there. Vetches are grown [illegible] spring food. The sheep are a cross of the Leicester; the pigs of an improved kind; but the greatest attention has been paid to the breed of horses, which are superior in most points to those in other parts of the south of Ireland, and very active strong animals may frequently be seen in the common country carts. A better description of agricultural implements has been introduced within the last few years, such as iron Scotch ploughs and double harrows. A few farmers use rollers, but winnowing-machines are only used by the largest landholders, the corn being commonly winnowed by women in the open air: the old single heavy harrow is still used by the majority of farmers. The greater part of the barony is held under lease, the terms depending upon lives, and running from twenty to fifty years before they fall in: the farms are rather above an average size for the south of Ireland. In all recent leases clauses of non-alienation and non-subletting have been introduced. Rents depend rather on the price of butter and pork than, as in England, on corn. There is a large field for the profitable employment of labour in road-making, draining land, improving fences. The statement of the farmers in the barony is that they employ one man to every six or eight statute acres under the plough; a much smaller proportion of land than in England gives employment to one man; but this labour costs only 1*l.* 5*s.* in Ireland, and between 3*l.* and 4*l.* in England.

In the barony of Middlethird, which the assistant commissioner visited, it is stated that an experiment was about to be tried, whether it would be more profitable for the dairy farmers to make cheese instead of butter. Con-acre, in the barony of Decies-without-Drum, is called 'dairy-ground:' the farmer ploughs and manures the land, which varies from half an acre up to three acres, and the labourer and his family do all the other work; the rent, either money or labour, being paid before the crop is allowed to be taken from the ground. There is often a difficulty in getting regular labourers, unless potato-ground is given to them. Con-acre is common in the barony, but not quite so general as it once was. Farmers' servants who used to take con-acre, and then sell the potatoes, do not now do so to the same extent.

Both landlords and farmers object to giving sites for cabins, and it is much more difficult to procure them than formerly. The consolidation of farms would go on much more rapidly, but for the fear of outrages. It is objected to the small tenants, that they constantly sow the same seed for years together; they cannot afford to buy manure; and their system of cropping exhausts the land. The usual rotation of crops in the barony of Middlethird is potatoes, wheat, potatoes, oats, and grass-seeds, but the smaller farmers often take two corn-crops together. Out of 812 farms in this barony, 484 were under 20 acres, including 227 under five acres, and only 101 exceeded 50 acres.

The general state of the peasantry is much the same as in Tipperary and Cork.

Divisions, Towns, &c.—The county is divided into seven baronies, as follows: 1, Coshbride and Coshmore, on the west; 2, Decies-without-Drum, north-west; 3, Decies-within-Drum, south-west or central; 4, Gaultier, east; 5, Glenahiery, north-west; 6, Middlethird, south-east; 7, Upper Third, north.

The capital of the county of Waterford is the city of Waterford. The other towns of most importance are the following:—

Cappoquin, or *Caperquin*, is a post-town, about 30 miles west by south from Waterford, direct distance: it is situated on the east or left bank of the Blackwater. The town has the appearance of decay, though there has been some increase in the population, which in 1821 was 1886, and in 1831 was 2289. It was antiently a place of much thoroughfare, and had at a very early period a wooden bridge over the river, which was rebuilt in the reign of Charles II. Near the bridge are the ruins of a castle.

Carrick-on-Suir.

Carrickbeg is a village suburb of Carrick-on-Suir, on the Waterford side of the river Suir, over which there is a good stone bridge, which connects the suburb with the town. It is about 12 miles west-north-west from Waterford, direct distance. The population, in 1831, was 2704. James, first earl of Lincoln, founded a Franciscan priory at this place in 1336. The steeple, which still remains, is said to be very curious, rising like an inverted cone to the height of sixty feet.

Clonmell.

Dungarvan is a post-town, 23 miles west-south-west from Waterford, situated in the bay or haven of Dungarvan, on the æstuary of the river Colligan, which is crossed by a fine bridge of one arch, built entirely at the expense of the Duke of Devonshire. Part of the town is on the west shore, and part on the east shore, which latter is called the Abbey Side, from an abbey which was formerly there. Dungarvan is an old seaport, and was incorporated in 1463. Within the walls of a castle, built by King John, and now in ruins, the barracks are established. The streets are for the most part narrow and dirty, but there is a handsome church, a Roman Catholic chapel, and a good market-house. There are two banks, the National Bank and the Provincial Bank. The population, in 1821, was 5105; in 1831 it was 6519. The inhabitants are chiefly employed in fishing. It is a good deal frequented in summer as a bathing-place. In the year 1835 the exports from the port of Dungarvan were—corn, 97,224 cwts.; provisions, 13,359 cwts.; copper-ore, 26,800 cwts.; cows and oxen, 215; sheep, 210; swine, 1498; the estimated value of which was 69,086*l.*, which, with other articles, estimated at 400*l.*, gave a total estimated value of 69,486*l.* In the same year (1835) the imports were—coals, culm, and cinders, 9877 tons; iron, 280 tons; oak-bark for tanners, 100 tons; sugar, 90 cwts.; tea, 480 lbs.; salt, 6010 bushels; glass and earthenware, 20 packages; the estimated value of which was 11,012*l.*, which, with other articles estimated at 5300*l.*, gave a total estimated value of 16,312*l.* The amount of the excise duty on malt was 2219*l.* 4*s.* 3*d.*, for 17,181 bushels of malt. Dungarvan returns one member to parliament.

Killmacthomas, a small post-town, seated on the river Mahon, about 15 miles west by south from Waterford, contains about 700 inhabitants.

Lismore.

Mayfield, a village in the neighbourhood of Waterford, has an extensive cotton manufactory, which gives employment to about 1000 persons. The calico finds a market not only in Ireland, but to some extent in England.

Passage, distinguished as East Passage, is a village on the west bank of the Suir, or rather of Waterford Haven, opposite which is a safe roadstead where hundreds of vessels of large burthen may anchor in safety. The village, which is chiefly inhabited by fishermen and pilots, is five or six miles below Waterford, and about the same distance from the mouth of the river.

Portlaw, a neat little sub-post-town to Waterford, on an affluent of the Suir, about nine miles west by north from Waterford, has an extensive cotton factory, which is said to employ more than 1000 persons: the machinery is worked by two water-wheels, one of very large diameter, and both of copper.

Tallow, or *Tallagh*, a post-town, near the west or right bank of the river Bride, is about 40 miles west by south from Waterford. James I., at the request of the earl of Cork, granted it a charter of incorporation, by which the liberties of the borough were extended one mile in every direction from the parish church. The population, in 1821, was 2329; in 1831 it was 2998. There are some remains of a castle formerly the residence of the earls of Desmond.

Tramore, a small but neat and regularly-built town on the Bay of Tramore, about nine miles south from Waterford, is much resorted to by the inhabitants of Waterford as a bathing-place, the beach being very firm and convenient for the purpose. The bay is very dangerous for shipping; it is sometimes mistaken for the Bay of Waterford, and shipwrecks occur occasionally. The town has a church, a chapel, a market-house, and an assembly-room. The population, in 1821, was 889; in 1831 it was 2224.

Before the Union, Waterford sent eight members to the Irish parliament: two for the county, and two each for Dungarvan, Lismore, and Tallow. The number of members now returned is two for the county and one for Dungarvan.

The county is in the diocese of Waterford, which is a joint see; the dioceses of Cashel, Emly, Lismore, and Waterford having been united. The number of parishes in the county is seventy-four. It is in the Leinster circuit. The average number of committals for criminal offences is under 300, two-thirds of which are chiefly for assaults, riots, and attempts to rescue, and similar offences. In 1836 the grand jury recommended that the assizes and sessions should be held at Dungarvan instead of Waterford. The county gaol at Waterford is one of the best managed in Ireland. The county lunatic asylum is at Waterford. There is no county infirmary. There are fever-hospitals at Waterford, Dungarvan, Lismore, and Tallow; and dispensaries at Cappoquin, Clashmore, Dunmore, Kilmacthomas, Kilbarrymeaden, Tramore, Dungarvan, Tallow, Lismore, Ballyduff, Bonmahon, and Drumcannon, supported chiefly by grand-jury presentments. In 1838 the number of patients relieved by the fever-hospitals and dispensaries was 18,231, of whom 15,739 attended at the different institutions, and 2492 were attended at their own dwellings. The number of admissions into the fever-hospitals was 775, or 1 in 191 of the total population of the county. On the 1st of January, 1840, the number of patients in the lunatic asylum was 101, but the institution was only calculated for 100.

The following Poor-Law unions have been formed in the county:—

	Population.
Carrick-on-Suir . . .	40,259
Dungarvan	57,534
Lismore	34,382
Waterford	79,664

In 1840 there were fifty schools under the National Board of Education, containing 5867 scholars—3227 boys and 2640 girls: the number of male teachers was 32, and female teachers 19.

The county constabulary (exclusive of the city) consisted, on the 1st of January, 1843, of 1 county inspector of the second class, 4 sub-inspectors of the first class, and 2 of the third; 1 head constable, first class; and 6 of the second class; 45 constables, 191 sub-constables, first class, and 28 sub-constables, second class. The expense of this force for 1842 was 8383*l*. The amount of grand-jury presentments for the year 1839 was as follows:—

	£
New roads, bridges, &c. . . .	4,456
Repairs of ditto	6,669
Court and sessions-house, repairs, &c. .	49
" other expenses	968
Constabulary and payments to witnesses	2,005
County officers not included in the above	2,446
Public charities	2,846
Repayment of government advances .	5,113
Miscellaneous	3,246
	£29,094

The grand-jury presentments for the county of the city of Waterford were £7169.

The manufacturing industry of the county is insignificant. At Waterford there are some large establishments. [WATERFORD, City.] A few years ago a cotton factory, for spinning and weaving, was established at Mayfield, in which about nine hundred persons were employed. The fisheries might be profitably extended, but the unprotected nature of a great part of the coast is said to discourage this pursuit. In 1836 they employed 101 half-decked vessels, of 1668 tons, employing 595 men; 52 open sail boats, and 301 men; 266 row-boats, and 1260 men; making altogether 2156 persons.

History and Antiquities.—Dr. Smith, who in 1745 published an account of 'The Antient and Present State of the County and City of Waterford,' states, on the authority of Ptolemy, that the Menapii, a Belgic colony, were the antient inhabitants of Waterford and the adjoining county of Wexford. The Desii, from the county of Meath, were a powerful clan at the period of the English invasion, when their importance was nearly destroyed. In 1171 Henry II. granted the city of Waterford and the adjacent province to Richard Le Poer, his marshal, and by marriage the estates and honours of his descendants came to the Beresford family, who still retain large possessions in the county. The county suffered little during the rebellion in 1798. Waterford city has been the chief scene of most of the historical events of importance.

Many remains of antiquity are found in the county. At Ardmore is one of the round towers, and there are found in several parts of the county intrenchments, earthworks, barrows, and cromlechs. A large double trench, called by the Irish 'the trench of St. Patrick's cow,' may be traced for seventeen or eighteen miles across the Blackwater towards Ardmore; it corresponds with the work called the 'Dane's Cast,' in the counties of Armagh and Down. A second trench runs westward from Cappoquin into Cork. At one period there were twenty-four religious establishments existing in the county, and the ruins of some of them still remain, as at Mothill, Dungarvan, Stradbally, and Lismore. The antient castles and fortified places were also numerous.

(Smith's *History of Waterford*; M'Culloch's *Statistics of the British Empire*; *Parliamentary Papers* on Ireland.)

WATERFORD, the capital of the county of Waterford, is situated on the river Suir, in 52° 16′ N. lat. and 7° 8′ W. long. It is a county of a city, and includes in the boundary of the county 9478 acres on both sides of the Suir. The city itself is entirely on the south bank of the river, and is about a mile long. A noble quay extends the whole of this length along the bank of the river, from which the city rises gradually. The situation is very fine, but the greater part of the streets are dark, dirty, and mean-looking. Waterford is about 12 miles from the sea, and vessels of 500 tons burden can lie by the side of the quay, but larger ships anchor about six miles lower down, opposite the village of Passage. The river is crossed at the upper end of the city by a very long wooden bridge, which opens in one part to allow vessels to pass. The bridge was designed by Lemuel Cox, an American, and was built about 1795. The river here is nearly a quarter of a mile wide; the opposite banks are very beautiful, rising gently with green wooded hills.

The town and suburbs occupy about 883 acres. In the county of the city there are twelve parishes, three of which are entirely agricultural, and nine partly agricultural and partly occupied by the town and suburbs. In December, 1831, the total number of houses in the county of the city was 3719, of which 3376 were in the city and suburbs, and of these latter 1009 were thatched. The number of houses of 10*l*. rent and upwards was 1671. The population of the county of the city, in 1821, was 28,679; in 1831 it was 28,821. The population of the city and suburbs, in 1831, was 26,377, the country part of the population being 2444. Upwards of 20,000 were Roman Catholics.

Waterford has been an improving town for many years, but it will be seen that the increase in population has been very small. It has probably been kept down by emigration. Very few new houses are built. In the worst parts of the town the misery is described as frightful; five or six families are sometimes found living together in a hovel, entirely without furniture, and with nothing but straw to lie upon.

The principal public buildings are—the cathedral, an elegant modern structure; the bishop's palace, which is of hewn stone, with a double front, and commands an extensive view across the river into the county of Wexford. There are three parish churches, four Roman Catholic chapels, and places of worship for the Quakers and other sects. The other public buildings are—a court-house, an exchange, a custom-house, a theatre, an assembly-room, barracks, and a gaol. Among the charitable institutions are a house of industry and an hospital for the poor.

Waterford, before the Reform Act, returned one member to parliament. It was an open borough, and the constituency consisted of 900 freemen and 80 freeholders. It now returns two members. The number of electors in 1834 was 1473; the number registered from Feb. 1, 1835, to Feb. 1, 1843, inclusive, was 1532, of whom 34 were 50*l*. freeholders, 22 were 20*l*. freeholders, 2 were 10*l*. freeholders, 19 were 40*s*. freeholders, 16 were 20*l*. leaseholders, 5 were 10*l*. leaseholders, 3 were rent-chargers, 791 were 10*l*. householders, and 640 were freemen. It first sent members to the Irish parliament in 1374.

The government of the city is vested, by the charter of Charles I., in a mayor, 18 aldermen, 18 assistants, a recorder, and two sheriffs; and the aldermen, assistants, recorder, and sheriffs form the council. The corporation possess considerable estates in the county of the city.

The constabulary force in Waterford consists of one sub-inspector, one head-constable, eight constables, and 45 sub-constables. The total expenditure for the force for 1839 was 2054*l*. 8*s*. 7*d*.

The assessments in the town only were, in 1830—church cess, 720*l.*; ministers' money, 248*l.*; lighting cess, 770*l.*; the total amount raised by these assessments being 1758*l.*, from about 1800 ratepayers. The grand-jury cess levied on the county of the city, in 1830, was 4348*l.* 14*s.* 10*d.*, but the amount of this assessment varies considerably in different years.

The commerce of Waterford is chiefly with England, and consists for the most part of agricultural produce, butter, pork, &c., and, since the introduction of steam-vessels, of live-stock. The exports from Waterford, in 1835, were corn, meal, and flour, 1,503,854 cwts.; provisions, 202,048 cwts.; potatoes, 20,000 cwts.; sugar, 165 cwts.; copper-ore, 48,000 cwts.; feathers, 1040 cwts.; wine, 5402 gallons; beer, 170,000 gallons; cotton manufactures, 180,200 yards; calf-skins, 6400; cows and oxen, 4410 head; horses, 342 head; sheep, 3936 head; swine, 74,097 head; the estimated value of which was 1,743,545*l.*, which, added to other articles estimated at 77,700*l.*, gave a total estimated value of 1,821,245*l.*

The imports for the same year (1835) consisted of a great variety of articles required for purposes of trade and general consumption, the total estimated value of which was 1,274,154*l.*

According to a Return to the House of Commons, dated March, 1842, the number of vessels above 50 tons burden, registered at Waterford, was 115, the total burden of which was 19,309 tons. The net receipt at the Custom-house, during the year ending January 5, 1841, was 183,510*l.* 15*s.* 3*d.*; the net receipt for the previous year was 161,752*l.* 5*s.* 5*d.*

There is a packet-station at Waterford for conveyance between Waterford and Milford daily; the number of packets is five, which are kept up at an average expenditure of about 14,000*l.* a year, the amount received from passengers being about 1700*l.* a year.

In 1835 there were seven steam-engines in Waterford, equal to ninety-horse power, for manufacturing purposes. In 1836 there were 339 cotton power-looms.

The amount of excise duty on malt, collected in Waterford in 1836, was 9840*l.* 3*s.* 6*d.*, for 76,182 bushels of malt.

There are two banks in Waterford—the Provincial Bank of Ireland, and the Branch Bank of Ireland. There is also a savings-bank, in which the number of depositors on the 20th Nov., 1842, was 3469. The expense of management for the year 1841-2 was 276*l.*, including 242*l.* salaries. The smallest sum on which interest is allowed is 15*s.* In some English savings-banks interest is allowed on 2*s.* 6*d.*

The newspapers are—the Waterford Weekly Chronicle, the Waterford News-Letter, weekly; the Waterford Mirror, three times a week; and the Waterford Mail, twice a week.

In 1840 an act was passed for a railway between Limerick and Carrick-on-Suir, passing through Waterford; but the act was not carried into effect, and has expired.

Waterford was originally founded by the Danes about A.D. 850, and it was their chief possession in Ireland for some centuries. In 1170 it was taken by assault by Strongbow, earl of Pembroke; and in the following year Henry II., when he passed over to take possession of Ireland, then newly conquered, landed near Waterford, and paid a visit to the town, which was afterwards restored and enlarged by Strongbow. Waterford received its first charter from King John, who resided there for some time; and subsequent kings, on account of its steady adherence to the English, gave it several other charters and privileges, especially Henry VII., for its opposition to Simnel and Perkin Warbeck. All its charters however were seized and annulled by James I., on the ground of the nonconformity of the chief magistrates, and Waterford remained without a charter from 1617 to 1626, when a new and more extensive one was granted by Charles I., which is the one now in force. The immunities granted by this charter were very great, and included, among others, an exemption of the freemen from the duties of poundage. Waterford was unsuccessfully besieged by Cromwell, but was afterwards taken by Ireton.

Curraghmore, the magnificent domain of the marquis of Waterford, is in the neighbourhood of Waterford; it
0 acres. The Clyde, a fine full stream, tra-
: the timber is of the best and largest kinds.
ot worthy of the domain.

(Inglis's *Journey throughout Ireland*, 1834; Barrow's *Tour round Ireland*, 1835; *Report on the Parliamentary Representation of Ireland*, printed June 8, 1832; *Second Report of Commissioners on Railways in Ireland*, 1838; various *Parliamentary Documents*.)

WATERING, in Horticulture, the process of applying water artificially to plants. Water in a greater or less quantity is necessary to the existence of the whole vegetable kingdom: not only do the elements of water enter into the composition of the tissues of plants, but by its agency the various saline ingredients, as well as certain gases that enter into the composition of vegetable tisues, are carried into the plant. Water also exerts an influence on the temperature of the soil and of the plants to which it is applied. It is on these accounts that the application of water to plants is an important process in horticulture, more especially in the hothouse and greenhouse. During winter plants require little moisture, as the processes of life are at that period very inactive, but at the same time a small quantity is required in order to meet the demands of approaching activity. If plants are supplied with too much water during winter, their tissues become distended, and the whole plant is enfeebled. The largest supply of water is required when plants are growing rapidly and at the season when they are putting forth their leaves. When plants have ceased to grow, or when the leaves and flowers have ceased to expand, they require less water. When however the object in the culture of plants is to render either their leaves or fruits as succulent as possible, they should be supplied with abundance of water. This is done with spinach, lettuce, and other oleraceous plants, and by this means their tissues are rendered more tender, and their peculiar secretions, which are often disagreeable, are diluted. The same thing is done in the cultivation of the strawberry, where the object is to render the fruit as large as possible. In this case however the large size of the fruit is always obtained at the expense of its flavour. Even plants bearing succulent fruits, as the melon, &c., may be over-watered, and the flavour of their fruit quite destroyed. In supplying water to all plants due regard should be had to temperature, as, *cæteris paribus*, plants require more water in proportion as the temperature is higher.

Although the supply of water artificially to plants cultivated in houses is obviously necessary, there is some doubt as to whether it is required by plants growing in the open air, where they are exposed to natural supplies. Professor Lindley, in his 'Theory of Horticulture,' says, 'It is indeed doubtful whether watering plants in the open air is not often more productive of disadvantage than of real service to plants. When plants are watered naturally, the whole air is saturated with humidity at the same time as the soil is penetrated by the rain; and in this case the aqueous particles mingled with the earth are very gradually introduced into the circulating system; for the moisture of the air prevents a rapid perspiration. Not so when plants in the open air are artificially watered. This operation is usually performed in hot dry weather, and must necessarily be very limited in its effects; it can have little if any influence upon the atmosphere: then the parched air robs the leaves rapidly of their moisture, so long as the latter is abundant; the roots are suddenly and violently excited, and after a short time the exciting cause is suddenly withdrawn, by the momentary supply of water being cut off by evaporation, and by filtration through bibulous substances of which the soil usually consists. Then again the rapid evaporation from the soil in dry weather has the effect of lowering the temperature of the earth, and such a lowering does not take place when plants are refreshed by showers, because at that time the dampness of the air prevents evaporation from the soil just as it prevents perspiration from the leaves. Moreover in stiff soils, the dashing of water upon the surface has, after a little while, the effect of 'puddling' the ground and rendering it impervious, so that the descent of water to the roots is impeded, whether it is communicated artificially or by the fall of rain. It is therefore doubtful whether artificial watering of plants in the open air is advantageous unless in particular cases; and most assuredly, if it is done at all, it ought to be much more copious than is usual.' At the same time the practice is at present very general, and there are some advantages in it, independent of supplying plants with water. It is frequently very effectual for removing insects from the leaves of plants, and also for removing dust and dirt in exposed situations. Mildew is also prevented in annuals by abundant watering. The fungi which produce or are found on mildewed peas, and those which destroy the spinach and onion, may be removed by abundant watering. Where the leaves of plants are watered, this should never be done whilst the sun is shining upon them, as this increases the evaporation, the evils of which have been already spoken of. The morning and evening are the best times for watering plants; but where it is necessary to do this in the middle of the day, the roots alone should be watered. After transplanting, whether of young or old plants, in pots or in the open ground, the watering of the plant is always recommended.

In watering plants several instruments are made use of, as the engine, the syringe, and the watering-pot. These are made either to throw water through tubes of various sizes so as to apply the water to a particular point, or by means of a rose which is appended to the tube to distribute the water over a larger surface. The former method is adopted when the roots of a plant are to be watered, and the latter when it is wished to wet the whole surface. Where a stream can be made use of, an effectual way of watering plants is to have a sluice by which the water of the stream may be let on and off as may be though. proper. This is the best mode of watering water-cresses and other plants requiring abundant moisture. Where there are water-works, pipes are sometimes laid for supplying compartments of a garden. Lawns and plots of grass may be watered with the water-butt.

WATERING OF LAND. [IRRIGATION.]

WATERLAND, DANIEL, D.D., an eminent English theologian, was the son of the Rev. Henry Waterland, rector of Wasely or Walesly, in Lincolnshire, where he was born 14th February, 1683. After finishing his elementary education at the free school of Lincoln, he was admitted of Magdalen College, Cambridge, in March, 1699, obtained a scholarship in December, 1702, and was elected a fellow in February, 1704. Continuing to reside at the university, and having taken holy orders, he acted for many years as a tutor even after he had been presented by the earl of Suffolk, in February, 1713, to the mastership of his college, and also to the rectory of Ellingham in Norfolk. It was during this period of his life that he drew up and published his 'Advice to a Young Student, with a Method of Study for the first Four Years,' which went through several editions. In 1714 he took his degree of Bachelor of Divinity, on which occasion he greatly distinguished himself by his defence of his thesis, the illegality of Arian subscription, his first opponent being Thomas Sherlock, afterwards bishop of London. Soon after this he was appointed one of the chaplains in ordinary to the king (George I.), and in 1717 he received by command of his majesty, on his visit to the university, the unsolicited honour of a degree of D.D., in which he was some time after incorporated at Oxford.

Dr. Waterland appears to have first come forth as a controversialist in 1718, in an answer to Dr. Whitby's Latin disquisitions on Bishop Bull's 'Defence of the Nicene Creed,' and 'An Answer to Dr. Whitby's Reply' to that attack. In 1719 he handled the same subject with more elaboration and effect in 'A Vindication of Christ's Divinity, being a Defence of the Queries, &c., in answer to a Clergyman in the Country.' The 'Queries' had been drawn up some time before for the use of the Rev. John Jackson, rector of Rossington, in Yorkshire, who wrote an answer to them, which he submitted to Waterland, and then sent the 'Queries,' his own answer, and Waterland's reply to that, to the press. This publication immediately involved Waterland in a controversy with Dr. Clarke and the Arian party. The longest and most important of Waterland's tracts in this controversy was his next, published in 1723, under the title of 'A Second Vindication of Christ's Divinity.' This was followed the next year by 'A further Defence of Christ's Divinity,' in answer to Clarke's 'Observations' on the Second Defence.

Meanwhile, in 1720, Dr. Waterland had, on the appointment of Bishop Robinson, of London, preached the first course of sermons at the lecture founded by Lady Moyer, which he afterwards published in 8vo., under the title of 'Eight Sermons, &c. in defence of the Divinity of our Lord Jesus Christ.' Next year he was presented by the dean and chapter of St. Paul's to the rectory of St. Austin's and St. Faith's, in the city of London; and in 1723 he was promoted by Archbishop Dawes to the chancellorship of the church of York. The same year he published his 'Critical History of the Athanasian Creed.' In 1727 he was collated to a canonry of Windsor; and in 1730 he was presented by the chapter of Windsor to the vicarage of Twickenham; upon which he resigned his London living, but accepted the archdeaconry of Middlesex from his diocesan Bishop Gibson.

The publication, in 1730, of Dr. Clarke's 'Exposition of the Church Catechism' drew Waterland into a new controversy both with Clarke and Dr. Sykes. This was followed by another with Tindal, whose 'Christianity as old as the Creation' also appeared in 1730, and was replied to by Waterland, in a work entitled 'Scripture Vindicated,' &c., in 1732. Out of this grew another controversy with Middleton; and that was succeeded by a fourth with the Rev. John Jackson, on the worth of the *à priori* argument for the being of a God, which, opposed as it was to Waterland's natural turn of thought, which was critical rather than metaphysical, may be supposed not to have recommended itself to him the more as having been adopted by his great Arian adversary Clarke. In 1734 he published a tract entitled 'The Importance of the Holy Trinity asserted;' and in 1737 in an 8vo. volume, 'A Review of the Doctrine of the Eucharist, as laid down in Scripture and Antiquity,' which was the last work he sent to the press. He died on the 23rd of December, 1740, at London, whither he had come from Cambridge to consult Dr. Cheselden about his complaint, a nail growing into one of his great toes, which ended in a mortification. He left a widow, whom he had married in 1719, but no children. Two volumes of his Sermons, with a discourse on the Doctrine of Justification, and another on Infant Communion, appeared in 1742, under the care of Joseph Clarke, M.A.; and a complete edition of Archdeacon Waterland's works, with a Life of the author, by the late Bishop Van Mildert, was published at Oxford, in 11 vols. 8vo., in 1823.

WATERLOO is a village in the province of South Brabant, in the kingdom of Belgium. It is situated in 53° 33′ N. lat. and 4° 25′ E. long., at the edge of the Forest of Soignies, about 10 miles south of Brussels, on the road to Charleroi, and has about 2000 inhabitants. At a short distance from this village, the duke of Marlborough was prevented by the Dutch deputies, in 1705, from attacking the French army, and obtaining a victory, which might have given to this obscure village the celebrity which it acquired above a century later by the memorable battle of the 18th of June, 1815, in which the emperor Napoleon was defeated by the duke of Wellington. In memory of this decisive victory a monument has been erected on the field of battle; it consists of a conical mound of earth, which is 2160 feet in circumference at the base, and 200 feet high. A double spiral flight of stairs leads to the summit, where there is a pillar 60 feet high, which supports a lion 12 feet high and 21 feet long.

(Hassel, Cannabich, and Stein.)

WATERLOO-BRIDGE. [LONDON.]

WATERLOO, ANTONI, a celebrated Dutch landscape-painter, etcher, and engraver, was born near Utrecht about 1618. His landscapes are much prized, on account of their colouring, their skies, and their foliage. His etchings are also excellent: their subjects are taken chiefly from the vicinity of Utrecht, consisting of cottage scenes, crooked roads, woods, and entrances into forests, &c. He could not draw the figures: those in his pictures were painted by Weeninx and others; in his etchings he inserted them very sparingly. There are many bad impressions of Waterloo's etchings, owing to his peculiar mode of execution. He etched the whole design of an equal strength, but slightly, and then finished in a bold manner with the graver those parts which he desired to be most effective. As the plates therefore were worked off, the etching grew perceptibly fainter, while that part which was executed with the graver suffered comparatively no diminution of effect. Good impressions are much sought by collectors. Bartsch has enumerated 134 of Waterloo's etchings, all of which he has named and described.

Although Waterloo was well paid for his works, and inherited some property from his parents, he died in poverty in 1662 at the hospital of St. Job, near Utrecht, aged about forty-five. He is accounted by some the most masterly etcher of landscape, and his works have always been much studied by engravers.

(Houbraken, *Schouburg der Nederlandsche Konstschilders, &c.*; Bartsch, *Peintre Graveur*; Huber, *Manuel des Amateurs, &c.*)

WATERMAN, one who rows a boat on a river for the conveyance of passengers. The only large body of watermen in England are those employed on the river Thames at London. Before the introduction of coaches they were a very essential class for the conveyance of persons not only between London and Southwark, but between London and Westminster, and up and down the river to the various places on each side. The Thames was then the great highway. Stairs and watergates were numerous on the north bank from London to Westminster, where there were many palaces of the nobility, each palace having its landing-place, its barges and wherries, and its private retinue of watermen, or bargemen, as they were then commonly called. Processions on the river, water-tournaments, boat-races, and other aquatic amusements were frequent. In the reign of Richard II. the fare for a passenger, with his truss or farthell, from London to Gravesend or Milton, was 2*d*. Stow computes that there were as many as 2000 boats in his time, that there were 40,000 watermen on the rolls of the Watermen's Company, and that they could furnish 20,000 men for the fleet. No doubt he included in this large number the private watermen of the court and the nobility. John Taylor, the 'water-poet,' as he styled himself, complains bitterly of the introduction of coaches: 'I do not inveigh against any coaches that belong to persons of worth or quality, but only against the caterpillar swarm of hirelings. They have undone my poor trade whereof I am a member.' Since that time the increase in the number of bridges and the introduction of steam-boats have still more reduced the number of watermen.

An apprenticeship of seven years on the Thames constitutes a free waterman. The watermen and lightermen are an incorporated company, founded in 1556, and dependent on the corporation of the city of London. They are regulated partly by their own bye-laws and partly by the 7 & 8 Geo. IV., c. 75. The monopoly of labour held by this company is very extensive, embracing the whole of the river navigation from Staines to Yantlet Creek. With the exception of certain flat-bottomed ferry-boats and barges above Kingston, no person can ply in a boat for hire on the Thames who is not a member of the Watermen's Company.

The number of free watermen is between 4000 and 5000. In 1796, according to the Report of the Dock Committee, the number of free watermen was 8283. The number of boats licensed to carry passengers was 2728 on January 1, 1836. (*Appendix to Report on the Port of London*, p. 233.) The Trinity House Corporation share to some extent in the monopoly of the Watermen's Company, having the power to license certain king's seamen, besides pilots, to ply on the river; but the licences granted by them are under 200.

By the act 7 & 8 Geo. IV., c. 75, 'for the better regulation of watermen and lightermen on the river Thames between Yantlet Creek and Windsor,' the court of aldermen are to fix the fares that may be taken for the conveyance of passengers; every waterman who shall demand and take for his fare more than is allowed, is to forfeit for every offence not exceeding 40*s*.; lists of fares are to be painted on boards and affixed at suitable plying-places; every waterman is to have a printed list of the fares in his boat, and if he shall refuse to produce the same, or not permit the same to be examined, then the passenger shall be discharged from his fare, and the waterman shall pay for every offence not exceeding 5*l*.; the number of the boat and the name of the owner are to be painted on the boat; and a waterman wilfully avoiding a passenger, or hindering any person from reading the name or number, or using abusive language, is liable to a fine not exceeding 5*l*. Complaint may be made within thirty days after the offence to the lord-mayor or any justice within his jurisdiction. For other regulations less interesting to the public we refer to the act itself.

The Thames watermen have recently established a steam-boat company, in which any free waterman may be a shareholder, but no other person.

A very handsome set of almshouses have been built on Penge Common, near London, for 'poor, aged, decayed, and maimed free watermen and lightermen on the river Thames.' According to the statement made at the Anniversary meeting in June, 1843, forty-one houses had already been erected, the cost of which was 15,500*l*., of which 14,000*l*. had been paid by the Society, leaving a debt of 1500*l*., towards which 1200*l*. was collected at the meeting.

(Knight's *London*, 'The Silent Highway;' *Westminster Review*, May, 1843; *Act* 7 & 8 Geo. IV., c. 75.)

WATERPROOF CLOTH AND LEATHER. The textile fabrics, whatever be their character, are pervious to water from two causes, viz. the existence of minute spaces between the individual fibres of the yarn, whether of silk, cotton, wool, or flax; and the rectangular meshes consequent on the process of weaving. To close up these minute channels, as likewise the pores of leather, so as to impart a 'waterproof' quality to the material, has been the object of a large number of patents within the last twenty years, as likewise of recipes which have not been patented. Some of these protective agents may be noticed under the subdivisions of—1, solutions into which the cloth is dipped; 2, varnishes applied to the surface; 3, interlayers of caoutchouc composition; 4, waterproof composition for leather.

1. In 1835 Mr. Hellewell, of Salford, took out a patent for a solution, which, by immersion, should render cotton and other fabrics waterproof. According to this plan, for a quantity of woven material equal to 1000lb. weight, there are used 120lb. of rock alum, 80lb. of common whiting, and 200 gallons of water. This mixture is intended, by the chemical action of its ingredients, to yield a solution of alumine, with which the cloth is saturated. After the saturation, the cloth is passed quickly through a vessel containing a solution, at a temperature of 100° Fahr., of yellow soap in water, the proportions being 3lb. of soap and 30 gallons of water to 50lb. of cloth. This latter process, according to the patentee's description, is for the purpose of fixing the alumine in the interstices of the cloth, and enabling it to resist the action of water. The cloth is finally washed, to free it from any impurities.

Mr. Hall, of Doncaster, patented in 1839 a method of waterproofing cloth by immersion. He describes two kinds of solution employed for this purpose: 1st, two ounces of pulverized alum are dissolved in a pint of distilled water; one ounce of dry white-lead is rubbed down in another pint of water; and the two solutions being mixed and allowed to settle, the supernatant liquor constitutes the required agent: 2nd, one ounce of dry white-lead is rubbed down in half a pint of water; one ounce of pounded alum is dissolved in another half-pint of water; and these two solutions, together with two fluid drachms of acetic acid, are mixed together, and allowed to settle. When the cloth has been immersed in the supernatant liquor resulting from either of the above solutions, it is passed through a solution of quicklime, and a third time through a solution of boiled Irish moss, which acts as a mucilage.

There are other patents of a somewhat similar character to the above, and there have also been methods published but not patented. Of these, one more example will suffice:—Boil half an ounce of Russian isinglass in a pound of soft water till dissolved; dissolve an ounce of alum in two pounds of water; dissolve a quarter of an ounce of white soap in a pound of water; strain these solutions separately through linen, and then mix them all together. Heat this liquid till it simmers, and apply it with a brush to the 'wrong' side of the cloth, on a flat table. When dry, the cloth is brushed, and then brushed again lightly with water. The intention of this process is to render the cloth impervious to water, but not to air.

2. The surface-application of a species of varnish has been the subject of many patents, which may be illustrated by two or three instances. About twenty years ago Messrs. Mills and Fairman introduced a composition, formed of 100lb. of linseed oil, 40lb. of pipeclay, and a small quantity of burnt umber, white-lead, pounded pumice-stone, and one or two other substances. These ingredients were melted together and ground to a smooth paint-like state, and then applied to the surface of the fabric with large knives, the cloth being stretched over wooden frames. When the surface was thus coated and dried, the other surface was similarly treated. This was not intended as a waterproof composition for ordinary clothing, but rather for tarpauling, awnings, coach top-covers, boat-cloaks, and other coarse materials.

Mr. Newberry's patent, taken out in 1840, is for a mode of applying waterproof composition in such a way as to leave one side of the woven fabric free from its influence, thereby presenting to the eye a texture nearly resembling that of ordinary cloth. The method consists in saturating the cloth with the waterproof composition, and exposing one surface only, in such a way that the atmosphere, or artificial heat, may harden the composition on that surface into a dry membranous film; while the other side, after being kept moist during the drying of the first, is cleansed from the composition by means of spirit of turpentine. Mr. Newberry describes three modes of effecting this object. In the first mode the cloth or woven fabric is stretched over a frame, and after being saturated with the composition, is allowed to float on a layer of oil till the upper surface is dry; after which the lower surface is cleansed from the composition. In the second mode the cloth is stretched double, or in two plies, over a frame, saturated with the composition, and then left to dry on the exterior surfaces, the contact-surfaces remaining moist until the time of removal. In the third mode recourse is had to a roller, on which the cloth is coiled, and a flat table of slate, stone, varnished wood, or other substance non-absorbent to the composition. The table is coated with a layer of the composition, and the cloth, being uncoiled and laid down upon it, is pressed and rolled till every part becomes wetted by the composition beneath. In this way the upper surface may be cleansed while the lower is in contact with the table, and the latter is then exposed to a drying process. Mr. Newberry's patent relates rather to the mode of proceeding than to the kind of composition employed.

3. The application of a layer of cement, gum, or varnish between two other substances, with a view to render the inner one impervious to water, has been practised under many different modifications, including that which is known by the name of the inventor, Macintosh. In the year 1824 Mr. Weise of Bermondsey devised a peculiar kind of fabric, which seems to belong to the class now under consideration. This fabric was to be used either as a material for hats and bonnets, in lieu of the usual felted beaver, or as a cloth for other garments. The materials consisted of beaver-fur, musk-fur, hare's wool, Spanish wool, flax, down, and waste silk, any or all of which were to be combined, according to the kind of fabric required. The materials were carded, roved, and spun into yarn, in the manner of cotton; and this yarn was soaked in a solution of caoutchouc, or Indian rubber, to render the interstices between its fibres waterproof. The yarn was then woven into a textile fabric; and in order to render the meshes impervious to water, the cloth was drawn over a heated cylinder, whereby the resinous composition was so far melted as to flow into them. The last part of the process was to raise a pile or nap on the surface by means of teazles or brushes.

In Mr. Macintosh's patent of 1824, the use of a cement between two layers of cloth was divulged, and this mode has been extensively adopted. The cement, or thick elastic varnish, is made by dissolving caoutchouc in a small quantity of coal-oil, the proportions of the ingredients varying according to their quality. To facilitate the solution, the caoutchouc is cut into very fine threads, and the heat of a steam-bath is applied. To apply the varnish thus prepared, the cloth is stretched upon frames and brushed over with it. The surfaces of two such pieces, while in a partially damp state, are laid one upon another, and pressed between rollers till they firmly and inseparably unite. The double fabric thus produced is wholly impervious to water, and is at the same time free from any adhesive substance on the surface. Mr. Barlow (*Encyclop. Metrop.*), while speaking of this invention, says:—'A very ingenious application of this cloth was also made in some of our recent voyages of discovery, in which it was found necessary to have boats constructed very light, for the convenience of taking them over land. In this case the boat is made of wicker-work, with a casing of waterproof cloth; and by such boats very considerable rivers and pieces of water have been crossed.' Mr. Baillie Fraser, while describing his arrangements of dress for braving the weather, in his 'Tâtar Journey from Constantinople to Teheran,' remarks:—'But as my furs alone would have made a poor defence against rain or falling snow, I had provided myself with a good Macintosh India-rubber cloak, which now did worthy service.'

Mr. Hancock, in the year 1830, besides describing a mode of applying a layer of caoutchouc-solution to the external surface of cloth, patented a peculiar kind of waterproof material. This consists of fibres of cotton, silk, flax, or hair, mixed up with caoutchouc. The fibres are cut to about an eighth of an inch in length, and then incorporated with the gum, in the proportion of an ounce of the former to a pound of the latter; and colours, if required, may be given to the mixture by the addition of any of the usual dry pigments. The mixture is poured out upon a cold tablet, and allowed to harden in form of an extended sheet; and this sheet, after being gently warmed, is rolled or pressed to give it smoothness of surface. Of this material the patentee proposes that boats, shoes, gaiters, caps, cart-coverings, and numerous other articles may be formed; the proportion of gum to fibre being regulated according to the purpose to which the resulting material is to be applied.

Among Mr. Sievier's ingenious applications of caoutchouc are two or three relating to waterproof cloth, patented in 1835. One method relates to *non-elastic* cloth. A woven fabric, of cotton, wool, or silk, is in the first instance coated with a solution of caoutchouc in spirits of turpentine. It is next coated with a mixture composed of caoutchouc, spirits of turpentine, and litharge or some other drying ingredient. While yet wet, the cloth is covered with fibres of wool, cotton, silk, hair, or fur, cut into uniform lengths and pressed evenly down upon the cloth by rollers or brushes. When dry, the surface is brushed, and those fibres which remain immoveable form a permanent surface to this double waterproof material. The inventor describes the appearance as being analogous to that of broadcloth or of velvet, according to the nature of the fibres employed, and states that the cloth may be sheared if a short nap be required. Mr. Sievier proposes to produce multi-coloured patterns, by having blocks cut similar to those used by paper-stainers, floorcloth-printers, and calico printers, and by applying fibres of one colour to the varnished ground-fabric by means of these blocks; a portion only will be thus covered, and the remainder is proposed to be covered with fibres of a different colour, applied as in the first method, but which will not adhere at the parts covered with the block-tint. A mode is described of employing stencil-plates instead of the carved blocks.

Mr. Sievier's *elastic* waterproof material is thus formed:—very thin sheets of caoutchouc are cemented by a solution of caoutchouc to gauze, bobbin-net, or other open material; and on this, as a ground, and with a similar cement of quick-drying caoutchouc, is laid a stratum of fibres. The fibres are pressed and dressed as in the former instance; but the resulting fabric differs in this—that the open and extensible meshes of the gauze or bobbin-net give to the whole an elasticity which closely-woven textures cannot impart.

4. The attempts to render leather waterproof depend in general on the filling up of the small pores which have previously admitted the tannin; the substance imbibed being such as will repel or resist water. Many such methods have been proposed at different times, of which the mention of a few will here suffice. Melt over a slow fire a quart of boiled linseed oil, a pound of mutton suet, three-quarters of a pound of yellow bees'-wax, and half a pound of common resin, or smaller quantities in the like relative proportions; and with this mixture saturate the leather of new boots or shoes, while the latter is slightly warm. Another method is to melt two ounces of yellow bees'-wax, two ounces of Burgundy pitch, and two ounces of turpentine, in a pint of linseed oil, and with this mixture to saturate the warmed leather. The 'Journal of the American Institute' gives the two following:—1. Boil together for half an hour one quart of linseed oil, two ounces of resin, and half an ounce of white vitriol, to which add four ounces of spirits of turpentine and two ounces of white oak sawdust, and apply this mixture to the leather by means of a brush. 2. Apply a coating of tallow to the leather; and after this has dried, coat it again with a mixture of one part of copaiba balsam with two of naphtha. Another mixture for this purpose consists of six ounces of caoutchouc boiled for two hours in two quarts of linseed or neat's-foot oil. Lastly, a mode has been much recommended in different quarters, of applying a hot mixture of two parts tallow and one part resin, with

which the leather may be completely saturated, the resin imparting an antiseptic quality to the tallow.

One of Mr. Sievier's contrivances is for rendering leather at once elastic and waterproof. A thin sheet of leather is cemented to a thin sheet of solid caoutchouc by a caoutchouc solution, and kept under pressure for five or six days. The compound fabric thus formed is nearly inelastic, because the leather has temporarily suspended the elastic power of the caoutchouc; but by the application of a temperature about equal to 180° Fahr., the caoutchouc partially collapses, and the leather assumes a corrugated surface, similar to Morocco leather. The leather, rendered thus elastic and waterproof, is then manufactured into boots and shoes or other articles.

WATFORD. [HERTFORDSHIRE.]

WATLINGTON. [OXFORDSHIRE.]

WATSON, RICHARD, D.D., was born in August, 1737, at Heversham, near Kendal, in Westmoreland, where his father, a younger son of a small statesman, or landowner, had been head master of the grammar-school from 1698: the family, supposed to have come originally from Scotland, had subsisted for at least three or four generations at Hardendale, near Shap. His mother's name was Newton. Old Watson had great reputation as a teacher; but Richard, who was the younger of his two sons, did not enjoy the advantage of having him for his master; for he had resigned his office in 1737, although he lived till November, 1753. Watson was educated under his father's successor, who took little pains to give him an accurate grammatical training; and about a year after his father's death he was sent, on an exhibition of 50*l.* belonging to the school, to Trinity College, Cambridge, where he was admitted a sizar, 3rd November, 1754. All he had, besides his exhibition, to carry him through college, was a sum of 300*l.* which his father had left him; but he set bravely to work to make his way to independence by hard study and hard living. It is said that at first his dress was a coarse mottled Westmoreland coat and blue yarn stockings. He offered himself as a candidate for a scholarship, which he obtained on the 2nd of May, 1757. In September following, while still only a junior soph, he began to take pupils, and continued to be so employed, first as private tutor, then as assistant college tutor, till, in October, 1767, he became one of the head tutors of Trinity College. Meanwhile he had taken his degree of B.A. in January, 1759, when he was declared second wrangler (he says himself, he ought to have been first); had been elected a fellow of his college in October, 1760; had graduated M.A. at the commencement in 1762; and in November, 1764, had been, on the death of Dr. Hadley, unanimously elected by the senate to the professorship of chemistry. This was a strange choice, for at that time Watson knew nothing of chemistry whatever; but he did not disappoint the confidence that was felt, by himself and others, in his ardour, application, and quickness of comprehension. With the assistance of an operator, whom he sent for immediately from Paris, and by immuring himself in his laboratory, he acquired such an acquaintance with his new subject as to enable him, in about fourteen months, to read his first course of lectures, which were honoured with a numerous attendance, and proved highly satisfactory. He afterwards delivered other courses, which were equally successful; in 1768 he printed a synopsis of the principles of the science under the title of 'Institutiones Metallurgicæ;' in 1769 he was elected a Fellow of the Royal Society, and during some years after this he contributed many chemical papers to the Philosophical Transactions. In 1771 he published 'An Essay on the subjects of Chemistry, and their General Divisions;' in 1781 he published two vols., 12mo., of 'Chemical Essays;' a third appeared in 1782; and a fourth in 1786 completed the work, which has often been reprinted, and was long very popular. But Watson's first publication, properly so called, was 'An Assize Sermon, preached at Cambridge,' 4to., 1769. About two years after this, in October, 1771, he was unanimously elected to the distinguished office of regius professor of divinity, although he was at the time neither D.D. nor B.D., and in truth seems by his own account to have known little more of divinity than he did of chemistry seven years before. But such was his good luck, or the reputation he had established for carrying his object, whenever he took one in hand, that no other candidate appeared. The professorship when he got it was worth about 330*l.*; but he boasts of having raised it to more than three times that value. Not that he ever had any pretensions to call himself a learned theologian: on the contrary, he was rather vain of being spoken of as the *Professor αὐτοδιδακτός*, the self-taught professor, or rather the professor who was indebted for what he knew neither to masters nor books. His constitution was, he says, 'ill fitted for celibacy;' so in December, 1773, he married the eldest daughter of Edward Wilson, Esq., of Dallam Tower, in Westmoreland; and the next day he went to North Wales to take possession of a sinecure rectory, procured for him from the bishop of St. Asaph by the duke of Grafton, which after his return to Cambridge he was enabled (also through means of his grace) to exchange for a prebend in the church of Ely. In 1780 he succeeded Dr. Plumptre as archdeacon of that diocese; the same year he was presented to the rectory of Northwold, in Norfolk; and in the beginning of the year following he received another much more valuable living, the rectory of Knaptoft, in Leicestershire, from the duke of Rutland, who had been his pupil at the university. He was now therefore tolerably well provided for.

Meanwhile his publications not already noticed had been, in 1772, two 'Letters to the Members of the House of Commons,' under the name of 'A Christian Whig,' in support of the clerical petition for the abolition of subscription; in 1773, also without his name, 'A Brief State of the Principles of Church Authority;' in 1776, a restoration sermon entitled 'The Principles of the Revolution Vindicated,' which made considerable noise, and, as he conceives, gave great offence at court and in courtly circles; the same year his well-known 'Apology for Christianity,' in answer to Gibbon; and two or three other sermons and charges. In March, 1782, on the appearance of Soame Jenyns's 'Disquisitions on Various Subjects,' the toryism of which annoyed him, he thought it necessary to defend his whig principles in 'An Answer to the Disquisition on Government' in that work.

In July, 1782, he was promoted to the bishopric of Llandaff, not exactly, as it would appear, on the application of his friend the duke of Rutland, but rather by the new prime minister, Lord Shelburne, of his own accord, in the expectation of thereby both gaining an active partizan and gratifying the duke. Of course Shelburne professed to have selected him from his own discernment of his merits. Let that have been as it may, Watson proved a very unmanageable bishop. Neither Shelburne nor any succeeding minister could ever get him to run in harness. The first thing he did after he found the mitre on his head was to publish, in 1783, 'A Letter to Archbishop Cornwallis on the Church Revenues,' recommending an equalization of the bishoprics. This he did in spite of all that could be said to make him see that he was doing a thing which would embarrass the government, and at the same time do nothing to forward his object. And so he continued to take his own way, and was very soon allowed to do so without any party or any person seeking either to guide him or stop him. He made some good and effective speeches in the House of Lords, but never originated nor even materially assisted in carrying any legislative measure. For the most part, in general politics, he sided with what was called the whig party; but he would not come up to vote for Fox's India Bill in 1783, and he had a theory of his own upon the subject of the treatment of the House of Commons by Pitt which followed. On the occasion of the king's illness in 1788, again, he went with his party in maintaining the right of the prince of Wales to the regency, for which it was thought at the time that he had a good chance of the bishopric of St. Asaph, then vacant; but his majesty's recovery dissipated that along with many more such flattering visions. However before this Watson had received a considerable accession to his fortune by the death, in 1786, of his friend and former pupil, Mr. Luther, of Ongar, in Essex, who left him in his will an estate which he sold for 20,500*l.* He grumbled on about having sacrificed himself to his principles, and being overlooked and left in poverty; but with his bishopric, and his professorship, and his archdeaconry, and his rectory—all, by the bye, as he managed the matter, either entire, or as nearly as possible, sinecures – in addition to this money and the profits of his various publications, his case could not well be expected to excite much commiseration.

What remains of his biography is little more than the catalogue of his other literary performances. In 1785 he published a useful 'Collection of Theological Tracts selected from various Authors for the Use of the Younger Students in the University,' in 6 vols. 8vo., which went through two large editions. 'An Address to Young Persons after Confirmation,' which he published in 1789, was also extensively sold. In 1790 he published anonymously 'Considerations on the Expediency of revising the Liturgy and Articles of the Church of England, by a consistent Protestant;' another of his adventurous proclamations of peculiar views, which brought upon him a good deal of outcry and obloquy. This was followed, in 1792, by 'A Charge delivered to the Clergy of his Diocese in June, 1791,' full of vituperation of the Corporation and Test Acts, and laudation of the French Revolution. Upon this latter subject, however, he soon after cooled considerably, as appeared by his next publication, a sermon published in 1793, which he entitled 'The Wisdom and Goodness of God in having made both Rich and Poor,' and which was expressly directed against the very democratic principles out of which the Revolution in France had sprung. He talks of the 'strange' turn which that great movement had by this time taken, as justifying or accounting for his apparent change of feeling about it; as if it was the course of events that had been in the wrong—not he and his anticipations. In 1796 appeared another of his best remembered works, his 'Apology for the Bible, in a Series of Letters addressed to Thomas Paine.' This was followed two years after by 'An Address to the People of Great Britain,' an energetic appeal in support of the war against France, which, the more perhaps by reason of the quarter it came from, excited immense attention. Fourteen regular editions of it, he says, were sold, besides many pirated ones. Some years after, in 1803, he published another tract, entitled 'Thoughts on the intended Invasion,' in the same spirit. Various Charges and single Sermons were also printed by him from time to time, which need not be noticed in detail. His last publication was a selection of his fugitive pieces, in two octavo volumes, which appeared in 1815, under the title of 'Miscellaneous Tracts on Religious, Political, and Agricultural Subjects.' The latter years of his life he spent mostly in retirement on his estate of Calgarth Park, in Westmoreland, which he amused himself in ornamenting and improving by building and planting. He died there on the 4th of June, 1816. He left several children. After his death appeared, under the superintendence of his son Richard Watson, LL.B., prebendary of Llandaff and Wells, the work from which the above particulars have been principally extracted, entitled 'Anecdotes of the Life of Richard Watson, Bishop of Llandaff, written by himself at different intervals, and revised in 1814.'

WATSON, ROBERT, a respectable Scotch author of the age of Hume, Robertson, and Adam Smith. Robert Watson was a native of St. Andrews, where his father combined the professions of brewer and apothecary. Robert completed the usual courses of languages and philosophy, and commenced the study of divinity in the university of St. Andrews. He attended the Divinity Hall in Glasgow for at least one winter, and finished his theological studies in Edinburgh.

In 1751, Adam Smith having removed to Glasgow, where he had been elected professor of logic, Watson was encouraged by Lord Kames to deliver a course of lectures on rhetoric and belles-lettres, similar to that which had been delivered by Smith. The reception these lectures met with encouraged him to repeat the course every winter during his continuance in Edinburgh.

In 1758, having become a licentiate, or, as it is called in Scotland, a 'probationer,' Watson offered himself a candidate for one of the churches of his native town, which happened to be vacant. The application was unsuccessful, but Mr. Henry Rymer, professor of logic in St. Salvador's college, entertaining thoughts of retiring on account of infirm health, Watson prevailed upon him, by the payment of a sum of money, to resign in his favour. The other professors sanctioned the bargain, and elected Mr. Watson professor of logic, and the Crown soon afterwards constituted him by patent professor of rhetoric and belles-lettres. Watson effected the same innovation in the university of St. Andrews that was effected about the same time in Glasgow by Smith and Reid, in Aberdeen by Beattie, and in Edinburgh by Finlayson. He substituted for a course of lectures on logic, properly so called, a course of lectures on the theory of the human mind, on the exercise of the reasoning faculty, and on literary criticism.

In 1777 Dr. Watson, stimulated by the success of Robertson's 'Charles V.,' published (at London), his history of 'Philip II. of Spain.' The work was favourably received in England, and immediately translated into French, Dutch, and German. This success encouraged the author to commence the history of Philip III., four books of which were completed at the time of his death in 1780. A few years before his death he had been promoted to be principal of the united colleges of St. Leonard and St. Salvador on the death of Principal Tullidelph. Watson left five daughters by his wife, who is said to have been a woman of great beauty, daughter of Dr. Shaw, professor of divinity in St. Mary's college. The four completed books of the history of Philip III., with two additional, by Dr. William Thompson, were published by that gentleman for the benefit of the author's family.

In a literary point of view the histories of Philip II. and III. of Spain are far inferior to the work of Robertson: they are heavy, not very elegant, and show nothing of a comprehensive or philosophical mind in the author. They are however impartial, but for a slight natural bias of the author in favour of the Protestant party. The narrative is sufficiently distinct and intelligible. The earl of Hardwicke communicated some important MSS. to the author. He does not appear to have consulted the Spanish authorities for the Life of Philip II., and in compiling the History of Philip III. he seems to have been ignorant of the existence of Khevenhüller's 'Annales Ferdinandei.' English critics complain of the parade of military technicalities with which the 'History of Philip II.' in particular is overlaid: and M. de Beauchamp points out that the transactions in the Spanish colonies, in Naples and Sicily, are almost entirely overlooked. Schiller speaks in high terms of the 'History of Philip II.,' but he had not consulted the original authorities, and estimated the work, without reference to its accuracy or elegance, by the quantity of materials which it supplied for his imaginative pictures or philosophical speculations.

(Woodhouselee's *Life of Lord Kames*; Chalmers's *Biographical Dictionary*—Lives of Adam Smith, Blair, and Watson; *Preface to the Life of Philip III.*; *Biographie Universelle*—Lives of Philippe II. and III., and Watson; Schiller's *Abfall der vereinigten Niederlände.*)

WATT, ROBERT, M.D., is the author of a well-known work, entitled 'Bibliotheca Britannica, or a General Index to British and Foreign Literature,' 4 vols. 4to., Glasgow, 1819-1820; Edinburgh, 1821-1824. The account given of him in that work (sent to the press after his death) is that he was born in Ayrshire in 1774, that he died at Glasgow 12th March, 1819, that he was president of the Faculty of Physicians and Surgeons of Glasgow, and lecturer on the theory and practice of medicine, and that he had published the following works during his lifetime:—'Cases of Diabetes, Consumption, &c.,' 8vo., Paisley, 1808; 'Catalogue of Medical Books,' 8vo., Glasgow, 1812; 'Treatise on the History, Nature, and Treatment of Chincough,' 8vo., Glasgow, 1813; 'Rules of Life, with Reflections on the Manners and Dispositions of Mankind,' 12mo., Edinb., 1813 (anonymous); besides a few papers in the 'Transactions' of the Medico-Chirurgical and one or two other societies. We have found no account of him any where else.

The 'Bibliotheca Britannica' is in two parts: the first containing an alphabetical arrangement of authors, with the published works of each in chronological order: the second, a similar arrangement of subjects, with an enumeration of the books treating of them, and references to the entry of each work under the author's name in the first part. The compilation, prepared amid the calls of a professional life and without access to any extensive library, and carried through the press without having the advantage of the author's revision, is no doubt chargeable with many positive errors, as well as with important deficiencies; but it is notwithstanding both a remarkable performance for an individual and an aid of very considerable utility in many literary investigations. It cannot be relied upon as an authority, but it is serviceable as a guide or indicator.

WATT, JAMES, 'who,' to adopt the eloquent language of the inscription placed by Lord Brougham upon his statue in Westminster Abbey, 'directing the force of an original genius, early exercised in philosophic research, to the improvement of the steam-engine, enlarged the resources of his country, increased the power of man, and rose to an eminent place among the illustrious followers of science and the real benefactors of the world,' was born at Greenock on the 19th of January, 1736. His great-grandfather farmed his own small estate in the county of Aberdeen, and was killed in one of the battles of Montrose, after which the vengeance of the dominant party led to the confiscation of his property, and rendered his son Thomas dependant upon the care of some distant relations. The condition of Thomas Watt led him to studious habits, and on the return of more tranquil times, he established himself at Greenock as a teacher of mathematics and navigation. He resided, it is stated, in the adjoining burgh of Crawford's Dyke, of which, for several years, he was baron-bailie, or chief magistrate; and he died in 1734, at the age of ninety-one or ninety-two, and was buried in the West Churchyard at Greenock. Thomas Watt left two sons, John and James, the former of whom followed his father's profession, but died in 1737, leaving a chart or survey of the river Clyde, which was subsequently published under the care of his younger brother, the father of the great engineer. This individual was at once a ship-chandler, a builder, and a merchant, and was for upwards of twenty years town-councillor, treasurer, and bailie of Greenock, where he is celebrated for the zeal and intelligence with which he performed his duties, and encouraged public improvements. By his various occupations he obtained an honourable fortune; but some unsuccessful enterprises deprived him of a portion of it before his death, which took place in 1782, in the eighty-fourth year of his age. He married a lady named Muirheid, who was the mother of James Watt.

Being, even in infancy, of a very delicate constitution, the early education of James Watt was in a great measure of a domestic character, although he attended for a time the public elementary school at Greenock. His ill health, which often confined him to his chamber, appears to have led him to the cultivation, with unusual assiduity, of his intellectual powers. It is said that, when only six years of age, he was discovered solving a geometrical problem upon the hearth with a piece of chalk; and other circumstances related of him justify the remark which is said to have been elicited from a friend on the above occasion, that he was 'no common child.' About 1750, or shortly afterwards, he amused himself by making an electrical machine; and from a curious anecdote related by Arago, it would appear that the grand subject by which he subsequently immortalized himself formed, thus early, matter of contemplation to the young philosopher. The anecdote referred to appears to have been communicated to Arago by a member of Watt's family. It is somewhat differently rendered in different translations, but is, in effect, that his aunt, Mrs. Muirheid, who did not entertain the same opinion as his father of the powers of the boy, upbraided him one evening at the tea-table for what seemed to her to be listless idleness: taking off the lid of the kettle and putting it on again; holding sometimes a cup, and sometimes a silver spoon, over the steam; watching the exit of the steam from the spout; and counting the drops of water into which it became condensed. With the increased light imparted by a knowledge of his subsequent career, the boy pondering before the tea-kettle will, as observed by his enthusiastic French biographer, be viewed as the great engineer preluding to the discoveries which were to immortalize him.

John, a younger brother of James Watt, (who was lost at sea in one of his father's vessels, in the year 1762, at the age of twenty-three,) having determined to adopt the business of his father, James was left to follow, in the choice of a profession, the bent of his own inclination; but the versatility of his talents rendered the choice somewhat difficult. During his youth his taste for the beauties of nature and love for botany had been developed on the banks of Loch Lomond, while his rambles among the mountain scenery of his native land called forth an attention to mineralogy and geology. Chemistry was a favourite subject when he was confined by ill health to his father's dwelling. The boundless field of natural philosophy was opened to him by the popular work of 'S Gravesande, translated from his 'Physices Elementa Mathematica;' and, like many other valetudinarians, he read eagerly works on surgery and medicine. He was found on one occasion conveying into his room for dissection the head of a child who had died of some unknown disease. Leaving, however, all these studies, Watt applied himself to the profession of a mathematical-instrument maker. It is usually stated, without any allusion to preliminary instruction in this art, that he removed to London in 1755, to place himself under Mr. John Morgan, mathematical and nautical-instrument maker, in Finch Lane, Cornhill; but a contemporary memoir published in the 'Public Characters' of 1802-3, states that he was, at the age of sixteen, 'articled as an apprentice to learn the art of "an instrument-maker," a sort of business,' it is observed, 'of which we have no idea in the metropolis of the United Kingdom; and, indeed, which is not now common even in Glasgow or other large towns either in north or south Britain.' 'At that period,' we are further informed, 'this profession included the making and repairing of the instruments made use of in experiments in mechanics and natural philosophy; the manufacture, in a rough way, of all kinds of musical instruments, and of theodolites, quadrants, and other instruments necessary for the practice of land-surveying.' The account referred to does not state the place of Watt's apprenticeship, which is there said to have been for three years, a period rarely exceeded in Scotland unless for the sake of obtaining certain privileges independent of the mere learning of the trade or profession; but from the narrative of Stuart* it would appear to have been Glasgow, since it is stated that during his visits to a maternal aunt at that place, Watt became interested in the operations of a mechanic 'who eked out a scanty subsistence by making and repairing fishing-tackle, and the simple instruments used in mechanical drawing.' By turns a cutler and a whitesmith, a repairer of fiddles, and a turner of spinets, he was, we are informed, a useful man at almost every thing. 'He retailed nicknacks of many kinds, and through dealing in spectacle-glasses, he was dignified with the title of an optician.' Such, according to Stuart's description, was the person with whom Watt learnt the rudiments of instrument-making, and with whom, according to this authority, he remained not quite two years. After this kind of apprenticeship, Watt removed to London, where he acquired ready and orderly methods of despatching business, and where, also, by sitting too near to the door of the workshop in winter, he caught a severe cold, the effect of which he felt occasionally until his sixtieth year, when the distressing headaches thereby occasioned ceased to afflict him. It is somewhat curious that this connection with the humble instrument-maker of Glasgow should not be noticed by Arago, who derived much of his information from the surviving son of Watt; by his relative, Mr. Muirhead; nor by his son himself, who is mentioned in the seventh edition of the 'Encyclopædia Britannica' as the author of the life published in that work, which first appeared, some years since, in the 'Supplement;' but as the dates and other circumstances agree, there does not appear to be any reason for doubting the substantial accuracy of the narratives referred to. The memoir by his son merely states that the desire of improvement in an art then little practised in Scotland, induced young Watt to visit London (according to this account in his eighteenth year), where however he remained little more than twelve months, when the infirm state of his health compelled him to return to the parental roof.

Shortly after his return from London, Watt endeavoured to establish himself in business in Glasgow, but, owing to his not being a burgess, he met with opposition from the corporations of arts and trades, who considered him an intruder upon their privileges, and refused to allow him to set up even the humblest workshop. From this difficulty he was extricated by the interposition of the authorities of the University, which was not under city jurisdiction. The University offered him an asylum within their precincts, where they permitted him to establish a shop; and they also honoured him with the title of their mathematical-instrument maker. These circumstances happened about the year 1757, when Watt had scarcely attained his twenty-first year; and it appears that he was especially indebted, for the friendship shown by the authorities of the University, to the kind offices of Adam Smith, author of the 'Wealth of Nations,' Dr. Black, Robert Simson, the eminent mathematician, and Dr. Dick, professor of natural philosophy. In this profession Watt displayed much ingenuity and manual dexterity; and his superior intelligence led those who had first known him only as an expert and amiable artificer, to form habits of intimacy and friendship with him, so that his workshop became a favourite resort for the most eminent scientific men in Glasgow. His intimate friend, the late Professor Robison, then a student ardently pursuing his investigations in mathematical and mechanical philosophy, in an unpublished MS. used by Arago, expresses the surprise which he felt when, on being introduced to Watt, whom he expected to find merely an intelligent workman, he found a philosopher, as young as himself, yet willing and able to instruct him, or any of the students who might fall into difficulties. He needed but prompting to take up and conquer any subject; and Robison states that he learnt the German language in order to peruse Leupold's 'Theatrum Machinarum,' because the solution of a problem on which he was engaged seemed to require it; and that similar reasons led him subsequently to study Italian. Without neglecting his business in the daytime, Watt devoted his nights to various and often profound studies; and the mere difficulty of a subject, provided it was worthy of pursuit, seems to have recommended it to his indefatigable character. In illustration of this characteristic of his mind, it is related that he undertook and accomplished the building of an organ, although he is said to have been so totally insensible to the charms of music that he could not distinguish one note from another. His instrument was no less remarkable for its harmony than for several important improvements in its mechanical details; and he is stated to have conquered certain difficulties respecting the theory of temperament in music, a matter then very little understood, and of which he could have gained no knowledge except through the profound but very obscure work published on the subject by Dr. Robert Smith of Cambridge.

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* In the very amusing work entitled 'Historical and Descriptive Anecdotes of Steam-Engines, and of their Inventors and Improvers,' where it is also stated that young Watt might occasionally be observed (whether during his apprenticeship or at a previous period is not stated) during the hours allotted for his recreation, exhibiting a box of philosophical toys to the students assembled at the college gate at Glasgow. 'Of a slender form,' observes the writer from whom we quote, 'and sickly in his appearance, his retiring and bashful manners but ill accorded with the assurance required to attract attention to a collection of "candle-bombs" which he had fabricated, and hoped by their sale to add to the means of his boyish enjoyments,' p. 218.

The earliest occasion on which the attention of Watt was seriously directed to the properties of steam appears to be that mentioned under Steam-Carriage (vol. xxii., p. 486); and his son states that about 1761 or 1762 he tried some experiments on the force of steam in the apparatus known as Papin's digester; and constructed and worked a small model, consisting of an inverted syringe, the bottom of the rod of which was loaded with a weight; alternately admitting the steam below the piston and letting it off into the atmosphere. Thus he practically demonstrated the power of steam used as in modern high-pressure engines; but he soon abandoned these experiments, and he appears to have entertained a prejudice against the use of high-pressure steam throughout his subsequent career. The event to which the commencement of his invaluable discoveries may be most distinctly assigned, took place in the winter of 1763-4, when Professor John Anderson, who occupied the chair of natural philosophy in the university of Glasgow, requested him to examine and repair a small model of Newcomen's steam-engine, which could never be made to work satisfactorily. His sagacity led him to discover and remove the defects of this model, which was subsequently used in the class-room; and by this circumstance he was led to detect the imperfections of the machine itself, and to investigate those properties of steam upon which its action depended. About this time he left the college and took up his abode in the town previous to his marriage with his cousin, Miss Miller, in the summer of 1764. Arago states that he went with Dr. Cleland to endeavour to find the house, near the harbour of Glasgow, to which Watt retired to follow out his important experiments, but found it pulled down, its site being, appropriately enough, occupied for the manufacture of colossal steam-boilers.

By referring to the article Steam-Engine (vol. xxii., p. 474), where the action of Newcomen's machine is described and illustrated by a diagram, it will be seen that its effective working depended upon two apparently irreconcileable conditions: first, that when the cylinder was full of steam, a degree of coldness should be produced within it that should occasion the sudden condensation of the steam, and thereby produce a partial vacuum beneath the piston, which should cause the atmospheric pressure on its upper surface to force it down with sufficient rapidity to give motion to machinery for working a pump; and, secondly, that immediately after the completion of one stroke the temperature of the cylinder should be again raised to such a degree as to enable it to become refilled with steam preparatory to another stroke. A considerable quantity of steam was lost between each stroke in effecting the second object; and when it was accomplished, as the cylinder was too hot to allow the immediate condensation of the steam just admitted, time was lost in cooling it again. Watt calculated that the amount of heat lost from this radical defect of the old, or, as it is usually called, the 'atmospheric' steam-engine, was three times as much as was applied to the efficient action of the machine. Such was the best, perhaps it is not too much to say the only efficient steam-engine used before the time of Watt; and notwithstanding its wasteful expenditure of fuel, it was extensively used for the purpose of draining mines. It was thus applied in the collieries in the north of England, in the tin and copper mines of Cornwall, and in the lead-mines of Cumberland. Shortly after the middle of the eighteenth century it was applied to the purpose of raising water to turn water-wheels, and it was used also for the working of blast-furnaces for smelting iron-ore, and in a few cases for raising water for the supply of towns; but its use was necessarily limited by the enormous cost of working, as well as by its defective and clumsy construction. Watt perceived that it was desirable, in order to the efficient use of the steam, that the cylinder should always be kept as hot as the vapour which entered it; to provide for which he had recourse to the beautifully simple expedient of condensing the steam in a separate vessel, which might always be kept cool, and between which and the cylinder a communication might be opened whenever the piston was required to descend. This arrangement being perfected, he next devised means for deriving the fullest possible advantage from it, by maintaining a uniform and high temperature in the cylinder; an object which he accomplished by enclosing its upper end with a cap or cover, through which the piston-rod could slide freely up and down by means of the air-tight aperture called a stuffing-box, and by employing the elastic force of steam, instead of the pressure of the atmosphere, to depress the piston whenever a partial vacuum was formed beneath it by condensation. The uniform warmth of the cylinder was further promoted by surrounding it with a *jacket*, or outer casing, and filling the intervening space between its inner and outer walls with steam. A fuller account of these modifications is given under Steam-Engine. The invention was in its main features completed as early as 1765; and in the course of his early experiments Watt was much struck by the great heat communicated to the injection-water by which the condensation was effected by a very small quantity of steam, a circumstance which led him by further trials to the discovery that water converted into steam would heat about six times its own weight of water at 47° or 48° to 212°. Being struck with, and not understanding the reason of, this remarkable fact, as he himself states in the notes to Robison's 'Mechanical Philosophy,' Watt mentioned it to his friend Dr. Black, who then explained to him his doctrine of latent heat, which he had taught some time previously, although Watt states that he had either not heard of it, or not attended to it when he thus, to use his own words, 'stumbled upon one of the material facts by which that beautiful theory is supported.' In order to correct an erroneous statement which may have obtained wider circulation than its refutation, we insert a further quotation from the above notes, where Watt observes—'Dr. Robison qualifies me as the pupil and intimate friend of Dr. Black, and goes the length of supposing me to have professed to owe my improvements upon the steam-engine to the instruction and information I had received from him, which certainly was a misapprehension. He is also mistaken in his assertion that I had attended two courses of the Doctor's lectures. Unfortunately for me, the necessary avocations of my business prevented me from attending his or any other lectures at college.'

The marriage of Watt released him from the difficulty which had compelled him to establish himself in the precincts of the college, his wife being the daughter of a freeman. Being thus rendered a freeman himself, he opened a shop in the Salt-market, when his increasing business led him to require the labours of an assistant. The success of his first experiments induced Watt to determine upon the construction of a larger model than could be conveniently and privately constructed at his usual place of business, and therefore he set up this machine, with the assistance of his ingenious apprentice, John Gardiner, in one of the rooms of a pottery or 'delft-work,' which he had assisted in establishing near Glasgow, and in which he held a share. An accident terminated his experiments with this engine, which had a cylinder of nine inches diameter, and which, as far as it was worked, proved satisfactorily the practical importance of his improvements; and as neither his leisure nor his means enabled him to proceed, the project was for a time laid aside.

In addition to his employment as a mathematical instrument maker, Watt devoted much time to the practice of land-surveying, and this led to the employment of his superior talents in the more important departments of civil engineering. Such engagements appear to have occupied much of his attention between the year 1765, when the leading features of his invention were perfected, and 1768, when he found in Dr. John Roebuck, to whom he had become known as a surveyor, an individual capable of appreciating the value of his improvements, and sufficiently enterprising to support him in further experiments. Dr. Roebuck, who is perhaps best known as the founder of the Carron iron-works and the vitriol-works at Prestonpans, was at this time engaged in an extensive colliery undertaking at Kinneil, a few miles from Carron; and in an outbuilding connected with his residence Watt commenced, in the winter of 1768, a third model, on a much larger scale than either of the preceding. This engine had a cylinder of block-tin, eighteen inches in diameter; and in its construction many difficulties had to be overcome, arising partly from inexperience as to the proportions of the several parts, but mainly from the imperfect workmanship unavoidable during the infancy of the art of machine-making. One great difficulty consisted in the steam-tight packing of the piston, which could not be effected, as in the old engines, by covering it with a body of water. At length, after eight months' labour, Watt and Roebuck had the satisfaction of seeing the machine in successful operation. The saving of fuel was enormous; the saving effected in the supply of water for condensation was little less important, and the result of the experiment fully satisfied Roebuck, who obtained a share in the patent by which Watt secured his inventions. This patent had been applied for in 1768, before the engagement with Roebuck, and it was obtained on the 5th of January, 1769.*

In the summer of that year however the mining speculations of Roebuck involved him in such embarrassments that he was compelled to abandon the experiments with Watt's engine, and Watt himself was therefore obliged to return to his former avocations as an engineer and surveyor (he having relinquished the business of instrument-making in 1768), and to such engagements he chiefly devoted himself until the close of the year 1773. Among the surveys and engineering works in which Watt was engaged before he finally devoted himself to the carrying out of his improvements on the steam-engine was a projected canal between the Forth and the Clyde, by what was called the Lomond passage, in which he was engaged in 1767, when Smeaton was engaged on similar surveys upon a rival line. He also planned and superintended the execution of a canal for conveying the produce of the Monkland collieries to Glasgow. He was engaged upon the Crinan canal, which was subsequently completed by Rennie; and the deepening of the river Clyde, improving the navigation of the Forth and Devon, and the Water of Leven; a canal from Machrihanish Bay to Campbeltown; another from the Grand Canal to the harbour of Borrowstownness; improvements in the harbours of Ayr, Port Glasgow, and Greenock; and the building of bridges at Hamilton and Rutherglen, are among the engineering works and projects with which he was connected. Business of this description crowded upon him, and it is stated, in the 'Encyclopædia Britannica,' that his reports are remarkable for their perspicuity and accuracy. In his surveys he used an improved micrometer (of which a description is given in Brewster's 'Edinburgh Encyclopædia,' article 'Watt'), and also a machine for drawing in perspective, both of which he had himself invented. It was while engaged on the greatest engineering work undertaken by him, the surveying and estimating a line of canal between Fort William and Inverness, since executed by Telford on a larger scale than was then proposed, under the name of the Caledonian Canal, that Watt, in the latter part of the year 1773, received intelligence of the death of his first wife; and he soon afterwards determined to follow the advice of his friend Dr. William Small, of Birmingham, and to accept an invitation from Matthew Boulton, the founder of Soho, to settle in England.

Boulton, to whom Dr. Roebuck transferred his share in the property of Watt's invention, was a man eminently qualified to bring it into profitable operation; his energetic and business-like habits supplying what was wanting in the character of Watt to cope with and eventually to conquer those moral obstacles which, far more than any mechanical difficulties, rendered the introduction of the improved steam-engine an arduous undertaking. He also possessed in his works at Soho mechanical facilities of a superior order, as well as a large capital to establish the manufacture of steam-engines. In short, as has been well observed by Stuart, 'to a man like Watt, so unfitted, from feeling and habit, to stand alone, nothing could have been more auspicious than his gaining the protection of two such men (as Roebuck and Boulton) in succession. Obstacles were seen by either only to be surmounted, and they both possessed, in an eminent degree, the master-art of infusing into all around them a portion of their own matchless energy. Projectors themselves, they were considerate of his feelings, and knew how much the flow of thought in irresolute or hesitating genius is quickened by the kindness of a patron. Assisted by their experience, and animated by their generous approbation of what he had already achieved, he was roused and carried onward to impart greater perfection to his mechanism.' Watt's connection with Boulton commenced early in the year 1774, and they remained in partnership until 1800, when Watt retired from business; but their friendship continued undiminished until Boulton's death, after which Watt expressed, in his notes upon Robison's account of the steam-engine, his high esteem for his former partner, in the passage quoted under Boulton, vol. v., p. 274.

By the latter end of 1774, Watt completed at Soho, with all the facilities afforded by the expert artisans under Boulton's command, his fourth model engine, which was exhibited to a deputation from the Cornish miners, and to other persons competent to judge of its performances, which were deemed highly satisfactory. Perfect however as was the action of the improved machine, the patentees knew that much remained to be done to bring it into extensive operation; that costly machinery must be constructed to assist in the fabrication of the new engines; and that a protracted struggle with ignorance and prejudice was to be anticipated before any remunerative return could be expected. As five years out of the term of fourteen years for which the patent was granted had already elapsed, it did not appear probable that the remainder of the term would suffice for the reimbursement of past and prospective expenses; while there was no doubt that, the preliminary difficulties once fairly conquered, an active competition in the construction of the improved engines would immediately follow the termination of the exclusive privilege held by Watt and his partner. They therefore immediately applied to parliament for an extension of the term of their patent; and, although the application was met by a violent opposition, in which Edmund Burke took part, 'not,' as observed by Muirhead, 'from any hostility to Mr. Watt or his patent, but simply from a sense of duty in defending what he conceived, or what were represented to him to be, the claims of a constituent,' and which occasioned great expense and anxiety to the patentees, it was ultimately successful, an act being passed in 1775 (15 Geo. III., c. 61),

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* The above date is taken from a chronological list of patents relating to the steam-engine, printed at the end of Stuart's 'Anecdotes of Steam-Engines;' and it serves to correct the erroneous impression conveyed by the narrative in pp. 248, 249 of that work, that the patent was procured in consequence of the success of the experiment at Kinneil. According to the brief summary contained in Stuart's list of patents, the objects embraced in this [illegible] are as follow:—'Excluding atmosphere from cylinder—keeping cylinder as hot as the steam—condensation produced in separate vessels—air extracted from condenser by pumps—pistons pressed by the steam—a steam-wheel (or rotary engine)—partial condensation of steam—using oil and wax, instead of water.'—(*Anecdotes, &c.*, p. 627.)

‘vesting in James Watt, engineer, his executors, administrators, and assigns, the sole use and property of certain steam-engines, commonly called fire-engines, of his invention, described in the said act, throughout his majesty's dominions,’ for a period of twenty-five years from the passing of the act. Being thus secured a return for their outlay, the patentees prepared for the manufacture of steam-engines upon the most extensive scale, and with a degree of accuracy never before applied in the production of large machinery. In order fully to comprehend the difficulties conquered by Watt, it must be remembered that his machine required much more accurate workmanship than those which it was to supersede, and that, as stated by Mr. Boulton, the son of his partner, at the meeting held at Freemasons' Hall in 1824, for erecting a monument to Watt, ‘at the period of the construction of the first steam-engine upon his principles at Soho, the intelligent and judicious Smeaton, who had been invited to satisfy himself of the superior performance of the engine by his own experiments upon it, and had been convinced of its great superiority over Newcomen's, doubted the practicability of getting the different parts executed with the requisite precision; and augured, from the extreme difficulty of attaining this desideratum, that this powerful machine, in its improved form, would never be generally introduced.’ Stuart states that when the engine tried at Kinneil was made, there were but one or two artists who could give the requisite truth of workmanship to air-pump cylinders of two inches diameter; while Watt required similar accuracy in cylinders of many thousand times their capacity, and in the large pistons, piston-rods, and other working parts of his machine.

The opposition raised to an extention of the patent had the effect of exciting the public attention, and the commercial tact of Boulton greatly facilitated the introduction of the machine to general use. Pursuing throughout an enlightened and liberal policy, the patentees invited the public to an inspection of the engine, freely explained the principles of its action, and promoted a series of experiments under the inspection of practical and scientific mechanics whose professional character and position in society placed their testimony beyond suspicion. Similar experiments were made, before the same persons, on an engine of Newcomen's construction, of the best make and in perfect order; and the results as to quantity of coal consumed, and amount of work done, in a given time, were contrasted. Thus the immense saving effected was rendered manifest to the parties to whom the use of the machine was recommended, and the remuneration of the patentees was made proportional to that saving. Without attempting to realize their profit as manufacturers of the engines, Messrs. Boulton and Watt claimed only, by way of rent, the value of one-third part of the coals saved by using their improved machine instead of the old fire-engine. After paying this very moderate claim, it cost little more than half the money previously paid to perform a given amount of work, to say nothing of the great saving of room, water, and repairs. Not only were the engines supplied, at certain fixed prices, according to size, at such a rate as would have been charged by any neutral manufacturer; but where persons were either unable or unwilling to throw aside the expensive apparatus which they might have already in operation, the patentees took the old engines in part payment for the new, often at rates far beyond their real value; while in other cases they erected machinery worth thousands of pounds on condition of being paid when they produced the estimated advantage. In some instances parts of the old machinery were brought into use, as, for instance, by placing a smaller working-cylinder within the old one, and using it as the outer case or jacket; when, although the new cylinder was seldom more than half the size of the old one, the power of the machine was so augmented as to present a striking illustration of the value of the patented improvements. Still further to facilitate the adoption of the new machinery by rendering the terms upon which its use was allowed as clear as well as liberal as possible, the patentees laid down a standard of horse-power by which to calculate the power of their machines; and in so doing their honourable spirit was rendered strikingly manifest, since, instead of taking a low standard of horse-power, which would have increased the *apparent* value of their engines, they estimated the power of a horse as equal to raising 33,000 lbs. one foot high in a day, while Smeaton had valued the force of a strong English horse as low as 22,000 lbs.; and they moreover calculated their machinery so as to perform work equal to raising 44,000 lbs. a foot high for every nominal horse-power; so that, in fact, what they called a *five*-horse-power engine would perform as much as *ten* horses according to Smeaton's estimate. Even these liberal terms and modes of computing the power of their machines might have proved objectionable if saddled with the necessity for frequent inspection on the part of the patentees or their agents; and therefore, at once to avoid all vexatious interference for the purpose of ascertaining the amount of work really done, and to afford to all parties a satisfactory check upon every species of fraud by which the engines might be represented as doing more or less than they really did perform, Watt contrived an apparatus for counting and registering the strokes of the great lever or beam of the engine, and thereby affording unerring and indisputable data for computing the duty performed. This apparatus, or *counter*, was locked up in a box with two keys, one of which was kept by the proprietor of the engine, and the other by the patentees, who employed a confidential agent to open and examine the apparatus, in the presence of the proprietors, every three months.

Of the spirited manner in which Boulton conducted the mercantile department of the great adventure some idea may be formed from the fact, that upwards of 47,000*l*. was spent before the patentees began to receive any return; but at length their remuneration began to pour in, and in no scanty stream. In Cornwall and other mining districts, especially where coal was not abundant, the new engines speedily replaced the old; and although in many cases the patentees agreed to receive a fixed sum, lower than the amount that would have been payable to them under the usual agreement, in lieu of the stipulated rent, they soon realized a very large annual revenue. In one instance, at the Chacewater mine, in Cornwall, where three very large engines were employed, the proprietors agreed to pay 800*l*. per annum for each engine as a compromise for the patentee's share of the saving of fuel.

The chief application of the old atmospheric engine, and also of Watt's first improvement upon it, was for the purpose of pumping water from mines, a purpose for which the circumstance of its power being applied only during the downward stroke of the piston was of little consequence. As, however, the extension of manufacturing operations called for the introduction of some powerful and manageable prime-mover, more uniform in its action and less dependent upon local circumstances than either wind or water, various attempts were made to apply the steam-engine to this purpose, for which, in most cases, it was necessary to convert its alternating rectilinear motion into a continuous circular motion. Prior to the time of Watt, the principal means adopted for accomplishing this object, which however was very seldom attempted, was to employ the engine in pumping water into an elevated reservoir, in its descent from which it might turn a water-wheel. A large atmospheric engine was erected for this purpose, in 1752, at Champion's copper and brass works, near Bristol; and such engines were subsequently introduced at several other places, among which was the Soho works. Watt was fully aware of the importance of some more convenient method of obtaining rotatory motion from the steam-engine; and of the numerous plans which had either been tried by others or were suggested by his own fertile imagination, he appears to have considered none equal to the common crank, the efficiency of which was shown by its use in the lathe, the knife-grinder's wheel, and other machines in common use long before its application to the steam-engine was thought of. A difficulty however presented itself in the application of the crank to the single-acting engine, or that which exerted power in the down-stroke only, because it would have been necessary to use a very heavily-loaded fly-wheel to keep up and equalize the motion imparted by the separate impulses of the piston, to avoid which Watt once proposed to employ two engines, working distinct cranks on the same axle. Watt however was not the man to publish his inventions until he had brought them to a considerable state of perfection; and consequently in this, as in some other cases, parties who were anxiously watching to obtain, by the most unscrupulous means, a share in the advantages of his ingenuity, were enabled to steal a march upon him. While his attention was directed to other important points, patents were obtained, in or about the years 1779 and 1780, by persons named Wasbrough and Pickard, for obtaining rotatory motion from a steam-engine, the plan proposed by Pickard being the simple crank and fly-wheel. Since it appears probable that the idea was obtained through a workman employed by Watt, it is likely that this patent might have been overturned; but as Watt did not think fit to contest it, he used, during the continuance of Pickard's patent, his own beautiful contrivance known as the sun-and-planet wheel. It has however been stated, in the 'Encyclopædia Britannica,' that Watt did actually use the crank, in defiance of Pickard's patent, whenever it suited his purpose, and that he was never molested for so doing. Few points in the history of machinery are more curious than the rivalry which existed on this subject, and the complicated contrivances proposed for doing that which is so simply and efficiently done by the crank; and many well informed persons, among whom was Smeaton, doubted the possibility of obtaining a perfect circular motion, like that produced by the efflux of water in turning a water-wheel, from the reciprocating lever of a steam-engine. Perhaps no improvement could be named of equal importance in rendering the steam-engine available as a prime-mover of machinery, as that by which the action of the steam was enabled, by a new arrangement of valves, to impel the piston upwards as well as downwards, thereby doing away with the necessity for balance-weights or any similar contrivance; an arrangement which Watt described and explained by a drawing during his application to parliament for an extension of his patent, although he did not actually patent it until 1782, prior to which time he is said to have privately constructed one or more engines on this, which is known as the *double-acting* principle. The adoption of this construction involved several other important changes in the machine, among which was the exquisitely beautiful arrangement called the parallel motion, from the working of which Watt himself stated that he derived all the pleasure of novelty which he could have experienced in examining the invention of another. Our space however will not admit of any detail of the improvements introduced under the successive patents of 1781, 1782, 1784, and 1785; and it is the less necessary, because many of them are described in the article STEAM-ENGINE. Even at the present time, notwithstanding all the light thrown upon the subject by succeeding engineers, we are perhaps not in a position fully to realize the advantages of one of his beautiful inventions, that of working steam expansively, or cutting off the access of steam when the piston has performed but a part of its stroke, and leaving it to be impelled through the remainder of its course by the expansive force of the steam already admitted. He is said to have tried this mode of working at Soho as early as 1776, although it was not made public till two years after that time. Suffice it to say, in concluding this brief sketch of the series of improvements by which Watt raised the steam-engine to its present state of efficiency, that, as expressed by Lord Jeffrey in the eulogium originally published in the 'Scotsman' newspaper a few days after his death, as to all that is admirable in the structure of the machine, or vast in its utility, Watt should rather be described as its *inventor* than as its *improver*. 'It was by his inventions,' observes the writer alluded to, 'that its action was so regulated as to make it capable of being applied to the finest and most delicate manufactures, and its power so increased as to set weight and solidity at defiance. By his admirable contrivances it has become a thing stupendous alike for its force and its flexibility, for the prodigious power which it can exert, and the ease and precision and ductility with which it can be varied, distributed, and applied. The trunk of an elephant that can pick up a pin or rend an oak is as nothing to it. It can engrave a seal, and crush masses of obdurate metal like wax before it,—draw out, without breaking, a thread as fine as gossamer; and lift a ship of war like a bauble in the air. It can embroider muslin and forge anchors, cut steel into ribands, and impel loaded vessels against the fury of the winds and waves.' Nor, while we admire the ingenuity and power of the stupendous machine, should we forget that its contrivance involved very much beyond the range of a mere practical mechanic, however great. With the generosity of a kindred spirit, the late Sir Humphry Davy observed, at the meeting for erecting the Watt monument, that Watt 'was equally distinguished as a natural philosopher and a chemist,' and that 'his inventions demonstrate his profound knowledge of those sciences, and that peculiar characteristic of genius, the union of them for practical application;' and showed that, in the prosecution of his great object, Watt 'had to investigate the cause of the cold produced by evaporation, of the heat occasioned by the condensation of steam—to determine the source of the air appearing when water was acted upon by an exhausting power; the ratio of the volume of steam to its generating water, and the law by which the elasticity of steam increased with the temperature: labour, time, numerous and difficult experiments, were required for the ultimate result; and when his principle was obtained, the application of it to produce the movement of machinery demanded a new species of intellectual and experimental labour. He engaged in this with all the ardour that success inspires, and was obliged to bring all the mechanical powers into play, and all the resources of his own fertile mind into exertion; he had to convert rectilineal into rotatory motion, and to invent parallel motion. After years of intense labour, he obtained what he wished for; and at last, by the regulating centrifugal force of the *governor*, placed the machine entirely under the power of the mechanic, and gave perfection to a series of combinations unrivalled for the genius and sagacity displayed in their invention, and for the new power they have given to civilized man.'

It is painful to turn from the record of the meeting at which Davy thus joined with others among the most eminent men of his time in doing honour to the memory of the great engineer, to the narration of the disgraceful measures by which, not many years before, it was attempted to deprive him of his well-earned emoluments. Even among the Cornish miners, who were deriving the greatest advantages from his machinery, and would in many cases have been compelled to abandon their works but for its giant aid, there were men who grudged to pay him the stipulated third part of their savings, and who took advantage of the pretences afforded by piratical infringers of his patent, to declare their engagements at an end. Thus compelled to call in the law in defence of their rights, Messrs. Boulton and Watt became involved in a most tedious, annoying, and vexatious series of processes, during which they were generously and powerfully assisted, according to Arago, by Colonel (afterwards General) Roy, Mylne, the engineer of Blackfriars Bridge, Herschel, Deluc, Ramsden, Robison, Murdoch, Rennie, Cumming, the author of a celebrated treatise on watch and clock-work, More, secretary of the Society of Arts, and Southern, all of whom gave evidence in their favour. With all his modesty and amiable mildness of character, Watt felt his ill-treatment most keenly, and in a letter to Dr. Black, quoted by Arago, he observes in reference to it, 'We have been so beset by plagiaries, that if I had not a very good memory of my doing it, their impudent assertions would lead me to doubt whether I was the author of any improvements on the steam-engine; and the ill-will of those we have most essentially served, whether such improvements have not been highly prejudicial to the commonwealth.'* Defeated on the ground of want of originality, the opponents of Watt organized a fresh attack upon the patent, upon the pretence that the written specification given by Watt in 1769 was imperfect. In order to comprehend at once the injustice and the plausibility of this plea, it should be considered that the specification was necessarily written with only the experience derived from the erection of a rude model at Kinneil, and also that Watt never pretended to be the inventor of the steam-engine, but simply of certain improvements upon it, which improvements were of so clear and distinct a character as to be unaffected by any change in the forms, proportions, or positions of the various members of which a complete steam-engine is composed. It was thus as unnecessary as it was impossible that the specification of 1769 should contain a complete description of the machine as made by Boulton and Watt twenty years afterwards. The principal distinguishing features of the engines of Watt were the separate condenser and the closed cylinder; and these being retained in all his machines, gave him a virtual monopoly in various subsequent improvements which were rather additions to than modifications of his original design, but which were too intimately connected with the essential features of his engines to be separated from them. Yet, as observed by Stuart, 'After a series of experiments, in which he had been engaged for twenty years, to develop his ideas, the splendid result of his genius and perseverance—the perfect machine—was raised up in judgment against him, to prove that between the years 1790 and 1800 the engines which were sent from Soho were more perfect than could be fabricated from the description he gave of the one he erected in 1769!' Bramah, whose own distinguished ingenuity and personal acquaintance with the subject, joined with his high integrity and regard for truth, rendered him a dangerous adversary, was enlisted among the determined opponents of Watt's patent, which he attacked solely on the ground just stated; while his printed letter to the judge who presided at a trial on which he had appeared as a witness, is referred to by Stuart, as being throughout a series of admissions of the value of Watt's contrivances, in which 'he points out inventions that had escaped the notice of others, with all the fine feeling of what is beautiful in an art in which he was himself a master,' while 'he ceases not by inference to ask if the inventor has described these in a proper manner; and he comes always to the same conclusion, that because he has not, therefore he is not entitled to any reward for his superlative invention.' At length, after a series of trials extending from 1792 to 1799, a unanimous and clear decision was given, fully vindicating and establishing the rights of the patentees. On this last occasion Mr. Rous, who acted as counsel for the patentees, delivered a speech which was afterwards published in the form of a pamphlet, and in which he at once keenly satirized and overthrew the argument insisted on by the opposite party, that Watt had invented nothing but *ideas;* asking whether it could be seriously contended that his invention, which during the space of nearly thirty years had been admired in all Europe as the greatest *practical* advance ever made in the *arts*, was a mere *abstract* discovery in *science;* and observing that were those who thus pleaded to approach the *untangible substance*, as they were pleased to call it, with the same ignorance of its nature as they thus affected, they would be crushed before it like flies, leaving no trace of their existence. Muirhead observes that the Cornish miners long afterwards found by experience that their selfish and shortsighted economy had defeated its own ends, for, according to a paper by Mr. Henwood, in Brewster's 'Edinburgh Journal of Science' (vol. x., p. 34), when Boulton and Watt relinquished, shortly after the expiration of their patent, the superintendence of the engines they had erected on the Cornish mines, so that they were left to the care of the parties who had infringed the patent, or of the mine agents, the amount of duty performed, which had been more than 20,000,000 lbs. raised a foot high by the consumption of a bushel of coal, fell to an average not exceeding 14,000,000 lbs.; and that the performance of many engines, under these circumstances, was not more than 6,000,000 lbs.

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* We quote from Muirhead's translation, but know not whether the words are precisely those of the original letter, or whether they are reproduced from Arago's French translation. It is a most unsatisfactory feature of all the translations from Arago, that quotations from English letters, &c. should be given, not directly from the originals, but as translations from his rendering Even where the original documents supplied to Arago by the friends of Watt were unpublished, it might have been expected that Muirhead would be able to obtain them first hand, but he does not appear to have done so, from the frequent traces of French idiom in passages which are printed as if direct quotations from the original documents

In 1794 the sons of Messrs. Boulton and Watt were admitted to the partnership, and on the expiration of the extended term of his patent, in 1800, Watt resigned his share of the business to his two sons, and retired into private life; a step to which he was probably determined in some degree by the harassing nature of the contests in which he had been so long engaged. Down to that period the introduction of the steam-engine into other than mining districts had been comparatively slow, and it is stated that at the expiration of the patent the aggregate power of the engines employed in London was not more than 650 nominal horse-powers, in Manchester about 450 horse-powers, and in Leeds about 300 horse-powers. Within the next five years the number of engines used in the metropolis was doubled, and more machines were supplied from the Soho works than during any equal period before the expiration of the patent.

As there were several scientific men residing about Birmingham who were on terms of intimacy with Watt and his partner, an association was formed under the title of the 'Lunar Society,' the members of which, including Priestley, Darwin, Edgeworth, Keir, and Galton, met monthly on the night of the full moon, for the purpose of social converse. At one of these meetings, according to Arago, a suggestion was thrown out which led Watt to the invention of the useful little machine known as the *Copying Press*, for which he obtained a patent, the specification of which was published some years afterwards in the first volume of the 'Repertory of Arts.' It is however stated in the 'Encyclopædia Britannica' that he was induced to contrive it by the necessity of preserving copies of his drawings and letters, which often contained important calculations, and the desire of avoiding that labour himself which he did not like to entrust to an amanuensis. Among his other useful inventions was a method of heating rooms by steam, which he introduced in his own house in the winter of 1784-5; and he also communicated to Brewster an account of a 'Steam Drying-Machine,' contrived by him in 1781 for Mr. Macgrigor, of which a description is given under the above title in the 'Edinburgh Encyclopædia.' Towards the latter end of 1786, on a visit to Paris, undertaken at the instance of the French government for the purpose of suggesting improvements on the *Machine de Marly*, by which the town, palace, and waterworks of Versailles were supplied with water from the Seine, Watt became acquainted with Berthollet, whose method of bleaching with chlorine [BLEACHING] he brought to this country, and introduced, with certain improvements of his own, in the bleach-works of his friend Mr. Macgrigor, near Glasgow, whose daughter he had married in 1775, not long after his removal to Birmingham. He offered to Berthollet a share in the undertaking, which, from the great superiority of the new over the old process, bid fair to be highly profitable, but this the French chemist declined. Another circumstance indicative of the universality of Watt's talents is his connection with the establishment of the Pneumatic Institution at Clifton, where the medical properties of the gases then recently discovered were made available on an extensive scale, mainly under the direction of Dr. Beddoes.* The illness of Watt's daughter, and delicacy of his younger son, Gregory, led him particularly to devote his attention to this subject, and he designed and constructed the apparatus required for procuring and administering the gases, and wrote the second part of a pamphlet, of which the first part was by Beddoes, entitled 'Considerations on the Medicinal Use of Factitious Airs, and on the manner of obtaining them in large quantities.' This was published at Bristol in 1795; and about the same time appeared two or three editions of a 'Description of a Pneumatic Apparatus, with directions for procuring the Factitious Airs,' by Watt.

Of Watt's snare in the discovery of the composition of water, an investigation in which he, Cavendish, and Lavoisier, were engaged about the same time, very little can be said here. Referring those who are curious upon this interesting point of scientific history to the full details contained in Arago's Life or 'Eloge' of Watt, and to the 'Historical Account of the discovery of the Composition of Water,' by Lord Brougham, illustrated with notes by the son of Watt, which is published as an appendix to Arago, it may suffice to observe that the great and pressing claims of Watt's professional avocations, together with his modesty and retiring habits, may in a great measure account for any difficulty that may arise in tracing the progress and extent of his discoveries in this, by no means the least important of the many subjects to which he addressed his comprehensive mind.

After retiring from business, Watt was with difficulty drawn into any undertaking, although on several occasions his advice was sought respecting engineering works. In 1809 the fertility of his inventive powers was shown by a beautiful solution of a difficult problem laid before him by a water-company at Glasgow, who, after establishing their works upon one side of the river Clyde, discovered that water of very superior quality might be procured from a kind of natural filter on the other side, if they could overcome the difficulty of laying a main from their pumps across the bed of the river. Watt contrived for this purpose a flexible iron pipe, the pieces of which were connected by a kind of ball-and-socket joint, of which he took the idea from the tail of a lobster. The main was constructed from his designs in the following year, with the most complete success; and it forms a tube about a thousand feet long and two feet in diameter, capable of bending and applying itself to the irregular bed of the river. [WATER-WORKS, p. 125.] In another case, late in life, Watt was prevailed upon, by the solicitation of the Lords Commissioners of the Admiralty, to attend a deputation from the Navy Board, and to give, with Captain Huddart and Mr. Jessop, an opinion upon works then being carried on in Sheerness dockyard, and upon other projected works designed by Messrs. Rennie and Whidby; and on this occasion he received the thanks of the Admiralty for his services. In 1813 or 1814 he yielded to the wishes of his friends, of Brewster especially, by revising the articles 'Steam' and 'Steam-Engine,' contributed by Robison to the 'Encyclopædia Britannica,' and enriching them with valuable notes, which were published with the collected edition of Robison's articles, which appeared under the title of 'A System of Mechanical Philosophy.' The last project to which Watt devoted his attention, and which he appears to have very nearly perfected when he died, was a machine for copying sculpture, with which he had proceeded so far as to execute several specimens, which he presented to his friends as the early attempts of a young artist entering his eighty-third year. Having suffered so much, in other cases, from communicating his ideas to others, he kept the construction of this machine strictly secret; but when he had proceeded sufficiently with his design to contemplate obtaining a patent, he found that another person in his neighbourhood, who appears to have been entirely unacquainted with Watt's project, was engaged upon a similar plan. A proposal was subsequently made for obtaining a joint patent, but Watt was unwilling, at so advanced a period of life, to embark in such an undertaking.

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* In the article BEDDOES, THOMAS, vol. iv., p. 132, it is incorrectly stated that *Gregory* Watt was the person who assisted in the founding of the Pneumatic Institution.

About the year 1790 Watt had purchased an estate called Heathfield, near Soho, where he resided to the end of his life; and he had also a property on the banks of the Wye, in Wales. His health improved in his latter years, and his intellectual faculties remained unimpaired to the last. It is related that, when upwards of seventy, he imagined them to be on the decline, and accordingly determined to put them to the test by undertaking some new study. Having selected the Anglo-Saxon language for this experiment, he mastered it with a facility which proved that there was little ground for his fears. At length however, in the spring of 1819, alarming symptoms began to appear, and on the 25th of August in that year he died, in his eighty-third year,—his last illness having been one, observes his son, rather of debility than of pain. Respecting the members of his family, Arago states that the invariable mildness and cheerful disposition of his first wife rescued him from the depressing lassitude and nervousness from which he had suffered so severely; and that, without her cheering influence, he might never have published his inventions to the world. She died in childbed, September 24, 1773, leaving her surviving children, James, the son frequently referred to in this article, and a daughter, who married Mr. Miller, of Glasgow. By his second wife, who died in 1832, he had two children, neither of whom survived him. One of these, Gregory Watt, distinguished himself by his geological investigations, but died in 1804, at the early age of twenty-seven. As might be expected, this bereavement affected Watt very keenly; but Muirhead states that his remarkable activity of mind was not impaired, nor was his interest in the pleasures of literature and society destroyed, by this melancholy event; and that neither his conversation nor his correspondence betrayed any approach to the remarkable silence which Arago states to have been observed in the latter years of Watt.

Of the private character of the great engineer a most pleasing account is given by Lord Jeffrey, who, after stating that, independently of his great attainments in mechanics, he was an extraordinary, and, in many respects, a wonderful man, observes, 'Perhaps no individual in his age possessed so much and such varied and exact information,—he had read so much, or remembered what he had read so accurately and well. He had infinite quickness of apprehension, a prodigious memory, and a certain rectifying and methodising power of understanding, which extracted something precious out of all that was presented to it. His stores of miscellaneous knowledge were immense,—and yet less astonishing than the command he had at all times over them. It seemed as if every subject that was casually started in conversation with him, had been that which he had been last occupied in studying and exhausting, such was the copiousness, the precision, and the admirable clearness of the information which he poured out upon it without effort or hesitation.' In social conversation he allowed his mind, like a great cyclopædia, to be opened upon whatever subject might best suit the taste of his associates; and he made everything so plain, clear, and intelligible, that, it is remarked, scarcely any one could be conscious of any deficiency in their own capacity in his presence. With all this flow of information, his conversation, we are further informed, 'had no resemblance to lecturing or solemn discoursing, but, on the contrary, was full of colloquial spirit and pleasantry.' Of a generous and affectionate disposition, he was considerate of the feelings of all around him, and gave the most liberal assistance and encouragement to all young persons who showed indications of talent, or who applied to him for patronage or advice. As his death approached, he was perfectly conscious of his situation, and calm in the contemplation of it, expressing his thankfulness for the length of days with which he had been blessed, for exemption from most of the infirmities of age, and for the calm and cheerful evening of life which he had been permitted to enjoy after the honourable labours of the day had been concluded.

In acknowledgment of his invaluable services to his country, it was intimated to Watt a few years before his death, by a friendly message from Sir Joseph Banks, that, to use the words of Muirhead, 'the highest honour usually conferred in England on men of literature and science was open to him, if he expressed a wish to that effect;' but while he felt flattered by the intimation, he determined, after advising with his son, to decline it. He became a member of the Royal Society of Edinburgh in 1784, of that of London in the following year, of the Batavian Society in 1787, and in 1808 a correspondent of the French Institute; and in 1814 the 'Académie des Sciences' of the Institute conferred upon him the highest honour it can bestow, by electing him one of its eight foreign associates. In 1806, by a spontaneous vote, the University of Glasgow conferred upon him the honorary degree of LL.D. In 1824 a subscription was entered into for erecting a statue to his memory in Westminster Abbey, and a public meeting was held at the Freemasons' Tavern to do honour to the man who had taught us to wield, as it was then observed, the mightiest instrument ever intrusted to the hands of man, and whose inventions were characterized by Davy as amongst the great means which had enabled Britain to display power and resources, during a long war, so infinitely above what might have been expected from the numerical strength of her population. A large sum was immediately raised, and Chantrey was engaged to furnish the statue, which is one of the finest of his works, and which calls to mind the remark of Watt's friend, Mr. Richard Sharp, who said that he never looked at his countenance without fancying that he beheld the personification of abstract thought. To this an appropriate inscription by Lord Brougham was added. Another statue by Chantrey adorns an elegant chapel erected by Watt's only surviving son, at the parish church of Handsworth, near Birmingham, in the chancel of which he was interred. Other statues have been erected in St. George's Square, Glasgow; in the University of Glasgow, where the memory of Watt is also preserved by an annual prize which he founded, for the best essay upon some subject connected with science or the arts; and in a public library at Greenock, which is enriched with a collection of scientific works presented by Watt during his life, and to which his son contributed liberally.

In 1834 M. Arago read to the French Académie des Sciences the 'Historical Eloge' to which allusion has been repeatedly made in this article, and which reflects much honour on the liberal feeling of the author. It has been more than once translated into English; but the translation we have chiefly referred to is that of Watt's relative, James Patrick Muirhead, Esq., M.A., published in 4to. in 1839, to which some valuable notes are added. Of other authorities referred to for the purpose of this memoir, Stuart's 'Anecdotes of Steam-Engines,' and the notices of Watt in the 'Encyclopædia Britannica;' Brewster's 'Edinburgh Encyclopædia;' and the 'Public Characters of 1802-3,' together with the printed 'Proceedings' of the public meeting above referred to, are among the principal.

WATTEAU, ANTOINE, a celebrated French landscape-painter, was born at Valenciennes in 1684. He went to Paris in 1702, with a scene-painter, with whom he had placed himself, and for some time was occupied in that branch of painting. But after some time his master left Paris, and Watteau was obliged to seek another employer: he for a short time found occupation as a copyist, and painted pictures by the dozen. From this employment however he was soon rescued by Claude Gillot, a painter of some ability, who having perceived the peculiar genius of Watteau, took him into his house and employed him to assist him in his works. Gillot painted landscapes with grotesque figures, fauns, satyrs, &c., and confirmed Watteau in the same style; but the pupil soon surpassed the master in his own style, and this was so evident even to Gillot himself, that he forsook painting and took to engraving. Watteau now acquired reputation rapidly: he was appointed peintre de fêtes galantes du Roi, and was elected a member of the French Academy of Painting. In 1718 he came to England, where he remained a year; but he painted only two pictures during his stay, for Dr. Meade, whom he came to consult, says Walpole. He returned to Paris in a very weak state of health, and died at Nogent, in the neighbourhood, in 1721, aged thirty-seven.

His colouring was rich, and his design, though peculiar, was correct: Rubens was his model for colouring. His pictures are chiefly theatrical scenes, or fêtes champêtres, and were remarkably popular in his time: nearly all the French engravers of his period were occupied with the works of Watteau. The prints after his works amount to 563, making three large folio volumes. Few painters in so short a life have done so much as Watteau.

As regards the particular style of his works, Watteau is generally allowed to have had an injurious effect upon the taste of the French artists of his time: his pictures generally represent balls, masquerades, garden parties, marches, and encampments, and his style prevailed in France for some time after his death. His principal imitators were Pater and Lancret. His style is well described by Walpole, who says, 'The genius of Watteau resembled that of his countryman D'Urfé; the one drew and the other wrote of imaginary nymphs and swains, and described a kind of impossible pastoral or rural life led by those opposites of rural simplicity, people of fashion and rank. Watteau's shepherdesses, nay, his very sheep, are coquet; yet he avoided the glare and clinquant of his countrymen; and though he fell short of the dignified grace of the Italians, there is an easy air in his figures, and that more familiar species of the graceful which we call genteel. His nymphs are as much below the forbidding majesty of goddesses, as they are above the hoyden awkwardness of country girls. In his halts and marches of armies, the careless slouch of his soldiers still retain the air of a nation that aspires to be agreeable as well as victorious.'

(D'Argenville, *Abrégé de la Vie des plus fameux Peintres*; Walpole, *Anecdotes of Painting, &c.*)

WATTON. [NORFOLK.]

WATTS, ISAAC, the eldest of nine children, was born at Southampton, July 17, 1674. His father, who kept a boarding-school in that town, was a man of strong devotional feeling and a rigid nonconformist. He was imprisoned on account of his religion, and during his confinement his wife sat on a stone at the prison door, with little Isaac, then an infant, at her breast. The child showed a taste for books at a very early age, and imbibed under parents whose faith had been strengthened by persecution that turn of mind which prompted the determination to become a dissenting clergyman.

Isaac Watts entered on the study of the learned languages in the free grammar-school of his native town in his fourth year. The little money he received in presents he spent upon books; his leisure hours he spent in reading, instead of joining the other boys at play. When only seven or eight years old he composed some devotional pieces to please his mother. His gentle yet vivacious disposition obtained him friends, who offered to support him at one of the universities; but having been bred a nonconformist, he determined to remain one. He was therefore sent, in his sixteenth year, to an academy in London, kept by Mr. Thomas Rowe, at that time minister of the Independent meeting-house in Haberdasher's Hall.

During the three years that he remained with Mr. Rowe, Watts pursued his studies with intemperate ardour, allowing himself no time for exercise, and curtailing the period allotted to sleep. He thus irremediably injured his constitution. He used to mark all the books he read, to abridge some of them, and annotate others, which were interleaved for the purpose. Dr. Johnson says of his classical acquirements:—'Some Latin essays, supposed to have been written as exercises at his academy, show a degree of knowledge, both philosophical and theological, such as very few attain by a much longer course of study;' and, 'In his youth he appears to have paid attention to Latin poetry: his verses to his brother, in the glyconick measure, written when he was seventeen, are remarkably easy and elegant.' He also made some proficiency in the study of Hebrew, of logic, and scholastic divinity. His acquirements in mathematical and physical science appear to have been inconsiderable. Before leaving the academy he joined in communion with the congregation of Mr. Rowe, who was accustomed to say that he never had occasion to reprove Watts, and who often held him up as a pattern to his other pupils.

Watts returned to his father's house in 1694, and spent the next two years of his life in private study. The greater part of his hymns, and probably most of his juvenile compositions, were composed during this time.

In 1696 he was invited by Sir John Hartopp to reside in his family at Stoke Newington as tutor to his son; he remained there till the beginning of 1702. Lady Hartopp was the daughter of Fleetwood by his first marriage. Sir John, as might be inferred from his forming such a connection, was a zealous nonconformist: when fiscal persecution was at its height, the fine upon Stoke Newington, of which he paid the greater part, amounted to six or seven thousand pounds. In this family the religious and political opinions which Watts had imbibed from his parents and schoolmaster were strengthened. Sir John, we learn from his funeral sermon preached by Watts, 'was inquisitive into the affairs of the learned world, the progress of arts and sciences, the concerns of the nation, and the affairs of the church of Christ;' and 'he had a taste for universal learning; ingenious arts were his delight from youth, mathematical speculation and practice a favourite study in his younger years, and even to his old age he maintained his acquaintance with the heavenly bodies.' The conversation of such a man kept alive Watts's literary and scientific tastes. The first outline of the work afterwards published under the title of 'Logic' was prepared during this period for the use of his pupil.

Isaac Watts preached his first sermon on the day on which he completed his 24th year, the 17th of July, 1698. In that year he was chosen assistant to Dr. Chauncey pastor of the Independent church then meeting in Mark-lane, but he continued to reside and discharge the duties of teacher in Sir John Hartopp's family till 1702. In that year he was persuaded reluctantly to succeed Dr. Chauncey in the pastoral office. Soon after his entrance upon this charge he was seized with a dangerous illness, which, after a long confinement and a slow recovery, left him with a constitution so evidently impaired, that the congregation thought an assistant necessary, and accordingly, in July, 1703, appointed Mr. Samuel Price. Watts's health returned gradually, and he performed his duty till 1712, when he was seized by a fever so violent and of such continuance that he never perfectly recovered.

This illness excited the lively sympathy of all his friends. The foremost in kind offices was Sir Thomas Abney, who invited him to try the effect of change of air at his house at Theobalds. Watts accepted his invitation, and went there intending to stay only a single week, but he remained six-and-thirty years—till his death. 'In a few years,' says Dr. Gibbons, Watts's earliest biographer, 'Sir Thomas Abney died; but his amiable consort survives, who shows the Doctor the same respect and friendship as before; and most happily for him, and great numbers besides (for as her riches were great, her generosity and munificence were in full proportion), her thread of life was drawn out to a great age, even beyond that of the Doctor. And thus this excellent man, through her kindness and that of her daughter Mrs. Elizabeth Abney, who in a like degree honoured and esteemed him, enjoyed all the benefits and felicities he experienced at his first entrance into this family till his days were numbered and finished, and, like a shock of corn in his season, he ascended into the regions of perfect and immortal life and joy.'

The tenor of the remainder of Watts's life was uniform. Sir Thomas Abney had been bred up in dissenting principles; King William knighted him; and he served the office of Lord Mayor of London in 1700. His first wife was a daughter of Caryl, the first pastor of the Mark-lane congregation; his second, a daughter of Mr. Gunston, an honoured friend of Watts. The house of the Abneys at Theobalds adjoined the site of Burleigh's residence. Of the splendid gardens of that palace there remained little more than a long moss-grown walk, overshadowed by two rows of elms, and within a few yards of the entrance of that walk there stood, in Sir Thomas Abney's garden, a summer-house, which, fifty years after Watts's death, was shown as the place in which he had composed many of his works. Watts's usefulness among his flock was in no wise diminished by his residence at Theobalds. There was a carriage at his command when his health permitted him to officiate in London. When he was incapable of public labour, he refused to receive his salary; and at all times a third part of his income was devoted to charitable uses. The seasons when indisposition incapacitated him from public duty were spent in literary composition. 'Perhaps,' Dr. Southey has justly observed, 'the peculiar position in which he was placed increased both the respect and the affection with which his congregation regarded him. It made him independent of them; and they looked upon him not in the light of a dependent upon the wealthy family with which he was domesticated, nor as a humble friend, but as what he was in reality—one of its members, adopted into it by the especial friendship of one of the wealthiest and most considerable persons attached to the dissenting cause. . . . Moreover, the congregation felt that, in continuing his services to them as far as his feeble health would permit, Mr. Watts conferred upon them a favour and a kindness which could not be imputed to any motive of interest, or even of his own convenience, but proceeded from his sense of duty, his zeal in the dissenting cause, and his attachment to them. They prized him, therefore, as they ought, the more highly; and they were proud of his growing reputation, for he was then the best preacher among the dissenters, and one of the best of those times.'

The most important of Watts's publications are:—1, 'Logic; or, the Right Use of Reason in the Inquiry after Truth: with a variety of Rules to guard against Error in the affairs of Religion and Human Life, as well as in the Sciences,' published in 1725. This treatise, which appears to have been used in Dr. Johnson's time as a text-book at Oxford, was written originally to assist the studies of Watts's pupil, Sir John Hartopp, and was revised, augmented, and published at the request of Mr. Eames. Dr. Johnson remarked of this work—'If he owes part of it to Le Clerc, it must be considered that no man who undertakes merely to methodize or illustrate a system, pretends to be its author.' 2, 'The Knowledge of the Heavens and Earth made easy; or, the First Principles of Astronomy and Geography explained by the use of globes and maps, with a solution of the common problems by a plain scale and compasses as well as by the globe: written several years since, for the use of learners;' published in 1726. This is the work of an intelligent amateur. The amount of the author's scientific qualifications may be inferred from a passage in the preface:—'Most of the authors which I have perused in those days, when I wrote many parts of this book, were of older date: and therefore the calculations and numbers which I borrowed from their astronomical tables cannot be so exact as those with which some later writers have furnished us.' 3, 'The Improvement of the Mind,' an expansion of some passages in Locke's 'Conduct of the Human Understanding.' 4, A number of works for children and young persons, viz.:—'The Art of Reading and Writing English;' 'Prayers composed for the Use and Instruction of Children;' 'Divine Songs attempted in easy language for the use of Children,' &c. It was from motives of gratitude to Sir Thomas and Lady Abney that he first engaged in this humbler class of compositions. No compositions of the kind have obtained such extensive use as his hymns and songs for children. Doddridge relates in one of his letters to Watts an affecting incident regarding one of them:—'I was preaching to a large assembly of plain country-people at a village, when, after a sermon from Hebrews vi. 12, we sang one of your hymns (which, if I remember right, was the 140th of the second book), and in that part of the worship I had the satisfaction to observe tears in the eyes of several of the people; after the service was over, some of them told me they were not able to sing, so deeply were their minds affected; and the clerk in particular said he could hardly utter the words as he gave them out.' 5, 'An Essay towards the Encouragement of Charity Schools, particularly those which are supported by the Protestant Dissenters for teaching the Children of the Poor to read and work: together with some Apology for those Schools which instruct them to write a plain hand, and fit them for Service or for the meaner Trades and Professions of Life: to which is prefixed an Address to the Supporters of those Schools;' published in 1728. The occasion of this publication was a sermon which Watts had been desired to preach in the November of the preceding year, in support of the dissenters' schools. It vindicates the extension of education to the poor; and the establishment of dissenting schools on the ground of the proselytizing character communicated to general schools by the High Church party. 6, 'A Sermon preached at Berry-street, on the occasion of the Death of our late gracious Sovereign George I., and the Peaceful Succession of his present Majesty George II.;' published in 1727. This is chiefly valuable as an exposition of the religious and political views of the dissenters at that period. The theological works of Watts are too numerous to admit of being recapitulated here. His 'Three Dissertations relating to the Christian Doctrine of the Trinity,' and 'Nine Sermons preached in the years 1718-19,' published in 1812, with a preface by Dr. Pye Smith, may be taken as fair specimens. They are marked by much of that logical parade which characterizes the professors of the Calvinistic creed, but by far more than their average gentleness and tolerant spirit. The 'Horæ Lyricæ' of Watts, from which an estimate of his poetical talents may be formed, was republished in 1837, with a memoir by Dr. Southey. A poet he can scarcely be called, yet his verse is generally smooth, sometimes nervous; and the matter is always judicious, sometimes touching, sometimes approaching to eloquence.

Watts is a classic of the people. His hymns for children have exercised an influence on the minds of the young far beyond the limits of the dissenting body. His 'Logic' was once a textbook in various places of education. He was in his day one of the most zealous advocates of the principles which placed the house of Hanover on the throne; in his pamphlet in defence of the dissenting charity-schools he was the efficient precursor of those friends of popular instruction who gave, at a later time, their countenance and support to Joseph Lancaster; and his theological writings are prized by almost the whole religious public of Great Britain. Wherever the English language is spoken Isaac Watts will be found to have exercised no slender influence in the formation of public opinion. His writings have contributed much to keep alive the spirit of freedom, toleration, and piety. 'It was therefore with great propriety,' the opinion is entitled to the greater weight as coming from the high-church Tory, Dr. Johnson, 'that, in 1728, he received from Edinburgh and Aberdeen an unsolicited diploma, by which he became a doctor of divinity. Academical honours would have more value if they were always bestowed with equal judgment.'

The conduct of some very near relatives embittered his latter days, and for a while he seemed, being at the time in a state of extreme weakness, stupified by it to such a degree, as hardly to take notice of anything about him. The worst part of this behaviour was kept from him. 'Lady Abney,' says a correspondent of Doddridge, 'keeps him in peaceful ignorance and his enemies at a becoming distance; so that in the midst of this cruel persecution he lives comfortably, and when a friend asks him how he does, answers, "Waiting God's leave to die."' In this patient and peaceful state of mind, on the 25th of November, 1748, and in the 75th year of his age, he departed 'in sure and certain hope.' He was buried in Bunhill Fields; Mr. Samuel Chandler delivered a funeral oration at his interment; Lady Abney and Sir John Hartopp erected a handsome tomb over his grave; and the number of funeral sermons preached and published on the occasion bespeak the deep sense entertained by the dissenters of his merits. The texts of some are strikingly appropriate: that of the Reverend

David Jennings was 'By it, being dead, he yet speaketh;' that of the Rev. Caleb Ashworth, 'Know ye not that there is a prince and a great man fallen this day in Israel.'

(*Memoir of Isaac Watts, D.D.*, by Robert Southey; *Life of Watts*, by Dr. Samuel Johnson; *Sermon on the Death of the late Rev. Isaac Watts, D.D.*, by David Jennings; *Memoirs of the Rev. Isaac Watts, D.D.*, by Thomas Gibbons.)

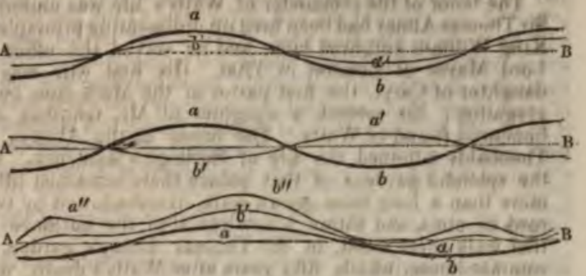
WAVES AND TIDES possessing in many respects the same character, it has been thought proper to state in one article the phenomena and the theories of both.

From the earliest times the periodical risings and fallings of the waters on coasts or in rivers have been noticed; and the recurrences of the phenomena depend so obviously on the positions of the moon and sun, that the influences of those celestial bodies in producing them have ever been assigned as their cause. The tide appears as a general wave of water which gradually elevates itself to a certain height, then as gradually sinks till its surface is about as much below the medium level as it was before above it: from that time the wave again begins to rise; and this reciprocating movement of the waters continues constantly, with certain variations in the height (with respect to the mean level), and in the times of attaining the maxima of elevation and depression.

Ordinary waves are produced by any cause which disturbs the equilibrium of the particles of a fluid. Thus a stone suffered to fall into water at rest gives rise to a series of concentric circular waves extending to a great distance from the place where the stone falls; and in a canal, the fall of a body of water from a level above that of the general surface will produce a series of waves advancing along the canal. Waves are also produced by suddenly pressing a solid into water, or by suddenly withdrawing it from thence; and a single wave may be caused by partly immersing a solid body in water and moving it quickly, for a time, in a horizontal direction. The inequalities of the pressure of the air on the surface of water, whether at rest or in motion, when a gentle wind is blowing, will produce ripples; and if the action is continued long, the ripples, at a certain distance from the place of their origin, become considerable waves. In the open seas the heights of the waves depend on the force of the wind; but in confined situations both the heights and forms of the waves are affected by the resistance of the bed, by reflections from the shores, and other circumstances. When waves are formed by wind blowing from the land, each wave-summit preserves constantly the same height; but the heights go on increasing with the distance from the shore.

Waves appear generally to be of a cycloidal form: their summits have a gentle curvature, while the height bears a small proportion to the length in the direction of the motion; but as the height increases, the summit becomes more acute, and assumes the form of a ridge; and when this becomes too sharp for the preservation of equilibrium, the force of the wind acting horizontally near the top breaks it into foam or spray. As waves advance towards a shore, the water becoming less deep, the resistance of the bed of the sea causes their lengths to diminish, and at the same time their heights to increase, so that the front of the wave becomes steep; and the motion of the upper part, towards the land, being more rapid than that of the lower part, it follows that the summit is carried beyond the base; and, falling forward, there is produced what is called a surf. The breaking of waves over a sunk shoal depends chiefly on a like cause.

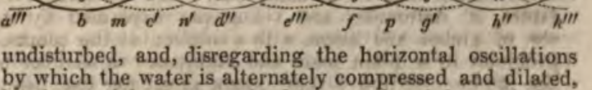
The surface of the sea often presents very complex phenomena: it may happen, for example, that while a long swell resulting from some distant storm is advancing in one direction, a breeze will produce a series of waves moving in the direction of the wind; and a second breeze springing up in another direction will produce a new series, which will become mixed with the former without destroying them: a third gale may also produce a system of waves intersecting the other systems. When a breeze has been blowing for some time from a certain quarter, and afterwards changes to the opposite, two series of waves may be seen moving in contrary directions; and if the waves are nearly of equal lengths, the vertical ordinates at the crest of the compound wave will be equal to the sum or difference of the ordinates of the simple waves, according as the crests are coincident, or fall in each other's intervals. These phenomena are indicated in the first and second of the subjoined figures, where ab represents the first undulation, and $a'b'$ the second; the straight line AB being the horizontal surface of the water when at rest.



Again, when there exists a third system of waves, caused, for example, by reflection from a coast, so as to be parallel to the two former systems, the combination of the three systems has been observed to produce a compound wave of the form represented in the third figure. (*Report of the British Association on Waves*, vol. vi.)

The waves of the sea do not extend to considerable depths: from the experiments made by the committee appointed by the British Association in 1836, it was found that with a depth of water equal to 12 feet, waves 9 inches high and 4 or 5 feet long did not sensibly affect the water at the bottom. Waves from 30 to 40 feet long, oscillating at intervals of 6 or 8 seconds, produced some effect, but much less than near the surface; and it was ascertained that, in waves produced by the wind on the surface of a deep sea, the velocities were not a direct function of the depth.

It must not be imagined that when water is agitated by waves, its whole mass has the movement which at first sight appears from the observed progressive motion of the undulation; and, in order to account for the formation and motion of waves, it is sufficient to assume that the particles of water, when disturbed, have merely small oscillatory motions in horizontal and vertical directions. When from any cause, as the fall of a stone into it, the water becomes agitated, a series of horizontal motions to and fro are produced; and while in a slender vertical column of water these motions are equal and in one direction, the surface neither rises nor falls; but if, in two neighbouring columns, the particles advance to meet each other, the water becoming compressed, the surface rises; if the particles recede from one another, those above descending by gravity, the surface falls. These different horizontal movements existing successively in the same vertical column, and simultaneously in those which are adjacent to each other, the surface of the water becomes undulated. In order however to understand the true movements of waves, let the straight line ak represent the surface of water when undisturbed, and, disregarding the horizontal oscillations by which the water is alternately compressed and dilated, let the particles be conceived to ascend and descend alternately in vertical lines, that is, in lines parallel to $a'aa'''$, which is supposed to be perpendicular to ak. Now at a given instant let the surface of the water have, in a vertical plane, the form $abcd$, &c., and let the force of ascent cause the particles in the line abm to be raised up to the line $a'b'm$ in a portion of time represented by T, that force becoming less as it is farther from a horizontally, and ceasing at m; at this place the force of descent commencing, the particles in the line $mcdn$ fall simultaneously with the rise of the particles in abm, and at the end of the same time T they occupy the line $mc'd'n$. Here the force of ascent acts, and the particles in $nefp$ at the end of the same time occupy the line $ne'f'p$, and so on. Thus at the end of the time T the surface of the water has assumed the form $a'b'c'd'$, &c. After this time the force of descent on the particles in the line $a'm'$ causes those particles to fall vertically, during a time equal to T, into the line am'; at m' that force ceases, and the force of ascent raises the particles in $m'b'c'n'$ vertically into the line $m'b''cn'$, and so on; thus, at the end of the time 2T from the given [illegible] the surface of the water has the form $ab''cd''$, &c.



manner, at the end of the time 3T the forces of descent and ascent will have brought the particles into the line $a'''b'c'''d'$, &c.; and at the end of the time 4T the particles will be again in the line *abcd*, &c.: so that in this time every particle of fluid has made one complete vibration vertically, as $aa'aa'''a$, and within the same time the top of the wave has assumed successively the positions d, e', f'', g''', h. The horizontal distance from d to h is called the length of a wave; let it be represented by L, and let τ express the time 4T in which the summit of a wave has passed from d to h; then $\frac{L}{\tau}$ is called the velocity of the wave. On observing the characters of experimental waves in troughs with glass sides, it is found that, by the combinations of the horizontal and vertical vibrations, the particles of water describe the peripheries of circles or ellipses. In the upper parts of the curves, near the tops of the waves, the particles move with their greatest velocities in the direction in which the wave is advancing; in the lower parts, near the bottoms of the waves, they are moving with their greatest velocities backwards; and at the extremities of the horizontal diameters, about the level of the water's surface when at rest, the motion is almost wholly vertical.

The varying attraction of the sun or moon on the particles of water in the ocean is alone sufficient to produce the perturbations by which waves are formed; and if it be assumed that the solid nucleus of the earth is covered entirely with water, both nucleus and water being originally spherical, those perturbations will bring the surface of the water to a spheroidal form, the longer axis being in the direction of a line joining the centres of the earth and luminary; there will consequently exist, at the same instant, two great waves whose summits are at a distance from one another equal to half the circumference of the earth.

Very little attention to the phenomena of the tides suffices to show that, in situations where the recurrences of high-water are nearly regular, the greatest elevation of the water takes place at intervals of about 12 hours 25 minutes, and the greatest depressions at the like intervals of time from each other; each greatest depression taking place about 6 hours 12 minutes after the instant of greatest elevation. Now the interval between two successive culminations of the moon on the same side of the geographical meridian of any place varies from about 24 hours 40 minutes to 25 hours; and thus the intervals between the times of high-tide have evidently a connection with the diurnal revolution of the moon; moreover the occurrence of high-water at any place is observed to have a dependence on the position of the moon with respect to the meridian of the place; at a few ports it coincides with the time that the moon is on meridian, but in general it takes place some time before or after the culmination. The position of the moon at the time is however subject to certain variations even at the same port; and it differs considerably at different places. The elevations also of the water with respect to the mean level differ; in some places, during about half the year, the high-tide which occurs when the moon is above the horizon is greater than that which occurs when the moon is below, and during the other half-year the phenomenon is reversed. In every place, at about the times of new and full moon, the high-tides attain their greatest elevation; and at about the times of the quadratures, the least: the former are called *spring-tides*, and the latter *neap-tides*.

In bays and harbours, the time of high-water coincides with that at which the current ceases to flow, but this is not the case with the seas which communicate at both extremities with the ocean. For, if it be imagined that a tide-wave flows in at one of the extremities, this will cause an elevation of the waters; but the waters which are passing off at the opposite extremity cause, at the same time, a depression, or, at least, a diminution of that elevation; the surface therefore must be the highest when the current flows with equal rapidity at both extremities, and not at the moment preceding the turn of the tide. When the stream continues to flow up for three hours after it is high-water, it is said to make tide and half-tide; if it continues to flow during one hour and a half, it is said to make tide and quarter-tide, and so on. Near the *shores of the British Channel*, probably in consequence of the obstructions caused by the land, or the disturbances at the mouths of rivers, the progressive movement of the tide-wave is more retarded than in the middle; and in some places the current has curvilinear motions, which on the French and English sides are in opposite directions. The *race* of Portland is a current produced by the tide-wave, while advancing along the shore; being arrested by the promontory till it attains a height which allows it to flow off obliquely with considerable velocity.

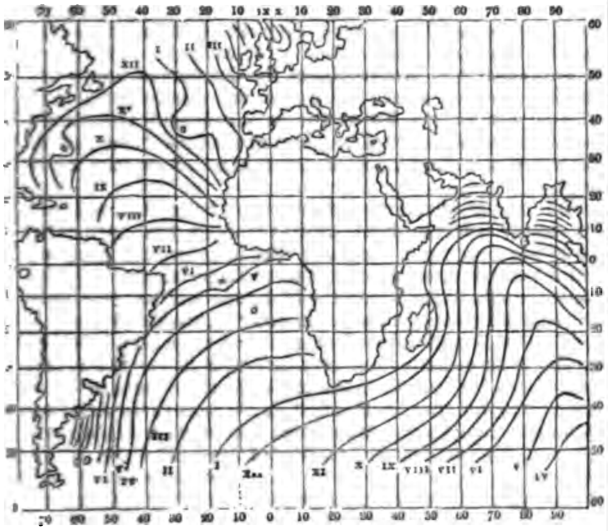
The rise of a tide-wave near the mouth of a river takes place rapidly by the shoaling of the sea and the confinement of the wave between the banks; for the motion of a body of water is capable of raising the particles to the heights through which they must fall to acquire their actual velocities; and if the same motion is employed in raising a smaller quantity of water, it is evidently capable of raising it higher: thus, when the contraction is considerable, as in the Bay of Fundy, the Bristol Channel, and other places, the elevation becomes very great; at Chepstow it amounts to 60 feet. When, at the mouth of a river, the bed has a long and gentle slope on each side, the waves, becoming high and steep, fall over, and flow up rapidly with a surf, constituting what is called a *bore*: the bore-wave which enters the Severn is 9 feet high, and that which occurs in the Amazons is said to be from 12 to 15 feet in height. In flowing up a river the summit of the tide-wave reaches the different stations later as these are farther from the mouth; and in the Thames it advances from Margate to London, a distance of 70 miles, in three hours. It is observed also that the current of a river runs upward during some time after the summit has passed any station, and downwards for some time after the surface of the water is at the lowest; the intervals between the times of low and high water, moreover, gradually diminish as the stations are farther up, while the intervals between high and low water increase.

From the observations made by the committee of the British Association in 1836, on the tide-waves of the river Dee in Cheshire, it was found that the first wave of flood-tide advanced 5·275 miles in intervals of time varying from forty-five minutes to one hour, or, at an average, at the rate of 6·4 miles per hour; and that the wave of high-water advanced the same distance with a velocity, by an average of the observations, of 14·6 miles per hour. It is said however to have been impossible to determine whether the wave which carried the flood-tide to the lower station was the same as that which carried it to the higher. It is thought probable that the wave which passed the lower station was diffused in the spaces between certain projections from the bank on one side of the channel, and was overtaken by a subsequent wave from the sea. The wave of high-water, being above those obstructions, flowed up more regularly, and the observed height of the wave approached very nearly to that which is due to its observed velocity: it being understood that the velocity of a wave is that which would be produced by a body falling from rest through half the height of the wave.

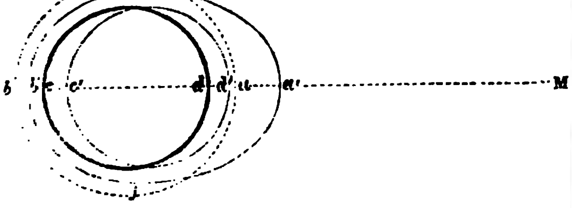
In order that the phenomena of the tides at different places may be readily compared together, charts have been constructed, on which are drawn curve-lines joining the points at which high-water takes place at the same times. Now, since the heights of the wave and the times of its greatest elevation vary at every place from day to day, it is necessary to fix on the height attained at a particular time; and on this account, by general agreement, the time of high-water at every seaport on the days of full and change of the moon is chosen. This is called the 'Establishment of the Port;' and an extensive table of 'Establishments' for the ports of Great Britain and Ireland is given in the 'Nautical Almanacs;' the hours and minutes indicating the time from apparent noon on the days of new and full moon when high-water takes place. Since, on the first of these days, the moon passes the meridian with the sun, the time of high-water on any other day may be found from the table by merely adding the 'Establishment' to the time at which the moon comes on the meridian on the given day. Finding upon the surface of the earth and sea any number of points at which the 'Establishment,' when reckoned according to Greenwich time, is the same, a line drawn through all the points will indicate the summit of a great tide-wave at that time: drawing a curve in like manner through all the points at which the 'Establishment' in Greenwich time is an hour later, there is obtained a new position of the summit; and it must then be understood that the wave has travelled, in the sense above explained, from the first line to the next in one hour. These are called 'Cotidal lines;' they were first indicated on a chart of the world by Mr. (Sir John) Lubbock, in the 'Philosophical Transactions' for 1831, and an extensive series of such lines are traced on the chart which accompanies Mr. Whewell's 'Essay towards an approximation to a Map of Cotidal Lines,' in the 'Philosophical Transactions' for 1833.

The definition above given of the 'Establishment' is only approximatively true: it is observed by Mr. Whewell, in the 'Essay,' that it would be correct if the high-tide always occurred when the moon's hour-circle makes equal angles with the meridian; but in fact the hour of tide on any day is reckoned from the time that the sun is on the meridian; and as the moon changes her right ascension every day by about forty-eight minutes (the observed hour of the tide being given on the day of new or full moon), the moon's hour-angle may differ according to the time of the day when the conjunction or opposition takes place, compared with the time of day when the high-tide is observed. Therefore an observation of the hour of the tide on the day of new or full moon may leave an uncertainty of about 1h. 8m. in the time of the 'Establishment,' unless account is taken whether the morning or afternoon tide was observed, and at what hour the syzygy took place.

The subjoined cut, which shows the principal cotidal lines in the Indian and Atlantic oceans, is from Mr. Whewell's chart above mentioned, and contains the modifications introduced in that which is given by Mr. Airy, in his Essay on 'Tides and Waves,' in the 'Encyclopædia Metropolitana.'



In investigations relating to the tides, it is required to determine the form assumed by the surface of the water when the particles are subject to the actions of disturbing forces; and for this purpose it is convenient to assume that if no such forces existed, the earth would consist of a solid spherical nucleus within a body of water whose exterior surface is that of a sphere concentric with the nucleus. Let the circle *cd* represent the nucleus, and the circumference *ab* the surface of the surrounding water in a plane passing through the centre of the earth, and the sun or moon at M: then, in the theory indicated by Newton, the attraction of the celestial body will draw the particles of water towards it so that the surface *ab* will assume the form *a'b'*; at the same time the attraction exercised on



the solid part *cd* will cause the latter to take the position *c'd'*. Thus at the same instant the surface of the water at *a'* and *b'* is farther removed from the centre of the earth than it would be if there were no perturbation; while at *e* and *f* it is nearer the centre. If the celestial body were constantly in the plane of the equator, the summit of the elevated water would also be in that plane, and exactly or nearly under the body. A section of the spheroid of water passing through the poles of the equator and the summit just mentioned would be an ellipse, and its periphery would coincide with the direction of a terrestrial meridian. By the diurnal rotation this tide-wave, as it may be called, would appear to move about the earth from east to west at the rate of above 1000 miles per hour at the equator; and its positions at the end of every hour would constitute a series of cotidal lines. Hence, if a small island at the terrestrial equator were to project above the surface of the water, it would arrive successively at the points *a'*, *e*, *b'*, *f*, *a'*, so that in the time of a rotation of the earth on its axis with respect to the celestial body, there would occur at the island two states of high-water and two of low-water. The arrival of the island at the summit *a'*, which would, if M were the moon, take place at the end of every 24h. 50m. nearly, is called the diurnal tide; and that which takes place when the island arrives at the summit *b'*, that is 12h. 25m. after the former, is called the semidiurnal tide. By this theory there ought to be scarcely any tides near the poles, the water being always drawn from them towards the tropical regions; and the attractions at *a'* under the celestial body being greater than the attractions at *b'*, it should follow that the diurnal tide is greater than the semidiurnal tide, neither of which circumstances is conformable to observation.

If an island having a great extent from the equator towards the north and south were to intercept the tide-wave, the elevated water, passing round the extremities of the island, would on its western side form two waves, which would advance towards, and meet one another at the equator, making, at different places on the coast, high-water successively later, in the directions of their motions. And it is easy to conceive that the tide-wave of a great ocean will send branches into any seas which it may approach in its movement about the earth: such are called derived tides.

The combined actions of the sun and moon, when those luminaries are in conjunction or opposition, that is, at new or full moon, may be readily conceived to produce what are called spring-tides; and the diminution of each other's attractions when in quadratures, to produce the neap-tides. It may further be understood that, as the distances of the sun and moon from the earth vary by the ellipticity of the orbits; at the times when either of the celestial bodies is in perigee, its attractive power being greater than at other times, the tide-wave raised by it will attain a greater elevation than usual; on the other hand, when in apogee, the high-water elevation must be the least.

The tides are greatly modified at any station or port by the position of the latter with respect to the equator, and by the declination of the sun and moon. The two summits of the great tide-wave are, at the same instant, diametrically opposite to one another; and if the latitude of the station were equal to the moon's declination on a given day, both moon and station being for example north of the equator, the summit of the wave would on that day be at the station when the moon is in or near the zenith; but about twelve hours afterwards, the station, having described half the circumference of a circle about the earth's axis by the diurnal rotation, will be on the opposite of the meridian; and the summit of the wave, being on the southern side of the equator, will be at a distance from the station equal to twice the moon's declination; consequently the height of this tide will be much less than that of the former tide. The contrary phenomenon occurs when the moon and the station are on opposite sides of the equator.

The only tide-waves with which we can be said to be well acquainted are those of the Indian and Atlantic oceans; and from the known times of high-water at different places, it is ascertained that the summit of a wave advances from the seas to the south of New Holland into the Bay of Bengal, and towards the Persian Gulf, causing the hour of high-water to be successively later at the ports from Ceylon northwards, on both sides of the western peninsula of India. The summit of a single wave seems to extend from the mouth of the Red Sea, along the eastern coast of Africa, to the Cape of Good Hope, where it joins the tide-waves of the Atlantic. These advancing northwards, cause the time of high-water to be successively later at the different ports on the western coast of Africa and Europe, and on the whole eastern coast of South and North America; so that the wave which at a certain instant is at the Cape, in 15 hours from that time is at the mouth of the English Channel and on the western coast of Ireland. This wave, being apparently checked in its progress by the British Isles, divides itself into two principal branches, of which one flows up the Channel, and passing through the Straits of Dover, is off the mouth of the Thames in 8 hours from the time that it was at Brest. A small branch advances up St. George's Channel; but the second principal branch of the wave flowing round the northern extremity of Scotland, proceeds slowly down the North Sea, and meets the first branch off the mouth of the Thames in 20 hours from the time that it was at the entrance of the Channel.

From Rio Janeiro to the Falkland Islands a wave summit seems to advance directly from east to west; and from the form of the continent of South America, the high tide occurs successively later in going southward from Cape Frio, as if the wave came from the north. The wave from the southern ocean sets northward, from Terra del Fuego and the Falkland Islands to the coast of Patagonia, and at Port St. Elena on that coast it occurs 12 hours later than at those islands. On the western coast of America the tide travels from north to south, between Acapulco and the Straits of Magellan; while from the former place it travels northwards. In the Pacific Ocean the general direction of the tide-wave is from east to west; but the heights of the tides are small, not exceeding 2 feet at the islands of the South Sea. It is observed however by Mr. Whewell ('Phil. Trans.,' 1833) that this must not be understood to be the tide which would be raised if the whole earth were covered with water, on account of the modifications produced by the form of the continent of South America. The most eastern part of New South Wales, between 25° and 30° S. lat., has the high-tide earlier than points which are situated towards the north or south of that tract.

Peculiarities in tides, arising from the interference of waves, occur in many different places. In the middle of the North Sea there is supposed to be a considerable space within which the tide produced by the waves coming from the north and south takes places at one time. And Mr. Whewell states, on the authority of Captain Hewett, that about the Ower Shoal there is no sensible rise of the tide till 3 hours after the time of low-water; but when the ebb stream has nearly ceased, there is a sudden rise of 5 or 6 feet; so that nearly the whole rise of the tide occurs in the last 3 hours.

In 1740 the Académie des Sciences offered a prize for the best memoir on the theory of tides; and the paper by Daniel Bernoulli on the flux and reflux of the sea shared it with those of Euler and Maclaurin. In that paper it is assumed that the water is kept in equilibrio between the attractions of its particles towards the earth's centre of gravity and the disturbing forces exercised by the sun and moon; and though the results of that theory are found to differ greatly from the observed phenomena, the theory itself is deserving of attention, since the analytical expressions which have been obtained by it first exhibited the several phenomena distinctly from one another: those expressions consequently became guides to the observer or experimenter in his efforts to ascertain the true values of the particular effects which they represented.

The attraction exercised by the solid nucleus of the earth on a particle of water at any distance from its centre, being considered the same as it would be if all the matter of the nucleus existed in that centre, is represented by $\frac{E}{r^2}$, E being the mass of the earth and r^2 the square of the distance of a particle from the centre. But if x, y, and z are rectangular coordinates of a particle, the centre of the earth being the origin, we have $r^2 = x^2 + y^2 + z^2$; and the partial differentials of the expression $\frac{E}{x^2 + y^2 + z^2}$, relatively to x, y, and z, represent the effects of that attraction upon a particle in the directions of the three axes. If the attractions of the particles of water for each other are taken into consideration, there must be determined the attraction exercised upon a particle by all the water between the spherical nucleus and the exterior surface (supposed to be spheroidal) of the surrounding fluid, and the expression for this attraction must be added to that for the solid.

The disturbing force of the sun or moon upon a particle of water is represented by $\frac{S}{R^2}$, S being the mass of the celestial body and R the distance of the particle of water from it; and the partial differentials of that expression relatively to x, y, and z give the values of the attraction in the directions of the coordinate axes: but the disturbing force exercised by the sun or moon on a particle of water being equal to the difference between its attraction on the particle and its attraction on the centre of the earth—the latter, which is represented by $\frac{S}{D^2}$ (D being supposed to be the distance between the centres of the earth and celestial body), is subtracted from the attraction exercised on the particle in the direction of one of the coordinate axes, supposed to be parallel to the line joining those centres, in order to have that difference. The attracting forces of the earth in the directions of the three axes being subtracted from the disturbing forces of the sun or moon in the same directions, there remain three terms which are usually represented by X, Y, and Z. And since it has been demonstrated by mathematicians that when a body is in equilibrio under the action of attracting forces, the expression $Xdx + Ydy + Zdz$ is an exact differential; the form of the surface of equilibrium is determined by making the integral of the expression constant.

The resulting equation being found to correspond with the general equation to a spheroid, a comparison of like terms in the two equations gives the values of the constants which enter into the former. If r represent the mean distance of the spheroidal surface of the water from the centre of the earth, and $\pm h$ represent the distance of any point on that surface above or below the mean level; then $x^2 + y^2 + z^2 = (r \pm h)^2$ at the surface; and the determination of h for any place gives at that place the height of the water above, or its depression below the mean level.

Uniting the effects of the solar and lunar disturbances by simply adding them together, since the disturbing forces are very small compared with the force of gravity; and introducing, in place of the rectangular coordinates, angles which depend on the longitude and latitude of a station, with the right ascension and declination of the sun and moon, the value of the term $\pm h$ may be shown to consist of three parts: one of these depends on the variation of the declination of the sun and moon, and indicates a slow tide which goes through its changes in about fourteen days; the second depends on the hour angles both of the sun and moon, and indicates two tides which go through their changes in a solar and a lunar day respectively. These being combined, there is produced a diurnal tide, the highest state of which should precede, at a variable interval, the moon's culmination between the times of passing from syzygy to quadrature, and should follow it between the quadratures and syzygys. It has been found however that the observed accelerations and retardations, and also the absolute elevations of the water, in very few cases agree with the results of the theory.

The third part depends upon the doubles of the hour angles just mentioned, and consequently indicates two semi-diurnal tides, which being combined constitute one such tide, whose highest state is variable. The nature of the expression shows that the semi-diurnal tide should be the greatest at the equator, and should diminish till it vanishes at the poles: it denotes also that it is greatest at new or full moon, and least at the quadratures. The theory moreover indicates that the difference between two consecutive tides ought to be very considerable in Europe; whereas they are known to be nearly equal to one another. Both Newton and Bernoulli endeavoured to explain this circumstance by the hypothesis of a general oscillation of the sea, in consequence of which the highest tide gives to the lowest a quantity equal to the difference between them; but the researches of La Place have shown that, even with such oscillations, the two tides could not (according to the theory) be equal unless the sea were everywhere equally deep.

Euler, departing from the hypothesis that the sea is always in equilibrio under the action of the sun and moon, endeavoured to introduce the subject of fluid oscillations in his theory of the tides; but the laws of undulation were not then known, and Euler assumed that a molecule of the sea in motion endeavours to regain the position which, in a state of equilibrium, it would occupy in a vertical line with a force proportional to its vertical distance from that position.

The theory adopted by La Place, in which there are taken into consideration the laws of the motion of fluid molecules when acted on by attracting forces, was a great improvement on that of the mathematicians before mentioned; and it is found to produce a more near agreement with the observed phenomena. The elaborate investigations of La Place will be found in the 'Mémoires de l'Académie des Sciences' for the years 1775, 1776; and in the first and fourth books of the 'Mécanique Céleste.' As in the former theory, the solid nucleus of the earth is supposed to be entirely covered with water of uniform depth; and the investigations commence with the proof (*Méc. Cél.*, liv. i., ch. 8) that any portion of the water, however its place may be changed, will always retain the same volume. The equation expressing this law is called the equation of continuity.

A very small parallelopiped of water within that which covers the solid nucleus of the earth is acted upon by accelerative forces arising from pressures estimated in the directions of three rectangular coordinate axes whose origin is at the centre of the earth: the first is supposed to be parallel to the axis of rotation, and the others in the plane of the equator; one being directed to the equinoctial point and the other at right angles to that direction. The pressures are supposed to arise from the attraction of the earth, from the angular velocity of its rotation, and from the disturbing forces, and to tend towards the origin of the coordinates.

These pressures, which are expressed by partial differential coefficients relatively to x, y, and z, in the coordinate axes, are subtracted from the accelerative forces arising from the attraction of the earth, and the perturbations exercised by the sun or moon, by which the molecule would be made to recede from that origin; and the differences in the directions of the axes are represented by $\frac{d^2x}{dt^2}$, $\frac{d^2y}{dt^2}$, and $\frac{d^2z}{dt^2}$.

In these equations of motion the partial differential coefficients representing the pressures are transformed into others depending on the distance of the molecule from the centre of the earth, and on its latitude and longitude; while the perturbations of the sun or moon in the directions of the coordinate axes are expressed in terms of the right ascension and declination of the disturbing body, and also of the distances of the latter from the particle disturbed and from the centre of the earth. The result is that the expression for the altitude of a molecule of water above the mean level, in consequence of the perturbation produced by the sun or moon, consists of three parts (*Méc. Cél.*, lib. iv., c. 1); the first does not depend on the rotation of the earth, and indicates a tide which goes through its changes in a long period; it may consequently be disregarded. The second depends on that rotation and on the hour angle of the disturbing body: it indicates the diurnal tides, or those which take place when the celestial bodies are on or near the meridian, above the horizon; and which follow one another at intervals of twenty-four hours for the sun, and about 24h. 50m. for the moon. The third depends on an angle equal to the double of that on which the second depends; and consequently it represents the semi-diurnal tide.

But the subject of waves and tides has been treated in conformity to the theory of undulations by Mr. Airy, the astronomer royal, in a valuable essay which is published in the 'Encyclopædia Metropolitana:' the investigations, though admitting of general application, are particularly adapted to the phenomena of tides in rivers and arms of the sea; and they are conducted by an analysis within the reach of persons acquainted with the ordinary processes of the differential and integral calculus.

As in the theory of La Place, there is formed an 'equation of continuity,' which is founded on the equality of a rectangular parallelopiped of water at rest, to the oblique parallelopiped formed, when the water is in a state of disturbance, by the new positions of the eight particles constituting the angular points of the former parallelopiped. But, as the water is supposed to be in a rectangular canal, the extent of the parallelopiped in the direction of the breadth of the canal is supposed to be constant; and therefore it is sufficient to assume the equality of the parallelograms which form a side of each in the direction of the length of the canal.

The canal being of uniform depth, the 'equation of continuity' is expressed by

$$Y=-\int\frac{dX}{dx}\ \text{(between 0 and } y\text{)}$$

where x and y are respectively the horizontal and vertical coordinates of a particle of fluid, and where X and Y are respectively the horizontal and vertical displacements of the particle by the action of the disturbing forces: the equation expresses a relation between those coordinates and the disturbances or displacements.

An equation of the pressure experienced by any particle from the forces which act upon it is next found in the following manner:—Let p represent the pressure in every direction on the lower part of a disturbed molecule of water in consequence of the height or weight of the filament of particles above it: then, the vertical coordinate of the particle being y' or $y+Y$, suppose in the element dt of time the vertical coordinate to become $y'+\delta y'$ (the vertical height of the filament above the molecule in that position being increased by the general rising of the wave), the pressure on the upper part of the molecule will be greater than before, and may be represented by $p+\frac{dp}{dy'}\delta y'$; consequently the molecule may be supposed to be pressed downwards by a force represented by $\frac{dp}{dy'}\delta y'$. Now, in order to render the expression for the hydrostatical pressure homologous to that which is employed for the force of gravity, it must be considered as accelerative, or as a motive-power divided by the mass; and therefore the accelerative pressure downwards becomes $\frac{dp}{dy'}$, which being added to g, representing the force of gravity and supposed to be constant, there arises $\frac{dp}{dy'}+g$ for the whole acceleration of the molecule downwards: hence there is obtained the equation

$$-\frac{d^2y}{dt^2}=\frac{dp}{dy}+g.$$

This equation, being integrated between the limits for the bottom of the molecule and the top of the wave, gives the hydrostatical force by which a vertical filament of water descends, or that by which it is carried forward horizontally.

Let the slender column of water above the molecule have a horizontal breadth equal to h in the direction of x; then the horizontal pressure in front, by which the column is forced backwards, will exceed the pressure by which it is carried forwards by a force represented by $\frac{dp}{dx}dh$, or by an acceleration represented by $\frac{dp}{dx}$; therefore the horizontal acceleration forwards is $-\frac{dp}{dx}$: if extraneous forces, as the attraction of the sun or moon on the molecule, and the effects of friction, be together represented by F, when estimated in the direction of x, there arises the expression $F-\frac{dp}{dx}$ for the whole acceleration forwards; then the 'equation of motion' becomes

$$\frac{d^2X}{dt^2}=F-\frac{dp}{dx},$$

which gives relations between the terms X, Y, x, y, and t. This 'equation of equal pressure' and the 'equation of continuity' constitute the theory of the motion of fluids in canals of uniform breadth.

The general equation representing the disturbance or displacement of a particle of water is the same as that which expresses the disturbance of a particle of light [illegible] the 'undulatory theory;' and, in order to indicate oscillatory motion, both the horizontal and vertical displacements are represented by terms containing the sines or cosines of angles depending on the time t.

If it be assumed that

$$X = R \cos. (nt - mx) + S \sin. (nt - mx),$$

R and S being functions of y, the above equations of continuity and of equal pressure give, on the supposition that gravity is constant, that no extraneous forces act, and retaining for the present only the first power of $\frac{dX}{dx}$, or of the horizontal displacement,

$$\frac{d^2X}{dy^2} + \frac{d^2X}{dx^2} = 0.$$

From these two equations are obtained the values of X and Y in terms of $A \cos. (nt - mx)$ and $B \sin. (nt - mx)$.

These values will not be altered if mx is increased or diminished by one, two, three, &c. whole circumferences, that is, if x is increased or diminished by $\frac{2\pi}{m}$, $\frac{4\pi}{m}$, &c., while t remains the same; therefore $\frac{2\pi}{m}$ is the value of the increments of x which correspond to points where the particles of water are in the same condition with respect to disturbance, that is, $\frac{2\pi}{m}$ is the length of a wave. Again, the values will not be altered if nt is increased or diminished by whole circumferences, that is, if t is increased or diminished by $\frac{2\pi}{n}$, $\frac{4\pi}{n}$, &c., while x remains the same; therefore $\frac{2\pi}{n}$ is the increment of time which corresponds to the particles of water being successively in the like state of disturbance, that is, $\frac{2\pi}{n}$ is the period of a wave, or the time between two successive formations of a wave-summit at the same place. Therefore $\frac{n}{m}$ is the velocity of the wave; and, from the value found for it by the theory, it follows that the velocity depends on m and on the depth of the water: the latter being constant, the velocity depends on the length of the wave, or it depends on the time in which a particle of water makes a complete vibration. If the length of a wave or the time of its vibration is given, the velocity will vary with the depth of the water.

From a table of the computed velocities of waves of different lengths, and with different depths of water, it is found that when the length of the wave is not greater than the depth of the water, the velocity of the wave is proportional to the square root of its length: also when the length is not less than one thousand times the depth of water, the velocity is proportional to the square root of the depth, and is the same as that which a body would acquire in falling from rest through a height equal to half that depth. The greatest horizontal and vertical displacements of a particle being computed for different values of the length of the wave and the depth of the water, it appears that when the latter is great, compared with the former, as in the open sea, the motion of the water far below the surface is very small compared with the motion at the surface; and at a depth equal to the length of wave, it is only about $\frac{1}{535}$ of the motion at the surface. On the same supposition the greatest horizontal motion is equal to the greatest vertical motion. When the length of the wave is great compared with the depth of the water, as in tide-waves, the horizontal motion of the particles is nearly the same from the surface to the bottom, and the vertical motion varies with the distance from the bottom. On the same supposition the vertical motion of the superior particles is much less than their horizontal motion.

The movement of a particle of water near the surface may be determined from the values given by the theory to X and Y: if the waves are small, so that A may be considered as equal to B, we have $(X^2 + Y^2)^{\frac{1}{2}} = C$, a constant; which, being the equation of a circle, it follows that the particles move in the circumference of a circle whose radius is A; but if the length of the wave is great compared with the depth of water, the equation is that of an ellipse. These last deductions from the theory are conformable to what has been observed in experimental waves, as above mentioned. It follows that, in a long tide-wave flowing up a channel, the horizontal velocity in the direction of the wave's motion is the greatest at the summit of the wave, that is, at high-water: at the place of greatest depression, that is, at low-water, the motion is most rapid downwards; and at the mean level the water is for a time stationary.

In investigating theoretically the phenomena of waves by whatever cause produced, if the lengths of the waves are very great compared with the depth of the canal in which they move, it becomes necessary to retain the second and even higher powers of $\frac{dX}{dx}$, or of the horizontal displacement, in the equations of continuity and of equal pressure; but the vertical oscillations being then small, the value of $\frac{d^2Y}{dt^2}$ may be neglected. Then, if the perturbating actions of the sun and moon are not considered, the integration of the differential equation of equal pressure gives a value of the vertical displacement at the surface, or the height of the wave above the mean elevation, in terms which contain $k \sin. (nt - mx)$ and $kx \sin. (2nt - 2mx)$, k being the depth of water in the canal. Tracing an undulating line whose ordinates are the values of that vertical height, corresponding to different values of x, the horizontal distance from the mouth of the canal, which is supposed to open to the sea; it is found that, near the opening, the front and rear slopes of the waves are of equal lengths and of similar forms: but as the distance from the sea becomes greater, the front slope is shorter and steeper, and the rear slope longer and more gentle: at a great distance the latter becomes nearly horizontal in the middle, and at length it divides into two parts, so that the wave becomes double. Near the sea also, the time occupied by the rise of the wave is equal to the time occupied by its descent: at a certain distance the rise takes place in less time than the descent; and at a still greater distance the descent, after having been rapid, is checked, or changed into a rise, to which another rapid descent succeeds; so that there seem to be two tides, or elevations of the water, in the upper part of the canal, corresponding to one elevation at the mouth.

The value of $\frac{dX}{dt}$, or the velocity of the particles of water, is found also to contain the sines and cosines of the angles above mentioned; and, substituting in these the greatest positive and the greatest negative values of the elevation, it is found that the velocity corresponding to the first of these values, that is, at the top of the wave, is less than the velocity corresponding to the other: but the motion, in the first case, is up the canal, and in the other down it; and these are nearly the same as the greatest velocities of the water; consequently the velocity of the flow of the wave in the canal is less than that of the ebb. The preceding conclusions relate to the case in which the water was at rest in the canal previously to the formation of the wave: in the event of the water having a general movement towards the sea, the time in which the wave rises, or the time from low-water to high-water, is still less than the time of the descent; but the difference between the two times is greater than in the former case.

If a section of the bed of the canal, instead of being rectangular, has the form of an isosceles triangle, the investigations show that the velocity of the wave would be equal to that of a wave in a rectangular bed whose depth is equal to half the perpendicular of the triangle. If the section were a parabola, the velocity would be two-thirds of that which the waves would have in a rectangular bed of equal breadth and depth.

When the water, still supposed to be in a canal of uniform breadth and depth, is disturbed by extraneous forces, as the attraction of the sun or moon, the term F in the equation of equal pressure is conceived to consist of two, one represented by $H \sin. (it - mx)$ for the horizontal intensity of such force in the direction of x, and the other by $G \cos. (it - mx)$ for the vertical intensity; and the equation for $\frac{d^2x}{dt^2}$ being then satisfied by the equation $X = \phi''(y) \sin.$

$(it-mx)$, in which $\phi''(y)$ represents the second differential coefficient of a function of y, there is obtained a value of X at the surface of the fluid in terms of sin. $(it-mx)$, and a value of the height above the level of still water in terms of cos. $(it-mx)$. The wave thus indicated depends upon the continuance of the actions of the extraneous disturbing forces, and is designated by Mr. Airy the *forced* tide-wave. This wave, he observes, would cease to exist if those forces were to cease; but other waves resulting from the previous action would still continue to exist; and these he distinguishes by the name of *free* tide-waves. If the canal be supposed to surround the earth at the equator, the length of the forced tide-wave is equal to half the circumference of that great circle; and from the expressions for X and Y, it appears that the effect of the vertical disturbing forces on the phenomena of the tides is insignificant, almost the whole sensible effect being due to the horizontal force.

Taking into account the effects of friction, which may be considered as a horizontal retarding force proportional to the velocity, and which may consequently be represented by $-f\frac{dX}{dt}$; the value of X contains terms involving the sines and cosines of angles represented by $it-mx$ and $it \pm qx$, and the expression for the vertical elevation contains the sine and cosine of $it-mx$. The analytical expression arising from the introduction of this additional perturbation indicates the fact that the highest tides take place later than the times at which the disturbing forces arising from the action of the sun or moon are the greatest; and this circumstance gives to the wave theory an important advantage over those of Newton and La Place; for in both these theories the greatest tides take place when the force is the greatest.

In the case of a canal bounded at both extremities, the expression for X, the horizontal disturbance of a particle, is found to consist of two parts: one of which is the horizontal movement due to the disturbing forces; and the other, a combination of free tide-waves, probably caused by reflexions of the forced tide-waves from the opposite ends of the canal. When a canal so bounded is of small extent, the horizontal motion of the particles is found to be the greatest in the middle of its length, and to diminish gradually to the ends, where it vanishes. There is proved to be no variation of level in the middle of the length, and the variation in other parts is proportional to the distance from the middle; the elevation at one end taking place at the same time as the depression at the other. It results also that the greatest horizontal and vertical displacements of the particles take place at the same time; whereas in other circumstances, from the circular or elliptical motions of the particles, the greatest horizontal displacements take place when the vertical displacements are zero, and *vice versâ*.

In a deep gulf open to the sea at one end and closed at the other, and in which the waters have a tidal fluctuation, the termination of the flow upwards takes place at the mouth a considerable time after high-water; but near the bottom of the gulf the difference between the times is very small. When a tide wave is propagated up a river, the analysis shows that the vertical elevations of the wave, and also the horizontal motion of the particles of water, diminish continually as the wave advances: also the direction of the tide current changes sooner after the instant of high-water than it would if friction were not considered. When a river runs on a declivity towards the sea, the latter being affected by tides, it is shown that the low-water at certain points up the river may be higher than the level of high-water on the sea.

The theory of which a brief outline has just been stated, applies to what are called negative waves by a mere change in the sign of the coefficients of the trigonometrical factors. These waves are depressions below the general surface of the water, and, like the others, they have a progressive motion. Such waves, for example, are those which are formed by the paddles of a steam-boat.

All the theories concur in showing that the difference between the diurnal and semidiurnal tides is great in middle latitudes, and small at the equator and poles; and in this respect they are at variance with the actual phenomena. From observations it is found that this difference is as great at certain places near the equator as near the latitude of either tropic: it has also been found to be great at Petropaulowski and in Norfolk Sound, while in Europe it is small. It has been attempted to account for the latter circumstance by assuming that each tide-wave in this part of the world is composed of two, which flow towards the same place in opposite directions at intervals of about twelve hours. It is supposed that the semidiurnal waves of these tides, being in the same state or phase, produce together a like effect, but that the diurnal waves are in opposite states; so that the superior high tide of one wave coinciding with the inferior high tide of the other, they together produce a mean height of water differing but little from that of the united semidiurnal tides.

For the details of the investigations relating to the theories of the oscillations of water, discussions of the experiments which have been made by Mr. Russell and others on waves in artificial canals, methods of making observations on tides, and accounts of the particular tides in rivers and seas, see the article 'Tides and Waves,' in the *Encyclopædia Metropolitana*.

WAVELLITE. *Hydrargillite*, *Devonite*, *Lasionite*. This mineral, which is a phosphate of alumina, was discovered by Dr. Wavel, whence its name. Occurs in globular concretions from a very small size to that of an inch in diameter; these consist of small slender crystals radiating from a centre, with imperfect terminations. Primary form of the crystal a right rhombic prism. Cleavage parallel to the lateral planes, and the greater diagonal of the prism. Hardness, 3·5 to 4. Scratches carbonate of lime. Colour nearly white; grey, brown, yellow, and green of various shades. Lustre vitreous, somewhat pearly on the cleavage planes. Transparent, translucent. Specific gravity, 2·337.

Before the blow-pipe, it swells and becomes snow-white; when powdered, it dissolves without effervescence in nitric and sulphuric acids when heated, and gives out an acid which slightly corrodes glass.

This mineral is found at Barnstaple in Devonshire; near Cork, Ireland; in Cornwall, Germany, Brazil, &c.

Analysis of the mineral from Barnstaple, by (1) Fuchs, (2) Berzelius:—

	(1)	(2)
Phosphoric acid . .	34·84	33·40
Alumina . . .	37·16	35·35
Water . . .	28·00	26·80
Fluoric acid . .	„	2·06
Lime	„	0·50
Oxides of iron and manganese . . .	„	1·25
	100·	99·36

WAVENEY. [NORFOLK.]

WAX. There are several varieties of this substance, but the term used by itself means bees'-wax. This was once supposed to be merely the pollen of plants elaborated by the bee; but it is now admitted to be a secretion from its ventral scales. With this substance the comb is constructed, the cells of which are hexangular; from the comb the wax is extracted chiefly by pressure, then melting it in hot water, by which the impurities subside, and the wax is poured into and allowed to cool in moulds.

The properties of wax, or rather of yellow wax, are—that it has a yellowish or orange colour; its odour is peculiar. Even in winter it is soft enough to be indented by the nail, and in summer it is much softer. Its density varies from 0·960 to 0·965. It melts at about 143° to 150° Fahr. It is a nonconductor of electricity.

White or *Bleached Wax* is obtained, as stated by Dr. Pereira (*Mat. Med.*, p. 1381), by melting yellow wax by means of steam, running it off, while in a melted state, into a trough called a *cradle*, perforated at the bottom with holes, and placed over a large water tank, at one end of which is a revolving cylinder, almost wholly immersed in water. By this means the wax is solidified, converted into a kind of ribbon, and conveyed on the surface of the water to the other end of the tank. These ribbons of wax are here lifted out and conveyed in baskets to the bleaching grounds, where they are exposed to the air for one or two weeks (according to the state of the weather), being turned every day. The wax is then re-melted, re-ribboned, and re-bleached: it is subsequently refined by melting in water acidulated with sulphuric acid.

Pure wax thus obtained is nearly devoid of smell, and white with a yellowish tint; it is brittle, insipid; its melting point is 158° Fahr., and it solidifies at 149°.

Chemists differ considerably in opinion as to the nature of wax; some supposing it is a homogeneous body, while others are of opinion that it consists of two different substances. To one of these the name of *cerine* has been given, which, it has been asserted, constitutes about 70 per cent. of wax; it fuses at about 144° Fahr., and dissolves in 16 parts of boiling alcohol: the other substance is called *myricene*; it fuses at 149° Fahr., and is soluble in 200 parts of alcohol of the specific gravity 0·833.

Other differences have been stated between these two bodies; thus, cerine is saponifiable by potash, yielding margaric and a little oleic acid, and a considerable quantity of a non-saponifiable fat called ceräine. Myricine on the other hand is not saponifiable. Hess is however of opinion that wax is homogeneous in nature; and Liebig thinks it is probable that this is, at any rate, sometimes the case.

When wax is strongly heated it is decomposed, yielding the usual products of non-azotized vegetable matter. According to Hess, when wax has been deprived of its colouring matter by æther, white scales of wax are procured, which yield by analysis—

Carbon . . .	80·79	80·84
Hydrogen . . .	13·21	13·22
Oxygen . . .	6·00	5·94
	100·00	100·00

Wax is extensively employed both in its original and bleached state; in the latter it is used not only for candles, but also in numerous cerates, ointments, and plasters.

Myrtle Wax is a vegetable product, obtained from the berries of the Myrica cerifera, a native of the United States of America; these are boiled in water, and the wax then exudes, floats on the water, is skimmed off, and re-melted. It is greenish, diaphanous, and bleaches perfectly in the sun; it is so brittle that it may be pulverized. Its density is 1·, it melts at about 87° Fahr.

Several other plants yield waxy products; thus, the wax-palm of the Andes (*Ceroxylon Andicola*) is a tree which grows to the height of 160 to 180 feet, and yields a mixture of wax and resin, of which the natives make candles. From the resin Bonastre has extracted a substance which he calls *ceroxyline*. Another variety is produced by the WAX-TREE.

WAX-TREE, the common name of the plants belonging to the genus *Vismia*. This genus was named in honour of M. de Visme, a merchant of Lisbon, and belongs to the natural order Hypericaceæ. It has a 5-parted calyx, five petals villous inside, a membranaceous berry, five styles with peltate stigmas, numerous stamens disposed in five bundles, which are placed opposite the petals, and alternate with five glands or scales; the anthers are small, roundish, 2-celled, and bursting lengthwise; seeds with a double covering. The species are either shrubs or trees, having quadrangular opposite branches with entire leaves full of glandular and pellucid dots. The flowers are of a yellow or greenish colour. All the species afford a yellow juice, which is sometimes collected and sold in the markets under the name of American Gamboge. All the known species, except one, which grows in Africa, are natives of various parts of South America. The species in greatest abundance are the following:—

Vismia guianensis, Guiana Wax-tree, has a quadrangular stem, ovato-lanceolate or oblong leaves, which are dilated at the base and rufescent and smooth beneath; the petioles are short, the calyxes ovate with ciliated margins; the stamens numerous, and the berry ovate. This plant is a native of Guiana and Brazil. It is a shrub about eight feet in height. The Cayenne Wax-tree (*V. cayennensis*) has dotted ovato-lanceolate leaves, and few-flowered panicles of white flowers. It attains a height of about ten feet, and all parts of the plant yield the resinous juice.

V. sessiliflora, has an angular stem, lanceolate leaves, cordate at their base, with very short and thick petioles, and a multifid panicle. It is a native of Guiana, and yields the juice in great abundance. *V. latifolia*, with broad dotted leaves and dotted petals, is another species of Guiana, which yields great quantities of the juice when cut or broken. The juice when dried is purgative in doses of about seven or eight grains.

WAX, SEALING. The best red sealing-wax is composed of shell-lac, Venice turpentine, and cinnabar. The shell-lac by itself is rather too brittle, and the turpentine is added to remedy that defect. The proportions are about four parts of lac, one part of turpentine, and three parts of cinnabar, by weight. When the lac and turpentine are melted the cinnabar is added in powder, and the whole is well mixed by stirring it about. The round sticks of sealing-wax are made by hand on a smooth slab of marble or plate of metal, which is kept at an even and moderate temperature by a brazier or chafing-dish placed beneath it. The liquid sealing-wax having been partially cooled, a quantity sufficient to make about six sticks is rolled out on the slab or plate into one long stick, which, when of proper diameter, is cut into lengths, and transferred to another workman, by whom the sticks are rolled on a cold slab beneath a smooth piece of wood or metal. The sticks are now to be polished, which is done by holding them successively between two contiguous charcoal fires till the surface is fused, which produces the polish. One end is then softened by being brought near the flame of a lamp, in order to receive the impression of the maker's name. This manipulating process is only applied to the round sticks; those which are oval and ornamented are formed by pouring the liquid sealing-wax into a mould; when partly cooled, the sticks are removed to another mould made of steel, out of which they are taken polished and fit for use.

For the best sealing-wax, the best and most colourless shell-lac is used, the finest Venice turpentine, and the brightest cinnabar, or that which is called Chinese vermilion. For the best black sealing-wax, the finest ivory-black is substituted for the cinnabar. For sealing-wax o inferior quality, not only the darker-coloured shell-lac i used, but other resins of less value, common turpentines and mixtures of cinnabar and red lead, or sometimes re lead alone, and lamp-black is used instead of ivory-black Other colours are given to sealing-wax by mixing with it for the most part, different metallic oxides.

The softer wax, which was formerly in general use fo sealing letters and legal documents, and which is stil occasionally used for the latter purpose, consists of abou four parts of bees'-wax, one part of Venice turpentine, an as much cinnabar or other colouring material as is require to give it the tint which is preferred.

Sealing-wax consisting of lac with a red colouring matter seems to have been first brought from the East Indies The earliest seals of this material that have been found i Europe are of the date of about 1560. The compositio was soon discovered by the Dutch, French, and Germans and its superiority to bees'-wax soon brought it into general use. The quantity of lac imported into this country chiefly for making sealing-wax, is very great. [LAC. The Dutch call it *zegel-lak*, and the Germans *siegel-lack* both properly; the French, as well as the English, improperly call it wax: the French call it *cire-à-cacheter*; th softer material, which is really wax, they properly cal *cire-à-sceller*. The name was probably given to sealing wax by the French and English before its compositio was known.

The Egyptians appear to have used for sealing a kin of earth, probably containing bitumen, which Herodotu (ii. 38) calls sealing earth, 'γῆ σημαντρίς,' on which a impression was made by a seal-ring, 'δακτύλιος.' A similar substance was used also by the Greeks (πηλός) and b the Romans (*cretula*); but the material commonly use by the antients, at least in later times, was wax.

(Beckmann's *History of Inventions*, vol. 1; *Dictionnair Technologique des Arts et Métiers*; *Handmaid to the Art* vol. ii.)

WAY, *Chimin* (from the French *Chemin*), is a ter used to denote either a right, in one person or more, passing over the land of another, or the space over whic such right is exercisable. In the former sense a way is a incorporeal right of the class called EASEMENTS,—th corporeal right, the ownership of the soil, and of all i products, superficial and mineral, remaining in the part in whom such ownership would have been, supposing n right of way to have existed.

Five species of way are known to the law:—1, A foot way, for persons passing on foot only; 2, a horse-way, f persons passing on horseback, but including a foot-way 3, a drift-way, for driving cattle; 4, a carriage-way, f leading or driving carts and other carriages, always includ ing a foot and horse-way, and usually, but not necessarily, including a drift-way; 5, a water-way for ships and boats.

All these may be either private or public ways, the former being enjoyed by particular persons or classes, the latter being open to the public, to the queen, and to all persons who are either permanently or temporarily her subjects; hence such a way is said to be *communis strata*, or, *alta via regia*,—in the language of pleading, a common and public queen's highway.

I. The proper origin of a private right of way is, a grant from the owner of the soil, whose means of enjoying his own property are abridged thereby.

Such a grant may be made to a party or to him and his heirs, *in gross*, *i.e.* without respect to any land or house of which he may be the owner or occupier: or, to the grantee, his heirs, and assigns, *being* owners of such a house or close; in which case the right granted will be *appurtenant* to the house or close to which the grant is annexed, and the right will pass with the house or close.

The grant of a way may be either express or implied; and in the case of an express grant, the grantor may impose such restrictions upon his grant as he thinks proper. Where a man who, at the time he conveys part of his land to another, has no access to the land conveyed, except over the land which he reserves, the grant of a right of way over the land reserved is necessarily implied. So, where a man conveys part of his land, having no access to the part reserved, except over the land conveyed, a right of way over the land conveyed is impliedly reserved. The way so impliedly granted or reserved is called a 'way of necessity.'

Where no deed can be produced whereby a way is expressly or impliedly created, the party claiming the way may, in the case of a long continued user of the right without evidence of commencement or interruption within the period of legal memory, plead that it has been immemorially enjoyed by him and his ancestors in the case of a way in gross, or by him and all those whose estate he has, in the house or close to which the way is annexed, in the case of a way appendant (*i.e.* immemorially appurtenant).

Until lately also, a lost grant would be presumed in ordinary cases, after an uninterrupted and unexplained user of 20 years. But now, by 2 and 3 William IV., c. 71, § 2, no claim which may be lawfully made by custom, prescription, or grant, to any way to be enjoyed or derived upon, over, or from any land or water, when such way has been actually enjoyed by any person claiming right thereto, without interruption, for the full period of 20 years, shall be defeated or destroyed by showing only that such way was first enjoyed at any time prior to such period of 20 years; and when such way has been so enjoyed, for the full period of 40 years, the right is absolute and indefeasible, unless enjoyed by some consent or agreement, expressly given or made for that purpose by deed or writing.

A grant of a right of way made by a person who has only a limited estate in the land over which the way passes, is effectual only during the continuance of the estate of the grantor. Where a claim to a right of way is set up in respect of the 20 years' or the 40 years' enjoyment mentioned in the statute, if it appear that the land over which the right is claimed has, during the whole or part of the 20 or 40 years, been in the occupation of a party having a limited estate in such land, not only is no right of way acquired as against the reversioner, but no right whatever is gained by the user. (4 Tyrwh., 552; 1 Cro., M. & R., 217.) As to the construction of this act see 6 N. & M., 230; 4 Ad. & Ell., 369; 11 Ad. and Ell., 688, 788.

The party to whom a private road is allotted under the general enclosure act, has a *statutory* right of way.

Where the party entitled to a way becomes the owner of the land over which it passes, the right of way is extinguished if the party has the same extent of interest in the land and in the way. But if the one be held for an estate different in extent of duration from the other, the right is only *suspended* during the union of the two interests. Even where a right of way is extinguished by unity of possession, it will, in some cases, revive upon a severance of that unity as by partition amongst parceners, &c. A private right of way may also be extinguished by a deed of release executed by the party entitled to such way; and such a release may be presumed from a non-user for 20 years or from a declaration made by the party that he has no such right.

A way of necessity is limited by the necessity out of which it has arisen. Thus, where the party to whom such a way is impliedly granted, or by whom it is impliedly reserved, becomes entitled to some other access to his land, equally direct, the way of necessity is gone.

The particular rights of the grantee of a private way continue to exist notwithstanding the owner of the land may have dedicated it to the public as a highway.

By the general enclosure act (41 Geo. III., c. 102) all roads, private as well as public, within the district, not set out by the commissioners, are declared to be extinguished.

The grantee cannot throw the burthen of repairing the way upon the grantor, unless by the terms of the grant, evidenced by the deed or by user, the grantor has engaged to enable the grantee to use the way. In the ordinary case, where the right and the liability to repair the way are in the grantee, he is not entitled to go upon the adjoining land when the direct way is impassable (4 Maule and Selw., 387); whether he may do so where the state of non-repair is caused by the wrongful act of the occupier of the land, or where the liability to repair rests upon the latter, does not appear to have been decided.

If the occupier of the land over which a private way passes, or any other person, obstruct the way, the party entitled to the way may remove the obstruction, and he may also bring an action on the case, or, in some cases, an action of covenant against the obstructor. On the other hand, if the occupier of the land resisting the claim of a right of a way, bring an action of trespass against the person exercising the alleged right, the defendant may plead in justification a title founded upon prescription, grant, reservation, or statute.

II. Between private ways and public ways stand what may be called *quasi-public* ways, partaking of the qualities of both, but differing, in some respects, from each. By some writers these are classed amongst private, by others, amongst public ways; they seem more properly to constitute a distinct intermediate class. Such are ways which the inhabitants of a town, &c. have immemorially used from their town, &c. to a church or market. A right of this description cannot, in modern times, be created. It cannot be the subject of a grant, inasmuch as inhabitants, as such, are not at this day capable of taking any interest by grant; nor can it, like a public way, be created by dedication, as the dedication of a way can only be to the public at large. Such a right therefore can exist only by force of an antient custom.

III. A highway is created where the owner of the soil has, by express words or by some act done or forborne, declared his intention that the public shall have the use of a way over such soil. The dedication of a way to the public may be by writing or by words; so it may be inferred from the acts of the party, as the throwing down of fences, or from mere tacit acquiescence where the acquiescing party is in possession of the land, and therefore has the means, if disposed so to do, of preventing the use of the way. In all cases however it is necessary that the party dedicating should have a sufficient interest in the land to warrant such dedication. If he has a less estate than a fee-simple, his dedication will not bind the reversioner. But it would also appear that the owner of such a limited estate could not even dedicate a highway to the public for the limited period of his interest in the soil, and that his attempted dedication, however distinctly and formally made, would amount to nothing more than a licence revocable at pleasure.

When there is no express dedication, the presumption of an intention to dedicate, arising out of the conduct of the party, may be rebutted; as by showing that when the public were first admitted a bar or a chain was occasionally placed across the road, whereby passengers might, at times, be excluded; although it should also appear that the bar, &c. had long been omitted to be used, or that it had been suffered to fall into decay, or had been actually broken down, and that no attempt had been made to [illegible] it.

A highway is frequently created by statute, principally under enclosure acts.

Whatever may have been the origin of a highway, it cannot, at common law, be destroyed or altered except after an inquisition taken upon a Writ of ad quod damnum.

By the common law the burthen of repairing highways is thrown upon the occupiers of lands and tenements within the parish, or rather township.

[Town] in which the way is situated. But particular persons may be bound to repair a highway. This special liability may exist by reason of enclosure (ratione coarctationis), against parties who have enclosed the sides, or one side of the road, and have thereby lessened the facilities for breaking out into the adjoining lands where necessary; or by reason of the possession of lands (ratione tenuræ terræ suæ), which have by some means become chargeable with the burthen. In the case of a corporation aggregate, a liability to repair may also be established by prescription only, or antient usage, without enclosure or tenure.

Any obstruction or other nuisance in a highway may be abated or removed by any person who chooses to undertake the task. The wrong-doer may also be proceeded against by indictment as for a misdemeanour; but he is not liable to an action, as he is in the case of a nuisance to a private or to a quasi-public way, except in respect of special damage.

The regulation of highways has frequently been made the subject of legislative interference. The statute now in force is the 5th and 6th William IV., c. 50, some of the provisions of which it will be right to notice.

The inhabitants of every parish maintaining its own highway are to elect annually one or more persons to serve the office of waywarden or surveyor, by whom the highways of the parish are to be repaired and kept in repair (§ 6). To be eligible as waywarden the party must have 10*l*. a year in lands or 100*l*. personal estate (§ 7), and he may be appointed with a salary (§ 9). In case of non-election, disqualification, or misconduct of a waywarden, the justices may appoint (§ 11). Parishes may, upon application, be consolidated into districts (§ 13); the union to continue for three years, and afterwards until determined by twelve months' notice (§ 15). Large parishes are empowered to appoint a board for the superintendence of highways (§ 18). A rate is to be made and levied by the waywarden upon property liable to be assessed to the relief of the poor, and also upon woods, mines, and quarries of stone and other hereditaments theretofore usually rated to the highways (§ 27). In parishes in which the overseers are authorized to compound for poor-rates, the waywarden may compound for highway-rates (§ 30). Waywardens are to have the same remedies for highway-rates as the overseers have for poor-rates (§ 34). The waywarden may, with the assent of the vestry, appoint a collector of rates (§ 36). Yearly accounts are to be laid before the vestry, and afterwards before the justices at a special session, who are to examine the accounts and hear complaints (§ 44). The waywarden is not to have a share in any contract for work or materials (§ 46). Waywardens are empowered to take stones for repair, from waste lands &c. without payment, except for damage done (§ 51). If sufficient materials cannot be conveniently had from waste lands, &c., waywardens may, with licence from justices at petty sessions, search for materials in enclosed grounds, not being a garden, &c., and take them, making satisfaction to the owner (§ 54). No tree, bush, or shrub is to be planted within fifteen yards of the centre of a highway (§ 64). Encroachments on the highway are to be removed by the waywardens at the expense of the party, the amount of which expense is to be levied by distress and sale by the justices at a special session of the highways (§ 69). Persons committing nuisances by riding or by leading or driving cattle on footpaths, or tethering cattle thereon, doing any injury or damage to highways, or to the hedges or fences, injuring milestones, playing at games, or pitching a tent, booth, stall, or stand on the highway, firing off any gun, pistol, or firework within fifty feet of the centre of highway, laying timber, &c. on highway, suffering filth to run into highway, or obstructing the passage of the highway or of any footway, are to forfeit a sum not exceeding 40*s*. over and above the damage occasioned (§ 72). The waywarden is to impound cattle straying on highway (§ 74). The name of the owner of every waggon and cart is to be painted thereon (§ 76). Drivers of carts and other carriages not driven by reins, are not to ride thereon (§ 78). Cartways are to be at least twenty feet wide, horseways eight, and footways three (§ 80). Narrow roads may be widened by order of justices, if not of convenient breadth (§ 82 and 93). Provision is made for the stopping up, diverting, and turning of highways (§ 84 to 92). Justices are authorized and required to compel the repair of highways (§ 94 to 100).

By the 23rd section of the act, no road or occupation way made at the expense of individuals or corporations, is to be deemed a highway which the parish is liable to repair, unless the road is made in a manner prescribed, and certain notices are given, and the road adopted by the parish. This provision does not however appear to affect the right of the public to use a highway dedicated to the public without the observance of the formalities here required for the purpose of throwing upon the parish a liability to repair.

In the case of a way over water, either private, quasi-public, or public, if the course of the water alter by sudden or gradual change, the way is continued over the new course. Every navigable river, arm of the sea, or creek, is a highway for ships and boats.

WAY, MILKY. [Milky Way.]

WAYS, ROMAN. Our old chroniclers give this name to four principal antient highways which they suppose to have been either originally formed by the Romans in Britain during their occupation of the country, or at least to have been completed and perfected by that people upon lines of road for the greater part already traced and used by the former inhabitants. The names however by which the four highways are distinguished appear to be Saxon in form, although they may be Roman or British in etymology:—Watling Street, Ikenild Street, Ermin Street, and the Fosse. Watling or Gathelin Street, which is said to have been so called from a functionary of the name of Vitellianus (in British, Guetalin), to whom the care of it was committed—a most unsatisfactory and improbable etymology—is held to have extended from Dover to Chester; or, according to another hypothesis, to Chester-le-Street, in Durham, passing through Canterbury, London, and Verulam, from which last-mentioned town it had also the name of Werlaem Street. Its remains, or supposed remains, are still known in various places by the names of High Dyke, High Ridge, Ridge Way, and Forty-Foot Way. There has been much controversy however as to whether Watling Street did actually pass through London. Stukely in particular contends that it crossed what is now called the Oxford Road at Tyburn, and proceeded to the west of Westminster, through Hyde Park and St. James's Park, to the Thames, which it crossed at Old Palace-yard. The common opinion however is, that it passed along the line of what is still called Watling Street in the City, meeting the other three great roads at the central milliarium in Cannon Street, pointed out by the site of London Stone, and crossing the river at Dowgate to what is still called Stoney Street on the Surrey side. The northward course of Watling Street, after leaving London or its neighbourhood, is supposed to have been over Hampstead Heath, to Edgeware, and hence, through Verulam (or St. Alban's) and Dunstable in Bedfordshire, to Stoney Stratford in Northamptonshire, whence it skirted Leicestershire on the west to Bosworth. From this point its course is disputed, some making it proceed in a north-western direction to Chester, others carrying it due north to York and thence to Chester-le-Street; whence some imagine it to have been latterly extended to Lanark and Falkirk in Scotland, or even as far as to Caithness, at the extremity of the island. Ikenild or Ichenild Street is said to have been so called from its commencing on the eastern side of the island in the country of the Iceni, mentioned by Tacitus, and supposed to be the same with the Simeni of Ptolemy, who appear to have occupied Norfolk, Suffolk, and Cambridge. On the supposition however of London Stone having been the central milliarium where all the great roads of the country met, a branch of the Ikenild must have extended to this point; it is supposed to have passed through Aldgate, and to have been otherwise known by the name of the Vicinal Way. The course of the Ikenild to the westward is extremely obscure: nearly all that has been even conjectured on the subject is, that it crossed Watling Street at Dunstable, and thence extended in the direction of Staffordshire to the western coast. It seems most probable that, while Watling Street ran directly north to Chester-le-Street, the Ikenild crossed it obliquely to Chester; but the scanty remains of the one road have been confounded with those of the other. Ermin or Hermin Street, again, is conjectured by some to have extended from St. David's, at the south-western extremity of Wales, to Southampton; by others, to have stretched more directly across the country to London, which it may have entered by what is now called Holborn. Finally, the Fosse is supposed to have taken its course from south-west to north-east, beginning near Totness in Devonshire, and passing through Bristol, Cirencester (near which place it seems to have crossed Ermin Street), Chipping Norton, Coventry, Leicester, and Newark, to Lincoln. If it was carried from thence to London, it probably proceeded through Bishopsgate Street. Nothing however can be more obscure and uncertain than the whole subject of these supposed Roman highways. Camden treats it with a sort of contempt, declining to venture upon any pursuit after the course of the four pretended roads, and only remarking that our old historians, who will only have four ways of this sort, are in that, without all question, in an error. The Itinerary of Antoninus makes fifteen itinera or roads in Britain.

WAYWODE, or WOYEVODA, is a Slavonian appellation, derived from *voyna*, 'war,' and *vodit*, 'to lead;' and consequently it has the same etymology as the Latin *Dux*, the Saxon *Heretog*, and the modern German *Herzog*.

This name was originally given to military commanders in different Slavonian countries. In Poland each palatinate* or province had its woyevoda, whose duty was to command in time of war the pospolite, or arrière ban of his province. The woyevodes had in time of peace a certain administrative authority, and composed the first class of the senators. By a rather improper comparison with the Comites Palatii of the empire, they were translated in Latin by 'palatine.' [POLAND, *Constitution of*.]

In the earliest times of Russian history the appellation of woyevoda is given to high military officers. In Muscovy there were military and civil woyevodes: the first were simply generals, and Peter the Great abolished this antient Slavonian appellation and introduced that of general. The civil woyevodes were divided into provincial and town woyevodes, and they were governors of provinces and towns: and this appellation was changed only under the reign of Catherine II. into that of governors, commanders, &c.

The appellation of waywode was assumed for some time by the rulers of Moldavia and Wallachia, who substituted for it afterwards the Greek title of *despota*, and finally its Slavonian translation, hospodar. The princes of Transylvania had also sometimes the title of waiwode, which was also given to some minor Turkish officers.

W is here pronounced as the English V.

WEALDEN FORMATION, the uppermost series of the strata usually included by English geologists in the 'Oolitic system.' [GEOLOGY.] This arrangement is justified by the plants, fishes, and reptiles which occur in the formation, for they are generically, and even specifically, more allied to oolitic than to cretaceous types of structure. But as the Wealden deposits are of fluviatile origin principally, we do not find in them the usual shells or crustacea of the oolites, but a peculiar series, of which a few species are also discovered in other districts. What is the exact marine formation in other countries which is contemporaneous with the fresh-water Wealden-beds, or whether any such equivalent is known, appears doubtful.

(Mantell, *Geology of Sussex;* Austen and Fitton, in *Abstracts of Geol. Society*, 1843.)

WEALTH is the means of obtaining the products of labour. An individual is rich or poor according to the quantity of the necessaries and luxuries of life which he can purchase; and a nation is rich or poor, in the aggregate, according to its means of enjoying such advantages. Labour is the source of wealth, and every addition to its productiveness tends to increase wealth, by lowering the cost of commodities, and rendering them more easy to be obtained. Political economy treats mainly of the means of promoting the increase of national wealth, and of removing obstructions to its development; and it is the purpose of this article very briefly to enumerate and explain some of the chief principles of that science which bear directly upon the production of wealth. The first object is to encourage industry. This is best done by leaving it free to obtain an adequate reward, by protecting all persons in the enjoyment of such reward, and in reducing the amount or value of it as little as possible. These encouragements can only be effectually given in a free state, and under a civilized government, where property is secure, and labour free from restraint. Insecurity of person or property, arbitrary and oppressive taxes, monopolies, restrictions upon the free exercise of skill and enterprise, are all impediments to the increase of wealth: they discourage industry by diminishing the inducement to exert it, and they restrain its productive powers when exerted by thwarting the natural intelligence and activity of man in the pursuit of his own interests.

Whatever gives the best direction to industry, and facilitates its operations, is favourable to the increase of wealth. Thus the separation of men into different employments is highly useful, as it perfects their skill and ingenuity in their respective arts, and causes a general economy of time. Still more useful is capital, without which division of labour cannot be extensively practised. It puts labour in motion; combines the work of many hands; gives means and power to invention; creates mechanical aids to human labour, and finally distributes by degrees what it has assisted in producing. Facilities to the ready and effective application of capital obviously add to its utility; as credit, for example, which lends to one man the capital of another when he can employ it more profitably; and the various descriptions of money (the representatives of capital) which facilitate and cheapen the exchange of labour and its products between man and man. The higher the *general* rate of profits in a country may be, the more rapidly is capital likely to be accumulated; because the majority of men are usually desirous of accumulating, and the means of doing so are evidently increased by high profits. If a profit of five per cent. upon a man's capital engaged in business enabled him to live in comfort, and to continue his business without any diminution of his capital; a profit of ten per cent. would enable him, at the same time, to add to it five per cent. annually, to be employed in further production and accumulation. It is clear that there can be no increase of capital in any country in which the rate of profits does not leave a surplus beyond the necessary expenses of living. In such a case capital would be stationary, while the population to be supported by it would be on the increase.

The advantages of division of labour have been already noticed. The enriching properties of commerce are of a similar character. By distinct employments labour is made more productive; by commerce, the natural products and the peculiar arts of different countries are exchanged with mutual benefit and economy of labour to all. In France and Spain the grape, grown in the open air, provides delicious wine: in England, to make such wine (if it could be made at all), the grape must be grown in hothouses. In England cotton goods can be manufactured more cheaply than in any country in the world. If France and Spain would buy them, they would save annually whatever excess of price they pay for similar goods made by themselves; while the capital and labour now applied to such manufactures could be added to their means of production. To understand the effects of free commercial intercourse, it is only necessary to keep in view its analogy to the common dealings of life. No man thinks of making anything himself if he can buy it for less than it would cost him to make it. He continues working at his own employment, and buys the article he wants. If he did otherwise, he would lose his own profitable time and labour, and the article made by himself would take still more out of his pocket than if he had bought it; while its quality would most probably be inferior, by reason of his own want of skill and practice in that particular work. The same principle applies to nations. Commerce extends to all countries the happy results of division of labour, instead of confining them to particular communities.

The last circumstance directly favourable to the increase of wealth, which need be noticed, is a cheap and expeditious communication, both in the interior of a country and with all parts of the world, for the transit of merchandize and for the carriage of passengers. Every deduction from the cost of an article is an addition to the national wealth, and the expense of transit forms no inconsiderable part of the ultimate charge upon the consumer. So also a saving of time is an addition to the labour and productive energies of a country. The extraordinary resources added to labour by facilities of travelling may be illustrated by the case of railways in Great Britain. In the year 1842 about 18,000,000 persons travelled by railway. Each person, upon an average, must have saved at least an hour by the rapidity of railway locomotion. The aggregate time thus saved to the community at large would exceed 2000 years, or, in other words, the saving may be estimated as equal to the value of the labour of one man for 2000 years, or of 2000 men for one year. The importance of cheap and rapid modes of commercial intercourse, in other points of view, need not be pointed out.

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* Called in Polish, 'woyewodztwo.'

In conclusion, the advancement of general knowledge and intelligence must be noticed as an agent in the production of wealth. It is the mind and the disciplined will of man which render all the circumstances of the world available for his benefit; and in viewing education chiefly as a social blessing, we should never forget to urge its merits as a producer of wealth, upon those who would regard its other recommendations with less favour.

WEANING, the act of separating a child from the partaking of its mother's milk as food. A few hours after the birth of a child, the breast of the mother secretes milk for its nourishment. The milk that is secreted at first differs in some of its properties from the milk subsequently secreted, and has been called *colostrum*. Healthy milk under the microscope is found to contain globules of various sizes, which are perfectly spherical in form, swimming in a fluid in which are suspended no other particles; whilst the globules of colostrum are irregular and disproportioned, some of them being very large and others very small. There are also in colostrum particles of a yellowish colour, which are very minute, and which consist of fatty matter and a peculiar mucus. The milk retains these characters for several days, and it has been supposed at this period to possess a purgative property, which excites the intestines of the young infant to throw off the accumulated meconium. When the mother is healthy, the secretion of milk goes on abundantly till the ninth or tenth month, at which time the infant is generally able to take some other kind of food, and the process of weaning may commence at this period. It however often happens, from ill health or other causes, that the mother is not able from the first to suckle her child. In this case the child must be either transferred to another nurse or fed artificially. The former, where possible, should always be preferred. In the choice of a nurse care should be taken that the infant is transferred to one whose age, size, and temperament resemble its own mother. There should also be an absence of actual disease or a tendency to hereditary disease, and of all habits likely to interfere with a due secretion of healthy milk. Where children are artificially fed or reared from birth by the hand, the greatest care and attention are required. The first requisite is that the child should have a food as nearly resembling its natural food as possible. For this purpose the milk of various animals has been employed. That of the cow, as being most easily obtained, is most frequently used; but it would appear that the milk of the ass most nearly resembles human milk, and on that account, where it can be obtained, is to be preferred. The following is the latest analysis, by Dr. Playfair, of the milk of woman, the cow, and the ass, and may serve as a guide in the preparation of the food of children:—

	Woman.	Cow.	Ass.
Casein . . .	1·5	4·0	1·9
Butter . . .	4·4	4·6	1·3
Sugar . . .	5·7	3·8	6·3
Ashes . . .	0·5	0·6	. .
Water . . .	88·0	89·0	90·5

The milk of the cow contains a much larger quantity of the casein, or nitrogenized principle, than that of woman or the ass, and requires dilution previous to its being administered to new-born children. At first two-thirds pure fresh water and one of cows' milk, with a small quantity of sugar, may be employed. As the child grows older, the quantity of water should be gradually decreased till it takes milk alone. This food should be administered to the child at a temperature of about 98°, the heat at which the milk is supplied from the mother. When children are thus fed, a spoon should not be used, but some means should be had recourse to for administering the milk slowly, as the sucking-bottle, artificial nipple, &c. In feeding a child artificially, as in suckling, the first sign of indifference may be regarded as a sign that the child has had enough. On no account should children be fed again immediately after vomiting, a practice that is often extremely injurious.

As a child increases in size and strength, it requires other food in addition to milk, and at last ceases to require supplies from its mother. Although this is a perfectly natural process, it is often, from want of skill, or rather want of knowledge of natural laws, a source of painful disease to the mother, and sometimes even loss of life to the child. As a general rule, it may be stated that a child should never be suddenly weaned, and that the more gradual the separation between mother and child the better will it be for both. The time for weaning must depend in some measure both on the development and health of the child and the state and health of the mother. With regard to the child, one of the first indications that weaning may be commenced is the appearance of teeth. This is indicative of preparation for other kind of food, and generally occurs in healthy children about the sixth or seventh month; and it is at this period that a gradual abstraction of the breast may commence. If this be done, it is seldom that a child will require suckling beyond the first year; although, where no ill consequences result to the mother, there is no objection to the child continuing at the breast till it is eighteen months or two years old. Where children are backward in the development of their teeth, and present other signs of want of strength and delicacy of constitution, it is frequently advisable that they should remain a lengthened period at the breast. It is always necessary to take into consideration the health of the mother during suckling, as children may suffer much more severely from an imperfectly secreted or diseased state of the milk than they would from immediate weaning, and under these circumstances of course the least evil is to be preferred.

In order that the weaning should be gradual, the child should be induced at the fifth or sixth month to take some light food once or twice a day, and its supply from the breast should be proportionately diminished. If such a plan is pursued, the quantity of food administered by hand being increased whilst the supply from the nurse is decreased, it will be generally found that little difficulty will be experienced in entirely weaning the child at ten or twelve months old. After a child has been weaned its food ought principally to consist of liquid or semifluid substances. Asses' and cows' milk alone, or boiled with bread, thickened with ground rice or baked flour, may be given for the first few months. To these may be added, for the sake of variety, rice, tapioca, sago, and arrow-root, which may be made up with milk or water, or both; and when water alone is used, sugar should be added. Where children cannot take milk, light broths should be administered. As solid food for the first year after weaning, there is nothing better than bread and butter: but in all cases in the diet of children a due regard should be had to the relation between azotized and non-azotized aliments. If the former are given in too great quantity, congestion and inflammation are frequently the result; whilst if the latter prevail in the diet, the child gets fat and loses strength, and becomes subject to diseases of debility. Neither the one kind nor the other should be withheld, and it is only by their judicious combination that the fatal effects of improper diet can be avoided.

(Gardien, *Dictionnaire des Sciences Médicales*; Combe, *On the Management of Infancy*; Maunsell and Evanson, *On the Diseases of Children*.)

WEAR. [WEIR.]

WEAR, river. [DURHAM.]

WEARDALE, ST. JOHN. [DURHAM.]

WEARING. [VEERING.]

WEARMOUTH. [SUNDERLAND.]

WEASELS (*Mustelidæ*), a family of digitigrade CARNIVORA. [Vol. vi., p. 307.]

The genus *Mustela* of Linnæus, in the last edition of the 'Systema Naturæ,' which underwent his revision, comprised the following species:—*lutris*, *lutra*, *lutreola*, *barbara*, *gulo*, *martes*, *putorius*, *furo*, *zibellina*, *erminea*, and *nivalis*. The genus thus established consisted of the Otters and Gluttons, as well as the true Weasels, and was placed between VIVERRA and URSUS.

Cuvier divides the *Martes* (*Mustela*, Linn.) into the following subgenera:—

Putorius, Cuv.

The animals of this subgenus are, he observes, the most sanguinary of all; the lower canine has no internal tubercle; and their upper tuberculous tooth is wider than it is long; they have only two false molars above and three below. They may be recognised by the extremity of their muzzle, which is rather shorter and stouter than that of the *Martes*; and they all diffuse a most disagreeable odour.

The species arranged under this subgenus are the common Fitchet or Polecat, *Mustela putorius*, Linn.; the Ferret, *Mustela furo*, Linn.; the Polecat of Poland, *Mustela sarmatica*, Pall.; the Siberian Polecat, *Mustela sibirica*, Pall.: the Weasel, *Mustela vulgaris*, Linn.; and the Stoat or Ermine Weasel, *Mustela erminea*, Linn.

As approximated to these, he records the Mink, Norek, or Polecat of the Northern Rivers, *Mustela lutreola*, Pall., which frequents the banks of waters in the north and east of Europe from the Icy to the Black Sea, feeds on frogs and crayfish, and has the feet a little palmated between the bases of the toes, but which its teeth and round tail approximate to the Polecats more than the Otters. It is reddish-brown, and has the circumference of the lips and under part of the jaw white. Its odour is only musky, and its fur very beautiful.

Some, Cuvier observes, think this the same as the Polecat of the North American rivers, *Mustela vison*, Gm., to which the name of *Mink* has been transferred, and which has also the feet semi-palmated; but this animal has generally white on the point of the chin only, and sometimes a narrow line under the throat, and is a different species.

Among the Polecats of warm climates, Cuvier notices the Javanese Polecat, *Putorius nudipes*, F. Cuv.; the African Polecat, *Putorius africanus*, Desm.; the Striped Polecat of Madagascar, *Putorius striatus*, Cuv.; and the Cape Polecat (the *Zorille* of Buffon, *Viverra zorilla*, Gm.)

The Martes, or Martens, properly so called.
(Mustela, Cuv.)

These, according to Cuvier, differ from the Polecats in having an additional false molar above and below, and a small internal tubercle on their lower canine; two characters which a little diminish the cruelty of their nature.

Belonging to Europe he notices, as very closely allied to each other, the Common Marten, *Mustela martes*, Linn., and *Mustela foina*.

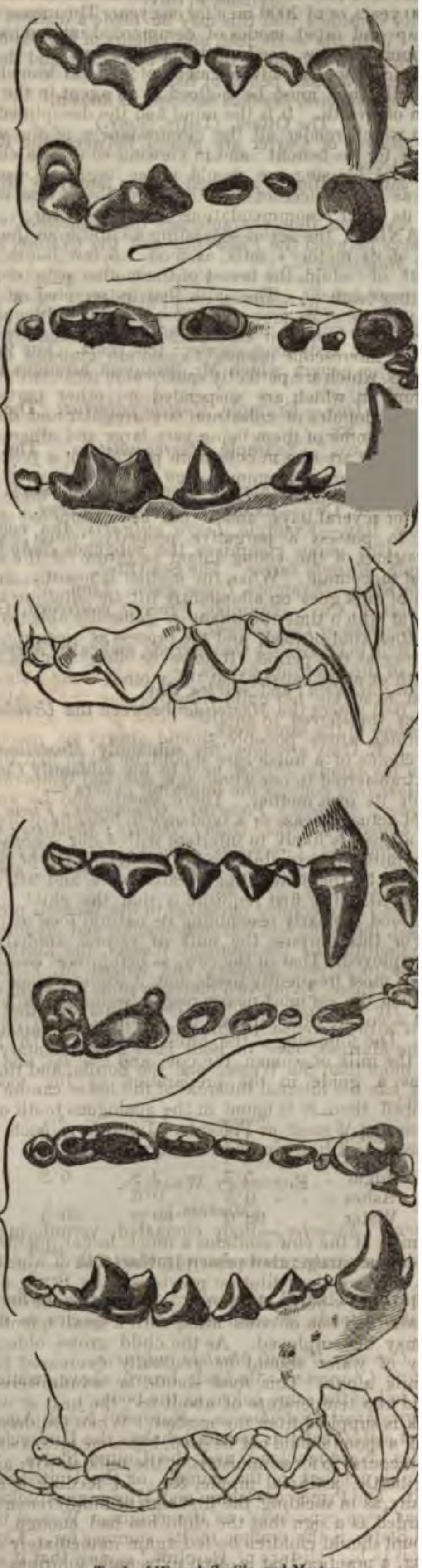
As the production of Siberia, he calls attention to the Zibelline Marten, *Mustela zibellina*, so celebrated for its rich fur, which is brown, with some grey spots on the head, and is distinguished from the preceding by having hairs even under the toes, a provision adapted to its habitation in the most frozen mountains. The painful chace of this species is laboriously followed in the midst of winter among frightful snows, and to the pertinacity with which it has been persevered in notwithstanding the meteoric terrors that surround the hunter, the discovery of the eastern countries of Siberia has been ascribed.

North America, observes Cuvier, produces many *Martes*, which travellers and naturalists have indicated under the names of *Pekan*, *Vison*, *Mink*, &c. One of these, the White Vison of the furriers, *Mustela lutrocephala*, Harl., has the feet as hairy and the hair nearly as soft as the Zibelline, but of a bright fulvous colour, and is almost whitish on the head. That, he remarks, which he shall call *Pekan*, *Mustela canadensis*, Gm., and which comes from Canada and the United States, has the head, the neck, the shoulders, and the upper part of the back mingled with grey and brown; the nose, the rump, the tail, and the limbs are blackish.

The Mouffettes. (Mephitis, Cuv.)

These, like the Polecats, have two false molars above and three below; but their upper tuberculous tooth is very large, and as long as it is wide, and their lower canine has two tubercles on its internal side, which approximates them to the Badgers, as the Polecats are approximated to the Grisons and the Gluttons. The *Mouffettes* have besides, like the Badgers, the anterior claws long, and adapted for digging, and they are even half-plantigrade: the resemblance is continued even in the distribution of the colours. Cuvier truly remarks in conclusion, that in this family, remarkable for its fetid odour, the *Mouffettes* are distinguished by a stench far exceeding that of the other species.

The Mouffettes, or Skunks, are generally striped with white upon a black ground, but the number of stripes varies in the same species. The most common is the North American species, *Viverra putorius*, Gm., which is black, with white stripes more or less wide and numerous, and the tip of the tail black. The odour of this suffocating animal has been compared to that of the Polecat, mingled with an overpowering stench of garlic; and nothi be more intolerable. Cuvier also notices the C



Teeth of Weasel, Zorilla, and Marten.

Upper set, a little more than twice the size of nature; lower set, nea the natural size.

(*Viverra mephitis*, Gm.), with the tail white: the stripes on the back sometimes occupy the whole of its width.

Mydaus, F. Cuv.

Cuvier considers that this may be made a distinct subgenus. With the teeth, feet, and colours of the Skunks, it has a truncated muzzle in the form of a snout, and the tail is reduced to a small pencil of hairs.

Only one species, *Mydaus meliceps*, is known.

The Otters. (Lutra, Storr.)

The *Martes* of Cuvier are placed between the Ratels and the Dogs.

The same position is assigned to this family by M. Lesson.

Mr. Swainson thus characterises the *Mustelinæ*, which he places between the *Viverrinæ* and the *Ursinæ*, in his family *Mustelidæ*:—

Cutting-teeth, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; grinders, $\frac{4-4}{5-5}$ or $\frac{5-5}{5-5}$, one of which only is tuberculous; head small, oval; ears short, round; body long, slender; feet short. The following are the genera which Mr. Swainson arranges under this subfamily:—

Putorius, Cuv.—Example, *Mustela putorius*. The Polecat, Weasel, &c.

Martes, Cuv.?—Example, *Martes abietum*. The Pine Marten.

Mephitis, Cuv.—Example, *Viverra striata*, Shaw.

Mydaus, F. Cuv.—Example, *Mydaus meliceps*.

Lutra, Ray.—Example, *Lutra vulgaris*, the common Otter. This genus comprises the subgenus *Enhydra*.—Example, *Mustela lutris*. The Sea Otter.

Gulo, Storr.—Example, *Ursus gulo*. Linn.

Ratelus, F. Cuv.—Example, *Viverra mellivora*, Gm.—(*Classification of Quadrupeds*.)

Mr. Bell, in his *British Quadrupeds*, makes the *Mustelidæ* consist of the following genera:—

Lutra; *Mustela*; and *Martes*, Ray.

Mr. Bell places the *Mustelidæ* between the *Ursidæ* and the *Felidæ* in the same work.

Mr. J. E. Gray arranges his subfamily *Mustelina*, the fifth of his family *Felidæ*, next to his subfamily *Canina*. The *Mustelina* contain the following genera:—

Martes; *Mustela*; *Putorius*; *Gymnopus*; *Vison*, *Zorilla*; *Galera*; *Ratelus*; *Gulo*; *Helictis*; *Mephitis*; *Chinchia*; *Marputius*; *Conepatus*; *Mydaus*; *Arctonyx*; *Meles*; *Taxidea*; *Lontra*; *Lutra*; *Aonyx*; *Pteronura*; and *Enhydra*. (*Synopsis*: *Brit. Mus.*)

We shall here confine ourselves to the Weasels properly so called, including the Martens, Skunks, and *Mydaus*.

The dentition of the common Weasel, the Zorilla, and the Martin is very similar; and indeed M. F. Cuvier unites the three, giving two plates to show the slight variations. He observes, that the only difference that they present with reference to this part of their organization is that the Martens have in both jaws a rudimentary false molar more than the Weasel and the Zorilla, and that the Zorilla has the internal tubercle of the lower canine more developed than it is found in the analogous tooth of the Martens and Weasels or Polecats. In other respects their systems of dentition are quite identical.

European Weasels.

(Mustela.)

Generic Character.—Body elongated, vermiform; feet short; toes separate; claws sharp; molar teeth $\frac{4-4}{5-5}$. Some error having obtained with regard to the species found in the British Islands, we shall select those species as examples:—

The Common Weasel, Mustela vulgaris.

Specific Character.—Reddish brown above, white beneath; tail of the same colour as the body.

Geographical Distribution.—Europe. North America. Pennant states that this species inhabits the Hudson's Bay countries, Newfoundland, and the United States. Godman, in his account of the animals of the United States, omits it. The Prince of Canino and Musignano thinks that what has been considered as the common Weasel in the United States, is the ermine in its summer fur. Lawson notices it in his 'History of Carolina,' saying that it is the same as in England, but very scarce. Catesby also mentions it, writing 'Weasle;' and in the 'New Description of Virginia' (1649), 'Weesels' are mentioned among their congeners, but with this saving clause, evidently written to soothe settlers: 'but these vermine hurt not hens, chickins, or eggs, at any time.' Dr. Richardson remarks that both the Weasel and the Ermine are indubitably inhabitants of the American continent, the Ermine extending to the most remote arctic districts, and the Weasel as far to the north, at least, as the Saskatchewan River. Captain Bayfield, he observes, presented the Zoological Society with specimens of the common Weasel, killed on the borders of Lake Superior, which agree in all respects with the European species; and Dr. Richardson obtained similar specimens at Carlton House. The last-named author adds that the Weasels of the fur countries become white in winter, like the Ermine, and are not distinguished from them by the traders.

Habits.—Mr. Bell, who, in his interesting and carefully digested work on the British Quadrupeds, gives the above specific character of the common Weasel, well observes that the near approximation in figure and character, and the great general similarity in habits, which a comparison between the Stoat and Weasel presents, have occasioned considerable confusion in some of the accounts which have been given of their history; though the difference of size and colour would at once be sufficient to distinguish the species, were there no other points of disagreement between them.

'The Stoat,' says Mr. Bell, 'is brown above, dirty white beneath; the tail always black at the tip, longer and more bushy than that of the Weasel, and the former animal is twice as large as its elegant little congener. The Weasel, on the other hand, is red above, pure white beneath, the tail red and uniform. Their habits also, though generally similar, are, in many of their details, considerably distinct; and we are fully borne out by observation in saying that the accusations against the Weasel, of the mischief which he is said to perpetrate in the farm-yard and the hen-roost, as well as amongst game of every description—on hares and rabbits, no less than on the feathered tribes—are principally due to the Stoat. It is not meant to be asserted that the Weasel will not, when driven by hunger, boldly attack the stock of the poultry-yard, or occasionally make free with a young rabbit or a sleeping partridge; but that its usual prey is of a much more ignoble character, is proved by daily observation. Mice of every description, the field and the water vole, rats, moles, and small birds, are their ordinary food; and from the report of unprejudiced observers, it would appear that this pretty animal ought rather to be fostered as a destroyer of vermin, than extirpated as a noxious depredator. Above all, it should not be molested in barns, ricks, or granaries, in which situations it is of great service in destroying the colonies of mice which infest them. Those only who have witnessed the multitudinous numbers in which these little pests are found, in wheat-ricks especially, and have seen the manner in which the interior is sometimes drilled, as it were, in every direction by their runs, can at all appreciate the amount of their depredations; and surely the occasional abduction of a chicken or a duckling, supposing it to be even much more frequently chargeable against the Weasel than it really is, would be but a trifling set-off against the benefit produced by the destruction of those swarms of little thieves.'

Mr. Bell adds, as ground for this defence of the Weasel, that a friend of his assured him that at least three bushels of different species of mice had been killed out of one wheat-rick, a number that will not surprise those who have seen a good thoroughly-routing mouse-hunt in a grain rick-yard or granary where the mice have taken up their quarters in earnest. Great good the Weasel certainly does, and its usual mode of attack when it reaches its prey shows that small quadrupeds and birds form its staple. It inflicts a bite on the head, which pierces the brain, and seldom fails to lay the victim dead at its feet by a single stroke. But there can be no doubt that it is a destroyer of newly-hatched gallinaceous and game-birds and young ducks, as well as the smaller feathered tribes; and that, although it does good service in keeping down the mice, it is a bad neighbour to the hare and rabbit-warren. Not that the Weasel will do one-third of the mischief that a Stoat will, nor upon animals of such large growth, but it will do enough. It is a most active and persevering hunter; few trees will stop it when in search of birds' nests, which it robs not only by sucking the eggs, but by carrying off the young. It will hunt the Mole, the Field-Mouse, and other small quadrupeds in their usual haunts not only by the eye but also by the scent, like a Stoat; and most amusing it is to see one of these flexible agile little creatures tracing up the scent when it is at fault. They will quarter the ground like a dog till they hit it off, and to lose no help from their eye, will occasionally sit up, raising themselves on their hind-quarters to gain a more extended view around them. Their perseverance will tire down animals larger and stronger than themselves; nor will water stop them when their game takes to it for safety. In they plunge, and seldom quit their object till the fatal bite is inflicted. The brain is generally first eaten, and the body of the victim kept as a supply near the haunt of the little hunter; but it seems very questionable whether they are addicted to those blood-sucking propensities which the vulgar attribute to them; and our own experience coincides with that of Mr. Bell, who considers this alleged habit to be much exaggerated, and whose own observation, as far as it had gone, tended to confirm the opinion of those who deny the existence of such a propensity altogether.

The last-named acute zoologist also throws well-grounded doubt on the assertion that the Weasel will attack and destroy snakes; and indeed he believes such a notion to be entirely erroneous. He placed a weasel and a common snake together in a large cage, in which the former had the opportunity of retiring into a small box in which it slept. Mutual fear was manifest, and the animals kept at a distance; the snake however showing as much disposition to be the assailant as the weasel, which at last gave the snake an occasional slight bite on the side or on the nose, without however materially injuring the reptile, and evidently without any instinctive desire to feed upon it. After they had remained two or three hours together, the animals appeared almost indifferent to the presence of each other. The snake was then removed.

'How different was this Weasel's conduct,' says Mr. Bell, after relating the experiment above stated, 'when a mouse was introduced into the cage: it instantly issued from its little box, and in a moment one single bite on the head pierced the brain, and laid the mouse dead without a struggle or a cry. I have observed that when a Weasel seizes a small animal, at the instant that the fatal bite is inflicted, it throws its long lithe body over its prey, so as to secure it should the first bite fail; an accident however which I have never observed to occur when a mouse has been the victim. The power which the Weasel has of bending the head at right angles with the long and flexible, though powerful neck, gives it great advantage in this mode of seizing and killing its smaller prey.'

This destroyer becomes itself a victim to birds of prey. We have all heard the story of the eagle and cat, and how the maddened quarry brought the mighty bird that had snatched it away down again to the earth in the agonies of death. In the 'Magazine of Natural History' a similar anecdote is recorded of a stoat and an eagle, not however with any strong voucher. But Mr. Bell, on the authority of Mr. Pindar, residing, when the event occurred, at Bloxworth, in Dorsetshire, relates the following passage in the life of a weasel; and as there is no ground whatever for doubt, it affords a striking instance of the murderous instinct of this little quadruped.

Mr. Pindar, while riding over his grounds, saw at a short distance from him a kite pounce on some object on the ground and rise with it in his talons. 'In a few moments however the kite began to show signs of great uneasiness, rising rapidly in the air, or as quickly falling, and wheeling irregularly round, whilst it was evidently endeavouring to force some obnoxious thing from it with its feet. After a sharp but short contest, the kite fell suddenly to the earth, not far from where Mr. Pindar was intently watching the manœuvre. He instantly rode up to the spot, when a weasel ran away from the kite, apparently unhurt, leaving the bird dead, with a hole eaten through the skin under the wing, and the large blood-vessels of the part torn through.'

With similar courage the Weasel will attack dogs, and even men, when its nest is invaded. This is framed of dry leaves and herbage, and is generally lodged in some snug locality, such as a crevice in a bank, the hollow of a tree, or a dry ditch, which keeps it warm and comfortable. Here four or five young are brought up from each birth, and the number of these litters is two, or even three, in the year.

The female weasel is smaller than the male, and Mr. Bell well observes that it is probably the 'little reddish beast,' called by the country-people a *Cane*, mentioned in White's 'Selborne,' and described as not much bigger than a Field-Mouse, but much longer. Mr. Blyth informed Mr. Bell that the animal was known in Surrey by the name of *Kine*.

This species sometimes, but rarely, turns white in the winter, and in this state it is the *Mustela nivalis* of Linnæus. Mr. Bell received one from Scotland with two white spots on each side of the nose, which it retained throughout the summer.

Pennant gives the following national names for this species:—*Bronwen* of the British; *La Bellette* of the French; *Donnola*, *Ballotula*, and *Benula* of the Italians; *Comadreia* of the Spanish; *Doninha* of the Portuguese; *Wisel* of the Germans; *Weezel* of the Dutch; *Vesla* of the Swedes; and *Væsel* of the Danes.

The Anglo-Saxon name is *Wesle*.

Mr. Bell has, very properly in our opinion, chosen to retain the generic term *Mustela* for the present form, in preference to *Putorius*, Cuvier's subgeneric name, because he considers it as the type of the family. The general form and aspect of the Weasel, he observes, show it to be typical in the group of vermiform carnivora. The body is extremely slender and arched, the head small and flattened, the eyes black, and remarkably quick and lively; the ears short and rounded, the neck very long, but little shorter than the trunk, and very flexible; the tail short, not one-third the length of the head and body, smaller than that of the rest of the genus, and without the terminal tuft of long hair which exists in the Stoat; legs short and furred to the end of the toes; fur short and close. Length of head and body of male 8 inches 3 lines; of tail, 2 inches 4 lines. Head and body of female, 7 inches; tail, 2 inches.

Common Weasel.

The Ermine Weasel. Mustela erminea, Linn.

Specific Character.—Body reddish-brown above, white beneath (in winter wholly white); extremity of the tail always black. (Bell.)

Description.—Winter Dress.—Yellowish-white, the yellow hardly visible on the head, but gradually showing itself more and more on the body and increasing in intensity, so that some are of a pale yellow colour on their hind parts. In high northern latitudes, and, in severe winters, lower down, the white on the upper parts is quite pure.

Summer Dress.—About the end of March the upper parts change to reddish-brown, of rather a dull tint; the lower parts continue white. The tail, as noticed in the specific character, remains black at the extremity during all the changes.

In northern latitudes, even in the alpine districts of Scotland, Mr. Bell observes that this change is universal; but farther south it becomes an occasional and even rare occurrence.

With regard to the mode in which this alteration is brought about, Mr. Bell expresses his belief that the winter change is effected not by the loss of the summer coat and the substitution of a new one, but by the actual change of colour in the existing fur; and he cites, in proof of this view of the subject, the case of the Hudson's Bay Lemming, which, in Captain Sir John Ross's first Polar expedition, was exposed in its summer coat on the deck to a temperature 30° below zero, and the next morning the fur on the cheeks and a patch on each shoulder had become perfectly white. Next day the shoulder-patches had considerably extended, and the posterior part of the body and flanks had turned to a dirty white. At the end of a week the winter change was complete, with the exception of a dark band across the shoulders prolonged down to the middle of the back.

Mr. Blyth however informed Mr. Bell that he had come to a different conclusion, and was of opinion that authors were wrong in what they had advanced respecting the mode in which the animal changes its colour, at least in autumn; for in a specimen which Mr. Blyth had lately examined, and which had been killed during the autumnal change, it was clearly perceivable that the white hairs were all new, and not the brown changed in colour. Mr. Macgillivray, too, a close observer, says that the change is not effected by an alteration in the colour of the same hairs, but by the gradual substitution of brown for white hairs. He states that a male killed on the 30th March had on the head, the hind neck, and the middle of the back, as far as the tail, a broad band of brown, intermixed with white hairs; and the brown hairs were all much shorter than the white. A female killed on the same day in company with the male had the upper parts all brownish-red, but paler than usual, with a very few small tufts of white hairs interspersed; but its fur was not shorter than that of an individual killed in December. In the former case, Mr. Macgillivray observes, the summer change had commenced, and brown hairs had grown in place of the white hairs of winter; but in the latter the winter coat had not assumed a white colour, and still remained. He states that a female shot at Loanhead, near Edinburgh, in the end of February, 1832, was brown above, with a few white hairs, especially on the tail. There had been an uncommonly mild winter, and the animal had not assumed its white winter fur, for the red hairs did not seem to be new. 'On the whole,' says Mr. Macgillivray in continuation, 'it appears to me that in spring and the beginning of summer, when the animal has assumed its white colour in winter, all the red hairs that appear are new. Towards December, earlier if the weather be very cold, later if less so, the hairs of the upper parts become white. In an individual obtained in December, 1834, the colour was a mixture of white and brownish-red. The hairs of the latter colour were not in the least degree faded, and those of the former were much shorter, and evidently just shooting; so that the change from brown to white would seem to take place by the substitution of new white hairs for those of the summer dress. But in mild winters the hairs retain their red colour; and if new hairs come in, they are also red: if the weather become colder, the new hairs that appear are white, although the old hairs do not vary; and if there are alternations of severe cold and temperate weather, the animal becomes mottled. It is certain that the change of season is not regularly attended with a change of colour; that great cold at any period of winter, if protracted, is accompanied with a change to white; but there is no evidence that a return of heat produces a return of the red colour in white hairs. The hairs continue to elongate from the end of spring to the beginning of winter, and the fur is certainly not longer in winter than in spring. Perhaps the hairs are renewed at all seasons, and those which grow in mild weather are brown, while those that shoot out in cold weather are red, cold having the effect of changing the structure of growing hairs, or of acting on their bulbs so as to prevent the application of colouring matter.'

We have given this detailed account in Mr. Macgillivray's own words, and of the accuracy of it there can be no doubt. Still the experiment made on the Hudson's Bay Lemming, where the change was so suddenly effected as to prevent the possibility of attributing it to anything but a change of the hair actually in existence, seems conclusive in favour of Mr. Bell's opinion, in some cases at least. Indeed Mr. Macgillivray himself admits, in the same account, that there is also reason to believe that sometimes the brown hairs themselves, on the application of intense cold, become whitened; and he states that he has seen individuals of a brown colour patched with white, in which the white hairs were of the same length as the brown; but he adds that he had never met with any of which the hairs were partially coloured, or appeared to be changing from brown to white, still less from white to brown; and he concludes thus:—'On the whole therefore I think that this animal sheds its hair gradually, and in small parcels or patches, all the year round, in the same manner as ptarmigans shed their feathers, and that so long as the weather is mild, the growing hairs are brown on the upper parts, but white when it is very cold. Thus in March, 1834, I was presented by Mr. Ferguson, of Raith, with a most beautiful specimen, on which there was not a single red hair. As to the change effected in coloured hair by intense cold, direct experience alone can determine what we are to believe concerning it, and as yet ermines have not been subjected to this kind of observation.' (*Naturalist's Library.*)

That change of temperature, and not merely change of season, is necessary to effect the alteration of colour, is evident from Mr. Hogg's observations, which will be found partly in the 5th vol. of Loudon's 'Magazine of Nat. Hist.,' and partly in the work above quoted of Mr. Bell, who received a letter from Mr. Hogg on the subject after the publication of the paper in Loudon's 'Magazine.'

Mr. Hogg, whose remarks appear to have been made in the county of Durham, states that within the last nine years from the date of his communication he had met with two Ermines alive, and in the most different winters that had occurred for a great many years. One was observed in the extremely severe winter (January to March) of 1823: the other in the extremely mild January of 1832.

'In consequence of the months of December, 1831, and January, 1832, having been so extremely mild, I was,' says Mr. Hogg, 'greatly surprised to find this stoat clothed in his winter fur; and the more so, because I had seen, about three weeks or a month before, a stoat in its summer coat or brown fur. I was therefore naturally led to consider whether the respective situations which the brown and white stoats seen by me this warm winter inhabited, could alone account for the difference of the colour of their fur, in any clear and satisfactory manner. The situation then where the Brown Stoat was seen, is in lat. 54° 32′ N. nearly, and long. 1° 19′ W. nearly, upon a plain elevated a very few feet above the level of the river Tees, in the county of Durham. Again, the place where I met with the Ermine, or White Stoat, on the 23rd January, 1832, is in the North Riding of Yorkshire, in lat. 54° 12′ N. nearly, and long. 1° 13′ W. nearly: it is situated at a very considerable elevation, and in the immediate neighbourhood of the lofty moorlands called the Hambledon Hills. These constitute the south-western range of the Cleveland Hills, which rise in height from 1100 feet to 1200 feet above the sea. At the time, the Ermine was making his way towards the hills, where, no doubt, he lived, or frequently haunted; and consequently the great coldness of the atmosphere, even in so mild a winter, upon so elevated and bleak a spot as that moorland, would satisfactorily account for the appearance of the animal in its white fur; although the place is, in a direct line, more than twenty-three miles distant to the south of the fields near the Tees, inhabited by the Brown Stoat.'

The *Ermine-Weasel*, the length of whose head and body is nine inches ten lines, the tail being four inches eight lines, is the *Carlwm* of the antient British; *Stoat*, *Stout*, and Greater Weasel of the modern British; *L'Hermine* and *Le Roselet* of the French; *Armellino* of the Italians; *Armino* and *Armelina* of the Spanish; *Hermelin* of the Germans; *Hermelin* and *Lekatt* of the Swedes; *Hermilyn* of the Dutch; *Hermelin* and *Lekat* of the Danes; *Seegoos* and *Shacooshew* of the Cree Indians; and *Terreeya* of the Esquimaux.

Geographical Distribution.—Temperate Europe generally, but common only in the north. The finest, that is, those with the longest and thickest fur, and of the purest and brightest colour, are imported from the high latitudes. Russia, Norway, Siberia, Lapland, furnish them abundantly. The British importation, in 1833, was 105,139. In America it is found from the most northern limits to the middle districts of the United States. Ermine-skins formed part of the Canada exports in the time of Charlevoix; but they have so sunk in value, that they are said not to repay the Hudson's Bay Company the expense of ollecting them, and very few are brought to this country rom that quarter.

Habits, &c.—'It appears that in England generally,' ays Mr. Macgillivray, 'the Ermine is less common than he Weasel; but in Scotland, even to the south of the 'rith of Forth, it is certainly of more frequent occurrence han that species; and for one Weasel I have seen at least ive or six Ermines. It frequents stoney places and hickets, among which it finds a secure retreat, as its gility enables it to outstrip even a dog in a short race, nd the slimness of its body allows it to enter a very small perture. Patches of furze, in particular, afford it perfect ecurity, and it sometimes takes possession of a rabbit's urrow. It preys on game and other birds, from the rouse and ptarmigan downwards, sometimes attacks oultry or sucks their eggs, and is a determined enemy to ts and moles. Young rabbits and hares frequently beome victims to its rapacity, and even full-grown indiviuals are sometimes destroyed by it. Although in general does not appear to hunt by scent, yet it has been seen trace its prey like a dog, following its track with cerinty. Its motions are elegant, and its appearance exemely animated. It moves by leaping or bounding, and capable of running with great speed, although it seldom usts itself beyond the immediate vicinity of cover. 'nder the excitement of pursuit however its courage is rprising, for it will attack, seize by the throat, and cling a grouse, hare, or other animal strong enough to carry off, and it does not hesitate on occasion to betake itself the water. Sometimes when met with in a thicket or oney place, it will stand and gaze upon the intruder, as if onscious of security; and, although its boldness has been xaggerated in the popular stories which have made their ay into books of natural history, it cannot be denied that, proportion to its size, it is at least as courageous as the ger or the lion.'

Mr. Bell was informed by the Rev. F. W. Hope that e latter, while shooting in Shropshire, was attracted by e loud shrill scream of a hare which he thought had en just caught in a poacher's snare. He ran towards e spot, and there saw a hare limping off, apparently in eat distress, with something attached to the side of the roat. This proved to be a stoat, and the stricken hare ade its way into the brushwood with its enemy still lding on. In England it takes advantage of the galles of the mole for its winter retreat, as well as the rabbit rrow.

Captain Lyon, R.N., saw the Ermine hunting the footeps of mice in the north as a hound would hunt a x, and observed their burrows in the snow, which were shed up in the same manner as the tracks of moles in itain. These passages ran in a serpentine direction, d near the hole or dwelling-place the circles were mullied as if to render the approach more intricate.

The same graphic voyager gives a lively description of captive Ermine:—'He was a fierce little fellow, and the tant he obtained daylight in his new dwelling, he flew the bars, and shook them with the greatest fury, utterg a very shrill passionate cry, and emitting the strong usky smell which I formerly noticed. No threats or asing could induce him to retire to the sleeping-place, d whenever he did so of his own accord, the slightest bbing on the bars was sufficient to bring him out to the tack of his tormentors. He soon took food from the and, but not until he had first used every exertion to ach and bite the fingers which conveyed it. This boldss gave me great hopes of being able to keep my little ptive alive through the winter, but he was killed by an cident.'

Dr. Richardson states that the Ermine is a bold animal, d often domesticates itself in the habitations of the fur ders, where it may be heard the live-long night puring the white-footed mouse (*Mus leucopus*). He rearks that, according to Indian report, this species brings rth ten or twelve young at a time. In this country it oduces about five in April or May.

Chace.—In Siberia Ermines are taken in traps baited ith flesh; and in Norway they are either shot with blunt rows, or taken in traps made of two flat stones, one ing propped up with a stick, to which is fastened a ited string. This the animal nibbles when the stone lls and crushes it. Two logs of wood are used for the me purpose and in the same manner in Lapland.

Ermine in summer dress.

Ermine in winter dress.

The Poecat, or Fitchet Weasel, Mustela putorius.

Description.—Stouter in proportion than either the common Weasel or the Ermine, and the head broader. Nose rather pointed, ears round and not conspicuous. Neck comparatively short. Tail inclining to bushy, rather more than a third of the length of the body and head. There are two kinds of fur in this species; the short is fulvous and woolly, the long is black, brownish black, and shining. A brown colour mingled with yellow, varying according to the proportions of these two sorts of fur in the individual, is the result. There are some white marks about the mouth and ears, and the parts which are darkest in colour are the head, tail, and feet. Length of the head and body 1 foot, 5 inches, 6 lines; of the tail, 5 inches 5 lines. Such is Mr. Bell's measurement. Mr. Macgillivray makes the total length to the end of the tail 17 inches, and observes that the anal sac is usually represented as single; but he found that beneath the extremity of the rectum externally two sacs containing a yellowish fetid substance of the consistence of thick cream were present.

This is the *Ffwlbard* of the ancient British; *Fulimart*, *Foumart* (as well as the terms given at the head of the description) of the modern British. *Polecat* has been supposed to have been a corruption of Polish Cat; but this seems to be not much better than a guess; *Foumart* and *Fulimart* have with better reason been considered to be contractions of *Foul Martin*, in contradistinction to the *Sweet Martin*. It is the *Putois* of the French, *Foetta* and *Puzolo* of the Italians, *Putoro* of the Spanish; *Iltis*, *ulk*, and *Buntsing* of the Germans; *Bonsing* of the Dutch; *Iller* of the Swedes, and *Ilder* of the Danes.

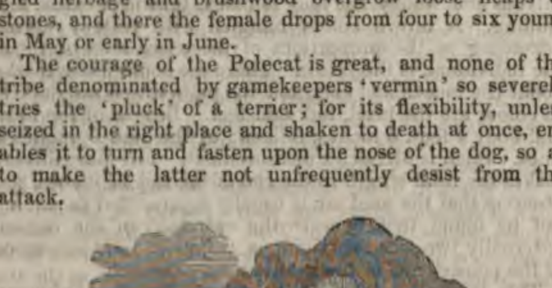
Geographical Distribution.—Europe generally. Pennant says that it is common in the temperate parts of Russia, but grows scarcer in Siberia, except in the desert of Baraba and beyond the lake Baikal.

Habits, &c.—The Polecat is most destructive to the poultry-yard and the preserve; its appetite for slaughter, which seems never to be satiated as long as any living thing remains within its reach, rendering it a most ruinous neighbour to those who rear fowls or keep up a head of game. Not only the young birds fall victims to it, but the parents also; nor are even geese or turkeys safe. We remember an instance of a hen and a whole brood of chickens being killed by one of these destroyers in a single night; and upon another occasion, seven or eight nearly full-grown turkeys. The brain and the blood seem to be the choicest portions. The bodies of the dead are carried off to its haunts, which are generally in some copse or wood near a farm or in the heart of a preserve, whence it issues on its deadly errand in the evening, generally soon after sunset, or when it grows dusk. It is bold and daring withal. Mr. Nevill Wood, of Foston Hall, in Derbyshire, informed Mr. Bell that some years ago he had ten fine young ducks, which were shut up every night in a small outhouse, destroyed in one night by a polecat. On entering the place in the morning, Mr. Wood found every duck lying dead, each with a hole in the neck; and in a few moments the perpetrator of the bloody deed marched out towards him, licking its jaws without exhibiting the slightest alarm.

No 'vermin' is placed with more satisfaction upon 'The Keeper's Tree,' for none commits more havoc, if so much, among the game. Beginning with the egg, it persecutes all the game-birds through every period of life, and is a far more determined enemy than the Stoat itself to the hare and rabbit-warren. The fox, as is well known, will do much to keep down the pheasants, and especially the rabbits and hares; but even this wily and powerful invader is not so mischievous as the species of which we are treating. Where a fox will kill one, a polecat will immolate ten, to say nothing of eggs; no vertebrated animal seems to come amiss to its murderous nature. Bewick relates that during a severe storm a foumart was traced in the snow from the side of a rivulet to its hole at some distance from it. As it was observed to have made frequent trips, and as other marks were to be seen in the snow which could not easily be accounted for, it was thought a matter worthy of great attention. Its hole was accordingly examined, and five fine eels were discovered to be the fruit of its nocturnal excursions. The marks in the snow were made by the motion of the eels in the quadruped's mouth. In Loudon's 'Magazine' (vol. vi.) is an account of a female polecat that was hunted to her nest, which held five young ones in a comfortable bed of withered grass. From a side hole the narrator picked out forty large frogs and two toads alive, but capable of sprawling only, for the old polecat had stricken them all with palsy by a bite through the brain of each.

The nest of this species is generally made in some rabbit-burrow, in the crevice of a rock, or where the tangled herbage and brushwood overgrow loose heaps of stones, and there the female drops from four to six young in May or early in June.

The courage of the Polecat is great, and none of the tribe denominated by gamekeepers 'vermin' so severely tries the 'pluck' of a terrier; for its flexibility, unless seized in the right place and shaken to death at once, enables it to turn and fasten upon the nose of the dog, so as to make the latter not unfrequently desist from the attack.



The Polecat.

Pennant remarks that warreners assert that the Fitchet or Polecat will breed with the Ferret, and that they are sometimes obliged to procure an intercourse between these animals to improve the breed of the latter, which by long confinement will abate its savage nature, and become less eager after rabbits, and consequently less useful. 'M. de Buffon,' says Pennant, in continuation, 'denies that it will admit the Fitchet, yet gives the figure of a variety under the name of the *Ferret Polecat* (*La Furet Putois*), which has much the appearance of being a spurious offspring. But to put the matter out of dispute, the following fact need only be related. The Rev. Mr. Lewis, vicar of Llansowel, in Caermarthenshire, had a tame female Ferret, which was permitted to go about the house; at length it absented itself for several days, and on its return proved with young; it produced nine of a deep brown colour, more resembling the Fitchet than the Ferret. What makes the matter more certain is, that Mr. Lewis had no males of this species for it to couple with, neither were there any within three miles, and those were closely confined.'

Inferior to the fur of the Sable or Marten, that of the Polecat is nevertheless esteemed, and a considerable importation of the skins annually comes to this country from the north of Europe, under the name of *Fitch*.

Genus Martes (Ray).

Generic Character.—Grinding teeth $\frac{5-5}{6-6}$; body much elongated; feet short, with separate toes; tongue smooth.

Before we enter upon the European species of *Martins*, or *Martens*, as they are perhaps more properly termed, it will be necessary to consider the difference of opinion among zoologists, as to the point whether the *Common* or *Beech Marten*, the *Pine Marten*, and the *Sable* are three different species, or merely varieties of one.

The *Martes* seems to have been known to the antients, though it does not appear which of the martens was thus designated; indeed it may have been a common name for them all. Martial writes (*Ep.*, x. 37)—

> 'Venator capta marte superbus adest.'

Some indeed read 'mele' for 'marte,' and so make a badger of the capture. The annotator in the Delphin edition has crowded as much confusion as he could into his illustration of that reading, for he writes, 'Legunt alii *capta mele*, Gallicè *blaireau*, *chat sauvage*, *fouine*.'—*badger*, *wild cat*, *marten*, for which last '*fouine*' is the French term.

George Bauer, who wrote under the name of Agricola, in his book *De Animantibus Subterraneis*, notices the three kinds of marten first above alluded to. After writing a clear account of the Polecat, he says: 'A third kind of sylvan weasel lies in the crevices of stones and caverns, which is called *Martes* by Martial and *Marturus* by the Germans.' He then gives Martial's line above quoted, and proceeds to describe the animal and its habits with much accuracy. This is the *Common* or *Stone Marten*. He then describes a fourth, the *Pine Marten*; and afterwards a fifth, 'called by the Germans *Zobel*,' the *Sable*. The skins of the last are, he remarks, more precious than cloth of gold, and he adds that forty of the best, the usual number in one bundle, have been sold for more than a thousand pieces of gold. (Folio, Basil, 1561.)

Gesner, Aldrovandus, and Jonston did little more than copy Agricola. 'They seem however,' says Mr. Bennett, who has well traced up the opinions of authors upon this subject, 'to have abandoned Agricola's subdivision of the second species, and to have described his first, the *Stone Marten*, as it was emphatically denominated by the Germans, as the *Beech Marten*, imputing to it a more familiar and sociable disposition, and a fondness for the neighbourhood of inhabited places. The same distinctions are adopted by Ray in his *Synopsis Quadrupedum*, 1693; but to his description of the Sable he adds that 'Dr. Tancred Robinson had seen the animal itself in the possession of Dr. Charlton. Its size was that of a cat of Cyprus, its colour a dark tawny; the fore part of its head and its ears of a whitish ash-colour; and the bristles on its eyebrows, nose, and face very long.'

Mr. Bennett remarks in continuation that so lightly did Linnæus estimate the value of the distinctions indicated between the Pine and Beech Martens, that he uniformly treats of them as one and the same animal in all his zoological writings, from the first edition of his *Fauna Suecica* to the twelfth of his *Systema Naturæ*. It is only, he observes, in the last, that Linnæus for the first time intimates the existence of any difference between them. There he speaks of two varieties as known to the rustics—the Beech Marten with a white throat, and the Pine Marten with a yellow throat. The Linnæan character of the Sable is principally, Mr. Bennett adds, founded on that of Ray, and is accompanied by the sign used by Linnæus to denote that he had not seen the animal to which it is appended.

Klein (1751) keeps the old descriptions of the three species. Brisson (1756) distinguishes the Beech and Pine Martens from personal observation, by the colour of their throats; but he describes the Sable, which he had not seen, from Ray and the more antient writers.

Daubenton evidently doubted whether to consider the Beech and Pine Martens as distinct species or varieties only, observing that they resemble one another so closely, that the colours of the fur form the sole distinction. He describes the Pine Marten as having the throat yellow, and the Beech Marten as being white in that part. The tints of the former are more lustrous, he says, than those of the latter, and he adds that both are found in woods of every description, even in those where there is neither fir nor beech; and that the Beech Marten cannot properly be considered a domesticated animal, for although it will seek its prey in inhabited localities, it is little less wild than the Pine Marten.

Buffon strongly contrasts the two animals and their alleged difference of disposition.

Neither Buffon nor Daubenton speak of the sable as an animal personally known to them, nor is it, Mr. Bennett observes, figured in their work.

Pennant treats the three species as distinct. His account of the Sable, which is more full than that of previous zoologists, is partly taken from the paper by J. G. Gmelin in the 'Memoirs of the Academy of Petersburgh' (1760), and partly from Müller's collection of Russian Histories in German.

Mr. Bennett, following out this inquiry, remarks that, of all the authors hitherto quoted, none have spoken of the Sable as an animal which they knew otherwise than by report. Most of them mention it as an inhabitant of Northern Asia and Russia, Poland, Scandinavia, and Lapland. Mr. Bennett however thinks that Poland, Scandinavia, and Lapland may probably be considered as only indicating the countries through the medium of which sable-skins were produced. J. G. Gmelin and Pallas became acquainted with the Sable while travelling in Siberia (to which country Pallas limits the range of the animal), and Mr. Bennett declares that they are the only two naturalists who have described it from personal observation. Gmelin examined two specimens in the possession of the governor of Tobolsk. They were kept alive for a whole year, and Gmelin describes them as resembling the martens in form and habit of body; the one being throughout the winter ashy black, cinereous on the chin, and yellowish round the ears; the other smaller, of a yellowish brown, becoming rather paler on the chin and ears. On the approach of spring, the former animal became yellowish brown, and the latter pale yellow. A figure of the darker-coloured specimen accompanied the paper, and this figure, to which Pallas applies the epithet 'pessima' (justly in Mr. Bennett's opinion), although it affords no assistance in discriminating the species, has been copied in the 'Encyclopédie Méthodique' and other works, as the most authentic figure of the sable extant.

And here Mr. Bennett observes, that were it not for the authority of Pallas (whose deliberate judgment, founded on a comparison of specimens both living and dead, carries too much weight to be shaken by any but the most positive evidence), we should scarcely hesitate in discarding the Sable from the list of genuine species, and considering it a mere variety of the Pine Marten, produced by climate and other concomitant circumstances.

It now becomes important to examine the description of Pallas, 'accompanied by a comparison of its several parts with those of a Pine Marten, found in the same forest, almost the only one in which the two animals are met with intermixed, and the most western habitat of the true sable.'

The differences distinguishing the Sable are stated to be, a somewhat larger size; a slight depression on the top of the head; a trifling elongation of the muzzle; the fur on the outside of the ears excessively soft, pale, and silky, and their inside lined with whitish hairs; the soles of the feet more villous; the toes not terminating in a naked callus, but in a tuft of crisp wool, completely enveloping the claws; the tail shorter than the legs when extended, and therefore more abbreviated than in the Marten, and becoming perfectly black at the tip; the blackness of the fur of the body, which in the Marten was of a yellowish tinge, and the ashy grey of the head, becoming brown on the muzzle, hoary about the eyes, and of a more obscure colour on the throat, but not abruptly, except in some varieties, distinguished, like the Marten, by a patch on the throat.

Upon this Mr. Bennett well observes, that some of these characters are very trivial, and others susceptible of variation. The slight differences in the form of the head are not greater than are found existing in the same animal at different ages, and the colour varies much in different individuals and in different seasons. The woolliness of the toes had already been mentioned by Pennant in his description of the Marten, in some specimens of which Mr. Bennett had observed the same fact. And lastly, even the comparative length of the tail, on which the greatest stress is laid, affords no absolute criterion; for Pallas himself, Mr. Bennett remarks, states that this organ is a little longer in the males, at least when young. 'His authority must however,' says Mr. Bennett, in concluding this part of his careful treatise, 'be allowed to outweigh all such considerations; and to indicate the existence of a true sable, as a distinct species from the martens, although unknown to later zoologists.'

The name of Pallas undoubtedly carries great weight with it, and justly, but still cases of this description ought not to be argued too much on authority.

But to return to the opinions of authors: M. Lesson enumerates all three as species, under the names of 1, *Marte comman*, *Mustela martes*, Linn.; *La Marte*, Buff. 2, *Marte Fouine*, *Mustela foina*, Linn. (Gmel. ?), *La Fouine*, Buff. 3, *Marte zibeline*, *Mustela zibellina*, Linn., the *Sobol* of the Poles and Russians; the *Sabbel* of the Swedes.

Mr. Bennett states that since the time of Pallas the three species have been almost universally enumerated by authors, each copying his predecessors with more or less correctness. Desmarest, he remarks, has omitted the most important characters given by Pallas for the Sable, and has, on his own authority, furnished it with a tail of two-thirds the length of its body, while that of the Pine and Beech Martens is stated to measure but little more than the half; and he says that he knows of but one instance, since Linnæus, in which the two latter animals have been even apparently conjoined. This occurs in Dr. Walker's 'Essay on the Scottish Mammalia.' Dr. Walker indeed, Mr. Bennett observes, does not mention the former, and possibly may not have regarded it as a native of Scotland: he characterizes the species however in the words of Linnæus, and observes that as the animal advances in age the throat becomes yellower.

Mr. Bennett, in the *Gardens and Menagerie of the Zoological Society*, where the above inquiry is carried out, figures, under the title of *Pine Marten, Mustela martes*, Linn., two individuals which were sent from Russia to the late Marchioness of Londonderry, as specimens of the true sable, from which, as described by Pallas, they were at once distinguished by a well-defined yellow patch, spreading over their chest and throat, and by the length of their tail, which considerably exceeded that of their hinder legs. 'Their colour,' says Mr. Bennett, 'during the winter was, with the exception of the throat and the margins of the ears (which were likewise yellow), of a deep chestnut with somewhat of a blackish tinge, and their hair extremely long and fine. The fore-legs of one of them were crossed in front towards the upper part by a yellowish stripe. In summer they assumed a much lighter tinge, and their hair became so much shorter as to give them the appearance of being scarcely more than half their former bulk. The extremities of their toes, which had been well protected by lengthened wool throughout the cold weather, were also stripped of their covering, and the claws completely exposed. In manners they were lively, active, and good-humoured; they slept much during the day, but frequently indulged in whirling themselves, half climbing and half leaping, round the inside of their cage, with such rapidity as almost to elude the sight.'

Mr. Bennett then goes on to state that the museum in Bruton Street contained five more specimens of the group, besides those which obviously belonged to species distinct from the animals under consideration. Two of these might, in his opinion, be fairly referred to the Beech Marten in its winter and summer dress. The former had the long hairs of a fulvous brown, few in number, and interspersed in a dense cinereous fur; those of the tail and legs were blackish-brown; the toes were slightly hairy beneath, but the claws projected considerably. The sides of the head were paler, and the throat and chest dirty white, with no intermixture of yellow or brown. In the other the hairs of the body were very short; the fur was much less dense; the general colour was of a paler brown, extending to the legs and tail, which were but a little darker; the soles were less hairy; and the top of the head was of the same dirty white colour with the chest and throat.

There were also, Mr. Bennett tells us, two British specimens of what appeared to be the Pine Marten. Neither of them seemed to be in its full winter dress; but both were approaching towards it, and in different degrees. They were both darker than the darkest of the former; and there was consequently less difference between the colour of the body and that of the legs and tail. The latter however became insensibly deeper, and at length nearly black towards their extremities. The upper part and sides of the head were nearly of the same colour with the body; the ears were pale yellow, especially round their margins; the throat and chest marked with a broad well-defined patch of yellow with somewhat of an orange tinge; the under part of the toes moderately hairy; but the claws nevertheless distinctly visible. In the fifth specimen, which was brought from the northern parts of America, the general colour was nearly the same with that of the last-mentioned individuals; but its tail was considerably shorter, a circumstance which Mr. Bennett regards as accidental. The sides of the head were somewhat paler; and the throat, instead of a broad patch of white or yellow, exhibited a kind of mottled appearance, formed by the intermixture of lighter and darker coloured spots of irregular shape and unequal size. This last, Mr. Bennett observes, has generally been regarded as a true sable, and he admits that in some of its characters it approaches Pallas's description; but he adds that if it be in reality anything more than a variety of the Pine Marten, he should rather feel disposed to refer it to the race of sables mentioned by Pallas as peculiar to America, and distinguished from those of Asia by their chestnut colour and the inferior quality of their fur. Mr. Bennett remarks that the pine martens are however known to vary greatly in the markings of their throat in the fur countries of America, where they are so abundant that upwards of a hundred thousand skins are annually collected.

'Such,' says Mr. Bennett, in concluding this investigation, 'are the specimens of martens contained in the Society's museum. Other individuals, exhibiting similar variations in their colouring and markings, have been observed by us in various collections; but it would be useless to multiply descriptions leading to no conclusive result. If the beech and pine martens of our own country be distinct, it is probable that the last-described animal may also belong to a different species from either. We do not however hesitate to declare our opinion that the true sable of Pallas is still a stranger to our collections; and we have good reason, in the silence of authors respecting it, for believing that it is equally unknown to the zoologists of the Continent. It is certainly not a little singular that an animal so highly valued and so anxiously sought after should still be a desideratum to the scientific world; but it is perhaps no less so that the opinion which has been so lightly adopted with such well-known animals as the indigenous martens, should never yet have been put to the test of direct experiment.'

Mr. Bell, after speaking in terms of deserved praise of Mr. Bennett's statement, says that a deliberate consideration of these and other authorities, and a comparison of many specimens of both kinds, had hitherto failed to lead him to a conclusion at all satisfactory to his own mind; and it is only with a protest against being considered as decidedly supporting the opinion that they are essentially different, that he ventures to give them a distinctive character in his *British Quadrupeds*. 'I am not,' says Mr. Bell, 'the more disposed towards this opinion by the observation of two living specimens in the Surrey Zoological Gardens—in which the throat, though decidedly yellow, is less bright and deep in its hue than in some other specimens—and of a single one in the menagerie of the Zoological Society, also living, the throat of which, though it would be termed whitish, yet has a slight yellow tinge. The dark colour of the former and the lighter and greyer hue of the latter, with the different colour of the throat, joined to a slight difference in the form of the head, the former being proportionally a little longer, would certainly lead us to consider the former as the yellow-throated or Pine Marten, and the latter as the white-throated or Beech Marten, supposing them to be distinct; but the differences are scarcely decisive, and the yellowish tinge on the throat of the latter specimen shows an approach to the Pine Marten even in this supposed distinguishing character, which is far from offering any help towards a satisfactory solution of the difficulty.'

Mr. Macgillivray notices these observations of Mr. Bell in the *Naturalist's Library* (*British Quadrupeds*); and then states that the examination of individuals in different stages, and obtained in various parts of Scotland, had disclosed to him a gradation of colouring combined with a sameness of form that had satisfied him as to the indivisibility of the species. 'In fact,' says Mr. Macgillivray, 'the "beech marten" and the "pine marten" differ less from each other as to size than individuals of the polecat, ermine, or weasel, and the differences of colour observed are not greater than in the common fox.'

The Beech Marten. *Mustela martes*, var. with the white throat, Linn.; *Mustela foina*, Gmel.; *Martes fagorum*, Ray; *Martes saxorum*, Klein. Mr. Bell describes the head of this marten as somewhat triangular; the muzzle pointed; the nose extending a little beyond the lips; the eyes large, prominent, and remarkably lively; the ears large, open, and rounded; the body much elongated and very flexible; the tail long, thick, and somewhat bushy; the feet rather short; the toes generally naked, but at times, probably in the winter, covered beneath with a thin soft hair. The fur, he observes, is of two sorts: the inner extremely soft, short, copious, and of a light yellowish grey colour; the outer very long, shining ash-coloured at the roots, brown at the extremity, but of different degrees of intensity at different parts of the body; the middle of the back, the tail, the outer parts of the legs and the feet being darker than the other parts; the belly lighter and more grey; the throat white, but Mr. Bell states that in one instance he had seen it of a light yellowish tinge; inner surface and margin of the ears whitish. Length of head and body 1 foot 6 inches; of the tail 9 inches 6 lines.

This is the *Bela graig* of the antient British, and *Stone Marten* of the moderns. It is *La Fouine* of the French; *Foina* and *Fouina* of the Italians; *Marta* and *Gibellina* of the Spanish; *Hauss Marder* and *Stein Marder* of the Germans; *Marter* of the Dutch; *Mard* of the Swedes; and *Maar* of the Danes.

Geographical Distribution.—Northern and Temperate Europe. Western Asia.

The Beech or Stone Marten.

Habits, &c.—This marten is found more remote from woods, though it is often met with in them, and more frequently in mountainous and stony places, and nearer the habitations of man, than the Pine Marten. It prefers the vicinity of farm-yards and homesteads, and is a ruinous visitor to them and the game-preserve. It is an expert climber, and Daniel, in his *Rural Sports*, has figured it on a tree about to attack a hen pheasant at perch. A very groundless notion once prevailed that this was the Pine Marten in a state of domestication. It is lively, active, and graceful in its movements. The nest of the female is constructed of herbage, straw, or grass, sometimes in the hollow of a tree, sometimes in the crevices of rocks, not unfrequently in a ruin, and occasionally in granaries or barns.

The fur of the Beech Marten is considered very far inferior to that of the Pine Marten, and is known in the trade as the skin of the Stone Marten. Many are imported from the north of Europe, and dyed to represent *Sable*. The comparatively poor quality of the fur however is immediately perceptible to the experienced eye, although, as is the case with most of the animals which are used for their fur, the northern skins are fuller, richer in colour, and more lustrous than those from more temperate climates.

The Pine Marten.—*Martes abietum*, Ray; *Mustela martes*, Linn. Brown; throat yellow; toes naked beneath; legs longer and head smaller than in the Beech Marten.

This is the *Bela goed* of the antient British; *La Marte* of the French; *Marta*, *Martura*, *Martora*, and *Martorello* of the Italians; *Marta* of the Spanish; *Feld-marder* and *Wild-marder* of the Germans; *Marter* of the Dutch; *Waupeestan* of the Cree Indians; *Wappanow* of the Monzonies; *Wawbeechins* of the Algonquins; *Sable* of the American fur-dealers; and *Martin* of the Hudson's Bay Company's lists.

Geographical Distribution.—Europe and North America.

Habits, &c.—The Pine Marten in its habits resembles the Beech Marten, but it shuns the neighbourhood of man—living in Europe in deep forests, and preying on birds and the smaller animals. The female deposits two or three young ones in a nest of moss and leaves formed in some hollow tree, when she does not take possession of that of the squirrel or the woodpecker.

Dr. Richardson states that the Pine Marten inhabits the woody districts in the northern parts of America, from the Atlantic to the Pacific, in great numbers, and that it has been observed to be particularly abundant where the trees have been killed by fire, but are still standing. 'It is very rare,' continues Dr. Richardson, 'as Hearne has remarked, in the district lying north of Churchill River, and east of Great Slave Lake, known by the name of Chepewyan or Barren Lands. A similar district, on the Asiatic side of Behring's Straits, twenty-five degrees of longitude in breadth, and inhabited by the Tchutski, is described by Pennant as equally unfrequented by the Marten, and for the same reason, the want of trees. The limit of its northern range in America is like that of the woods, about the sixty-eighth degree of latitude, and it is said to be found as far south as New-England. Particular races of Martens, distinguished by the fineness and dark colours of their fur, appear to inhabit certain rocky districts. The rocky and mountainous but woody district of the Nipigon, on the north side of Lake Superior, has long been noted for its black and valuable marten-skins.'

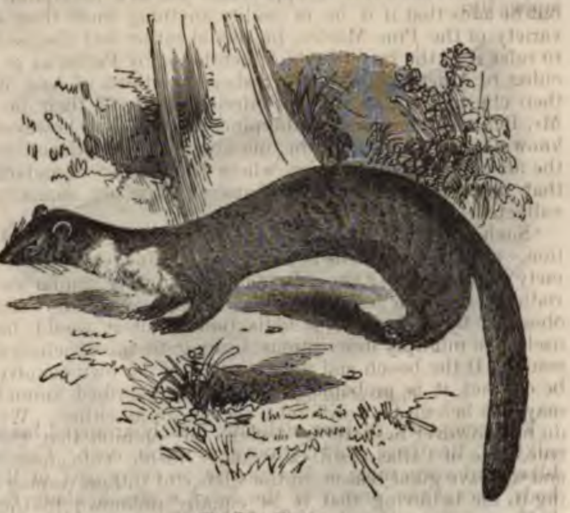
The same author gives the length of the head and body at from eighteen to twenty inches, and notices a remark of the natives that the fur loses all its lustre, and, consequently, much of its value, upon the falling of the first shower of rain for the season. He further states that this animal preys on mice, hares, and partridges, and, in summer, on small birds' eggs, &c. A partridge's head, with the feathers, is, he says, the best bait for the log-traps in which it is taken. It does not reject carrion, and often destroys the hoards of meat and fish laid up by the natives, when they have accidentally left a crevice by which it can enter. When its retreat is cut off, it shews its teeth, sets up its hair, arches its back, and hisses like a cat. It will seize a dog by the nose and bite so hard, that unless the latter is well used to the combat, it escapes. Easily tamed, it soon becomes attached to its master, but is not docile. The flesh is occasionally eaten but not prized by the Indians. The females are smaller than the males, go with young about six weeks, and produce from four to seven at a time about the end of April. According to Mr. Graham, this marten is sometimes troubled with epilepsy.

The importation of Pine Martens' skins from Hudson's Bay and Canada is great. Pennant relates that at one of the Company's sales (in 1743) not fewer than 12,370 good skins, and 2360 damaged, were sold, and about the same time the French brought into the port of Rochelle from Canada no less than 30,325. Dr. Richardson states that upwards of one hundred thousand skins have long been collected annually in the fur countries.

The editor of the last edition of Pennant's 'British Zoology' says that the length of a male which he saw in Suffolk was nineteen inches, exclusive of the tail, which measured ten inches; the total length of the female the same, but the tail longer in proportion to the body. The breast of the latter was of a paler yellow, and the colour extended behind the ears.

Mr. Bell, after remarking that the colour of the fur is scarcely a tangible distinction, observes that different individuals of the Beech Marten vary quite as much in this respect as the Pine Marten and the Sable: the existence of fur on the toes, which has been adduced as a character of the Sable, probably depends, he observes, on climate; and is mentioned by Pennant as having been seen by him in the common Marten. 'Never,' says Mr. Bell, 'having seen an undoubted whole specimen of the true Sable, I am unable to offer any satisfactory addition to our knowledge on the more important characters of the two animals; but I have found in the examination of numbers of the finest sable-skins, that the yellow patch on the throat had always an irregular outline, and that there were also small spots of the same fine colour scattered on the sides of the neck. This is a distribution of the colour which I have never observed on the common or Pine Marten. I offer the fact however, merely as one which, combined with other characters, may possibly aid in determining the question when we have fuller information on the subject.'

The probability seems to be that the Beech Marten, the Pine Marten, and the Sable do not offer sufficient differing characters to warrant their specific distinction.



The Pine Marten.

Asiatic Weasels.

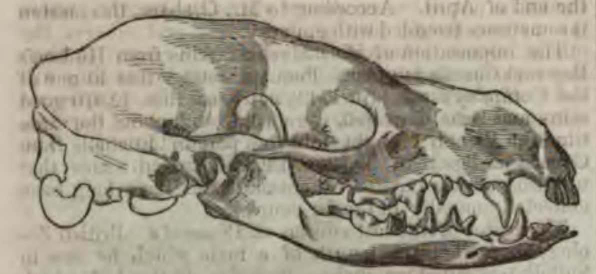
Genus, Mydaus.

We select this form as an example of the Asiatic *Mustelidæ*.

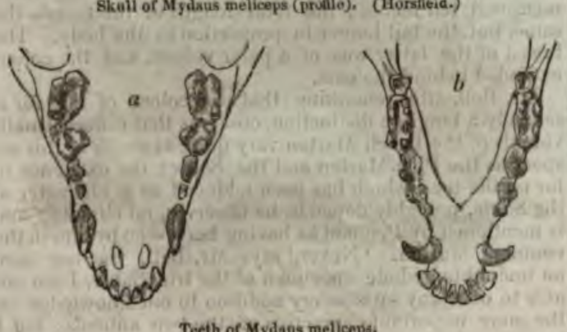
Generic Character.—Five toes on each foot, united up to the last phalanx by a very narrow membrane; claws proper for digging very large on the fore-feet, moderate on the hind-feet; tail rudimentary; pupil round; no external ear; four pectoral and two inguinal mammæ.

Dental formula:—Incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; false molars, $\frac{2-2}{3-3}$; flesh-cutting molars, $\frac{1-1}{1-1}$; tuberculous molars, $\frac{1-1}{1-1} = 34$.

Example, *Mydaus meliceps*.



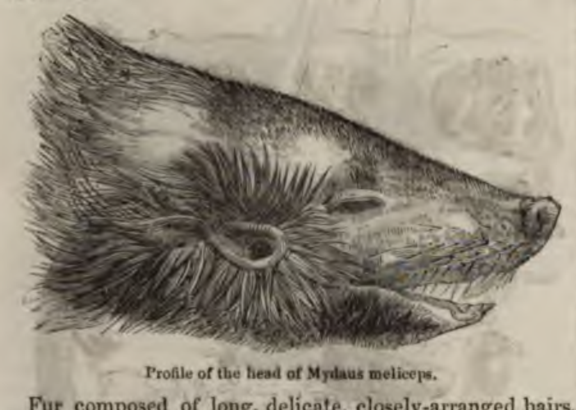
Skull of Mydaus meliceps (profile). (Horsfield.)



Teeth of Mydaus meliceps.

a, upper jaw, seen from below; b, lower jaw, seen from above. (Horsfield.)

Description.—Agreeing in size generally with the polecats of Europe and America. Eyes placed high in the head, resembling those of a hog, which animal is called to mind by the appearance of this species; eyelids rigid, well provided with minutely-bristled eyebrows; irides dark, pupil circular; ears nearly concealed by hair, but provided externally with an oblong concha surrounding the posterior part, and passing the lower extremity of the meatus auditorius, forming a small curve inward; no perceptible whiskers, a few long straggling hairs on the upper lip.



Profile of the head of Mydaus meliceps.

Fur composed of long, delicate, closely-arranged hairs, silky at the base, and forming a warm coat. Colour blackish-brown, more or less intense on every part of the body, except the crown of the head, a streak along the back, and the extremity of the tail, which are white, with a slight tinge of yellow, but in some individuals the streak is interrupted. The brown colour is generally lighter on the abdomen, and is subject to variations generally from greyish-brown to deep brown with a sooty tint; the last the most common. Tail scarcely half an inch long, the hairs projecting above an inch from the body. Limbs short and stout; feet plantigrade. Claws united at the base by a thick membrane enveloping this part as a sheath: those of the fore-feet nearly double the size of the hind-feet. Two glands of an oblong form, about an inch long and half an inch wide near the extremity of the rectum, furnished with an excretory duct nearly half an inch long, which communicates with the intestine. Fluid secreted by the glands perfectly analogous in odour to that secreted by several species of *Mephitis* in America, particularly to that of *Mephitis striata*, Fisch. Length of body and head, from extremity of nose to root of tail, one foot two inches and three quarters; of naked tail, half an inch; of tail, with hairy covering, two inches. (Horsf.)

This is the *Teledu* of the Javanese east of Cheribon; *Seng-gung* of the Sunda Javanese of the mountainous districts from Cheribon to Bantam; *Teleggo* of the inhabitants of Sumatra; *Mephitis Javanensis* of Raffles.

Geographical Distribution.—Dr. Horsfield states that this species presents a singular fact in its geographical disposition. It is, he says, exclusively confined to those mountains which have an elevation of more than 7000 feet above the level of the ocean; and on these it occurs with the same regularity as many plants. 'The long-extended surface of Java,' continues Dr. Horsfield, 'abounding with conical points which exceed this elevation, affords many places favourable for its resort. On ascending these mountains the traveller scarcely fails to meet with our animal, which, from its peculiarities, is universally known to the inhabitants of these elevated tracts; while to those of the plains it is as strange as an animal from a foreign country. In my visits to the mountainous districts I uniformly met with it, and, as far as the information of the natives can be relied on, it is found on all the mountains. It is, however, more abundant on those which, after reaching a certain elevation, consist of numerous connected horizontal ridges, than on those which terminate in a defined conical peak. Of the former description are the mountain Prahu and the Tengger hills, which are both distinctly indicated in Sir Stamford Raffles's map of Java: here I observed it in great abundance. It was less common on the mountain Gede, south of Batavia; on the mountain Ungarang, south of Semarang; and on the mountain Ijen, at the farthest eastern extremity; but I traced its range through the whole island.'

Habits, &c.—Most of these mountains and ridges are cultivated for the production of wheat and European vegetables, and fruits, such as potatoes, cabbages, peaches, and strawberries in a deep vegetable mould, where the Teledu ranges, and in its search for food injures the plantations and destroys the roots. It turns up the earth with its nose like a hog, and thus leaves vexatious traces of its nocturnal visits.

The dwelling of the animal is formed at a slight depth beneath the soil, under the roots of a large tree, where it constructs a globular chamber several feet in diameter, smooth and regular; and there is a subterraneous approach to it about six feet long, the external entrance to which the animal conceals with twigs and dry leaves. Here it remains hidden during the day, and at night comes forth to seek the insects and their larvæ, and common earthworms, which are its food. They are said to live in pairs, and the female produces two or three young at a birth, according to the natives.

The fetid matter, which is viscid, and which Dr. Horsfield was assured the animal could not propel beyond a distance of two feet, is very volatile, and consequently spreads to a great extent. The entire neighbourhood of a village is sometimes infected by the odour of an irritated Teledu; and it is so powerful in the immediate vicinity of the discharge as to produce syncope in some persons.

Mydaus meliceps. (Horsfield.)

Dr. Horsfield describes the manners of this species as by no means ferocious, and states that, if taken young, it might, like the badger, be easily tamed. He kept one some time in confinement: it became gentle, and never emitted its offensive smell. Dr. Horsfield carried it with him from Mount Prahu to Blederan, a village on the declivity of that hill, where the temperature was more moderate. It was tied to a small stake while the drawing was being made, and moved about quietly, burrowing the ground with its snout and feet, as if searching for food, without noticing the bystanders or making violent efforts to disengage itself. It ate voraciously of earth-worms (*lumbrici*) which were brought to it, and held one extremity of a worm in its claws while its teeth were employed in tearing the other. After it had eaten ten or twelve, it became drowsy, made a small groove in the earth, in which it placed its snout, and, having deliberately composed itself, soon slept soundly. (*Zoological Researches in Java.*)

AFRICAN WEASELS.

We select as an example, *The Ferret*, *Mustela furo*, Linn.; *Viverra furo*, Shaw.

Description.—Yellowish, different parts being more or less white, for the long fur is partly white and the short almost entirely yellow. Eyes pink. Length of head and body, fourteen inches; of the tail, five inches six lines.

This is *Le Furet* of the French.

Geographical Distribution.—Africa: domesticated in Europe.

The Ferret was well known to the antients, and it appears that it was used by them much in the same manner as it is employed in the present day. Its use in Spain is noticed by Strabo (iii., p. 144, ed. Casaub.) and Pliny (*Nat. Hist.*, viii. 55) speaks of its services, under the name of *Viverra*, in hunting rabbits by entering their burrows and ejecting them, so that they were taken when they bolted out.

Habits, &c.—Similar to those of the European Weasels, but more bloodthirsty. Capable of a certain degree of tameness, it seldom, if ever, becomes attached, and is a dangerous inmate unless properly secured. It has even been known to attack and cruelly lacerate an infant which had been left unguarded in its cradle, and with such ferocity that, after it had been driven away, the cries of the tortured child brought it from its hiding-place, eager to renew the attack.

This species, whose whiteness and red eyes may probably be the result of a long period of domestication, cannot bear cold, and should be kept warm to ensure its healthy condition. It is said to breed twice a year in a state of domestication, unless it devours its offspring, which it sometimes does, and then it has three litters. The gestation of the female continues six weeks, and she then produces generally six or seven young, sometimes nine. These are blind for a month, and at the end of two more are considered fit for service.

Ferrets should be kept in tubs or small boxes, and cleanliness is very essential to their health and strength. To enter them, they should, when the rabbits are half grown, be sent into the burrow with a line tied round them, and unmuzzled. When the ferret seizes a rabbit, the line should be gently pulled and the ferret drawn back, holding the rabbit in its mouth. This mode can only be practised where the burrows run comparatively straight and near the surface.

Ferrets should not be fed before they are taken to the warren, for if they are filled with food they will not hunt, but lie sleeping in the burrows for hours. Before they are turned in they should be muzzled or coped, there being no necessity for the inhuman practice of sewing up the ferret's mouth.

The following has been recommended as the best method of 'coping.' Tie a piece of soft string round the neck of the ferret, close to the head, and leave two rather long ends. Tie another piece round the under jaw, pass it under the tongue, bring it round over the upper jaw, and there tie it, leaving the ends long. The mouth will thus be kept closed. Then bring the four ends together, and tie them in one knot on the top of the head: this makes all safe. No pain is inflicted apparently by this operation, for the ferret thus coped hunts as eagerly as if it were unmuzzled.

Daniel, in his 'Rural Sports,' thus describes the method of ferreting. 'The ferret is coped or muzzled, and a small bell tied round his neck; and after the holes are as silently as possible covered with purse-nets, called *Flans*, the ferret should be put in *the windward side* of the burrows, where the person should also place himself, and observe the utmost silence, otherwise the rabbits will retreat to their lower earths and be scratched to death before they will bolt. *Hay* nets are however chiefly used by experienced warreners, who are loth to turn ferrets into burrows, which invariably give the rabbits a dislike to them.' The mode of using these *hay* nets is then described.

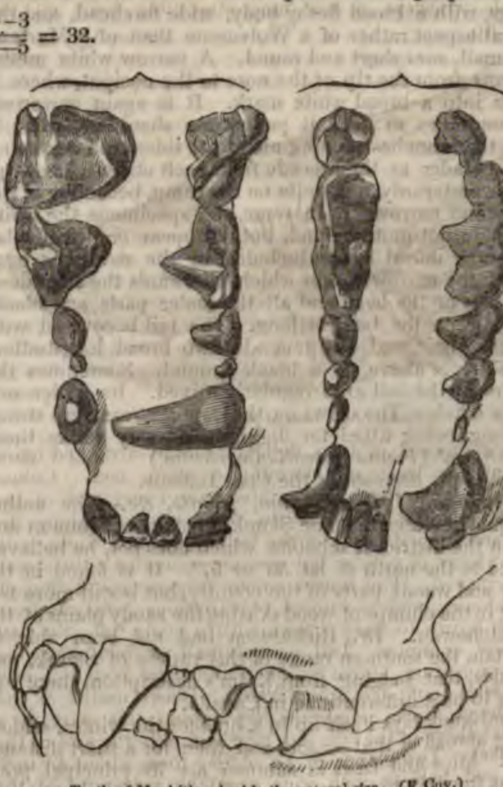
The Ferret.

AMERICAN WEASELS.

Genus Mephitis.

Generic Character.—Body elongated, arched; toes separated and armed with long claws, the anterior proper for burrowing. Tail long and very bushy, or entirely null. Anal glands secreting a fetid odour.

Dental formula:—Incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars. $\frac{3-3}{5-5} = 32$.

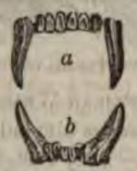


Teeth of Mephitis; double the natural size. (F. Cuv.)

M. F. Cuvier gives the above cut as the dentition of *Mephitis* and *Mydaus*. The dental formula is that given by Lesson for *Mephitis*.

The fetor of the species of *Mephitis* has obtained for them the names of *Bêtes puantes*, *Enfans de Diable*, and *Stinking* or *Stifling Weasels*. M. Lesson observes that a great number of these American *Mouffettes* have been described, but the imperfect accounts of voyagers render the arrangement unsatisfactory. He notices the following: *Mephitis americana*; *Meph. mapurito*; *Meph. chilensis*; *Meph. chincha, the Chinche*; *Meph. quitensis*, and *Meph. interrupta*. Dr. Horsfield gives the following representation of the profile and front teeth of *Mephitis dimiadata* of Fischer, the *Chinche* of Buffon.

Profile of Mephitis dimidiata.



Front teeth of same: *a*, upper; *b*, lower.

We select as an example the *Mephitis americana*, var. *hudsonica*, the *Hudson's Bay Skunk*.

Description.—The following accurate description is from the pen of Dr. Richardson. 'The Skunk is low on its legs, with a broad fleshy body, wide forehead, and the general aspect rather of a Wolverene than of a Marten; *eyes* small, *ears* short and round. A narrow white mesial line runs from the tip of the nose to the occiput, where it dilates into a broad white mark. It is again narrowed, and continues so until it passes the shoulders, when it forks, the branches running along the sides, and becoming much broader as they recede from each other. They approach posteriorly, and unite on the rump, becoming at the same time narrower. In some few specimens the white stripes do not unite behind, but disappear on the flanks. The black dorsal space included by the stripes is egg-shaped, the narrow end of which is towards the shoulders. The sides of the head and all the under parts are black. The hair on the body is long. The tail is covered with very long hair, and has generally two broad longitudinal white stripes above on a black ground. Sometimes the colours of the tail are irregularly mixed. Its under surface is black. The claws on the fore-feet are very strong and long, being fitted for digging, and very unlike those of Martens.' (*Fauna Boreali-Americana.*)

This is the *Seecawk* of the Cree Indians.

Geographical Distribution, Habits, &c.—The author last quoted states that the Skunk is not an uncommon animal in the district it inhabits, which does not, he believes, extend to the north of lat. 56° or 57°. It is found in the rocky and woody parts of the country, but is still more frequent in the clumps of wood skirting the sandy plains of the Saskatchewan. Dr. Richardson had not been able to ascertain the southern range of this variety of Skunk, and he adds, that judging from Kalm's description, there appears to be a different one in Canada.

The Skunk lays itself up in a hole for the winter, seldom going abroad at that season, and then for a short distance only. Mice and frogs in summer are its principal prey. It has from six to ten young at a litter, and is said to breed but once a year.

Unlike the more agile weasels, the Skunk is slow in its motions, and consequently easily overtaken. Its defence consists of a most fetid discharge, which is described as absolutely intolerable when it comes upon the nose by surprise. Lawson says, 'Polecats or Skunks in America are different from those in Europe. They are thicker and of a great many colours; not all alike, but each differing from another in a particular colour. They smell like a fox, but ten times stronger. When a dog encounters them they piss upon him, and he will not be sweet again in a fortnight or more. The Indians love to eat their flesh, which has no manner of ill smell, when the bladder is out. I know no use their furs are put to. They are easily brought up tame.' Professor Kalm was almost suffocated by one that was chaced into a house where he slept: the very cattle bellowed through distress at the stench. Another that was killed by a maid-servant in a cellar so overpowered her that she lay ill several days: the provisions in the place were so tainted that the owner was obliged to throw them away. Catesby says, 'When one of them is attacked by a dog, to appear formidable it so changes its usual form, by bristling up its hairs, and contracting its length into a round form, that it makes a very terrible appearance. This menacing behaviour however, insufficient to deter its enemy, is seconded by a repulse far more prevailing; for from some secret duct, it emits such fetid effluviums, that the atmosphere for a large space round shall be so infected with them, that men and other animals are impatient till they are quit of it. The stench is insupportable to some dogs, and necessitates them to let their game escape; others, by thrusting their noses into the earth, renew their attacks till they have killed it, but rarely care to have more to do with such noisome game, which, for four or five hours, distracts them. The Indians notwithstanding esteem their flesh a dainty; of which I have eaten, and found it well tasted. I have known them brought up young, made domestic, and prove tame and very active, without exercising that faculty, which fear and self-preservation perhaps only prompts them to. They hide themselves in hollow trees and rocks, and are found in most of the Northern Continent of America. Their food is insects and wild fruit.' (Carolina.) Dr. Richardson states that the noisome fluid which it discharges is of a deep-yellow colour, and contained in a small bag placed at the root of the tail. It is, he says, one of the most powerful stenches in nature, and so durable that the spot where a Skunk has been killed will retain the taint for many days. He quotes Graham for the fact that several Indians lost their eye-sight in consequence of inflammation produced by this fluid having been thrown into them by the animal, which has the power of ejecting it to the distance of upwards of four feet. 'I have known,' says Dr. Richardson in continuation, 'a dead Skunk, thrown over the stockades of a trading post, produce instant nausea in several women in a house with closed doors upwards of a hundred yards distant. The odour has some resemblance to that of garlic, although much more disagreeable. One may however soon become familiarized with it; for, notwithstanding the disgust it produces at first, I have managed to skin a couple of recent specimens by recurring to the task at intervals. When care is taken not to soil the carcase with any of the strong-smelling fluid, the meat is considered by the natives to be excellent food.'

The Skunk.

We have above adverted to the number of so-called species of *Mephitis*. Cuvier was of opinion that our knowledge did not justify us in considering them as more than varieties of a single species, and he enumerated fifteen such varieties. Dr. Richardson says upon this point, 'I have now seen a considerable number of specimens killed to the north of the Great Lakes, none of which presented any important deviation in their markings from the one principally referred to in the description. M. Desmarest remarks, that the varieties (if they are to be considered as such, and not as species) are, for the most part, sufficiently uniform in the same district of country in the disposition of the stripes. The Hudson Bay variety however comes nearest to the description of the *Chinche* of Buffon; the *Viverra Mephitis* of Gmelin, which is said to be an inhabitant of Chili. The *Fiskatta* or *Skunk* of Kalm, which inhabits Canada, has a white dorsal line in addition to two lateral ones.' (*Fauna Boreali-Americana*.)

In the Museum of the Royal College of Surgeons in London, Nos. 2140 to 2144 of the *Physiological Series* (both inclusive), present instructive preparations of the anal bags, glands, and follicles of the Ferret; of the Zorille (*Putorius zorilla*, Cuv.); of the Marten (*Mustela martes*); of the Javanese Skunk, *Mydaus meliceps*; and of a Skunk. (See *Cat.*, vol. iii., part 2.)

Fossil Weasels.

Fossil remains of Weasels have been found in the tertiary series, in the bone-caves and bone breccias at Lunel-Vieil, Kirkdale, Puy de Dome, &c.

Dr. Buckland states in his *Reliquiæ Diluvianæ*, that a few jaws and teeth were found in Kirkdale Cave belonging to the Weasel, and that at Oreston there were marks of nibbling by the incisor and canine teeth of an animal of the size of a weasel (pointed out by Mr. Clift), showing distinctly the different effect of each individual tooth on the ulna of a wolf and the tibia of a horse. In his *Bridgewater Treatise*, Dr. Buckland figures a weasel among the Land Mammifers of the third tertiary period.

The only fossil species named in Meyer's *Palæologica* is *Mustela antiqua*.

WEATHER is a term used to denote the state of the atmosphere with respect to heat or coldness, dryness or humidity, wind, rain, &c.

In some countries the variations of the atmospherical phenomena occur in an order which is nearly constant; and in those regions, predictions concerning the weather for several days, and even for months to come, may be made with almost a certainty that they will be verified by the event. On the opposite sides of the chain of the Ghauts, which extends along the western peninsula of India nearly from north to south, the phenomena during each half of the year are constantly and exactly reversed: thus, along the Malabar coast there is a clear sky from September to the following April, and on the coast of Coromandel the fair season continues from April to September; while during each following six months, in the two regions, it rains almost incessantly. Alternations of fair weather and rain also take place regularly in the interior of Africa; and, according to Humboldt, it rains constantly during five or six months in every year from the coast of Guiana to the Andes. But in insular situations generally, and in Europe and North America particularly, the winds, varying in direction and intensity according to no constant law, mingle together at irregular intervals of time the masses of air which abound with vapour raised from the ocean, and thus cause clouds to cover the horizon, and showers of rain, hail, or snow to descend. The wind which is most prevalent at any one place, generally, when it begins to blow, affords an indication of the kind of weather which may be expected; but, frequently, no circumstance occurs by which a change from a clear to a cloudy sky, or the contrary, can be predicted even a few hours before its occurrence.

The periodical changes of the moon's phases often coinciding with changes in the phenomena of the atmosphere, it was very natural that the latter should, by many persons, be thought to have some dependence on the former; an opinion apparently strengthened by the known fact that the tides of the ocean and atmosphere are produced by the attractions which the moon and sun exercise on the particles of water and air. It is certain however that the influences of the moon in changing the state of the atmosphere are of short duration, and take place gradually according to constant laws: they are consequently quite incompetent to the production of those sudden and irregular changes to which the atmosphere is subject. There are not however wanting men who have formed tables in which the probable state of the weather is stated in connection with the hour of the day or night at which the new and full moons take place; and that which seems to possess most the confidence of persons to whom an anticipation of rain or fair weather is of importance, is one which Dr. Samuel Clarke professed to have formed from a long series of observations. It is sufficient here to mention that, in this table, rain is predicted when the new or full moon takes place between noon and 2 P.M., or between 4 and 6 A.M.; and fair weather is announced when either takes place between 4 and 6 P.M., or between 10 P.M. and 2 A.M. An effort has lately been made to extend such empirical predictions to every day of the year, but it does not appear that success has warranted its continuance. An opinion has prevailed that seasons of a like character return in like order after each revolution of the moon's nodes; that is, at the end of every 18 or 19 years, at which times the earth and moon are nearly in like situations with respect to the nodes: but though seasons distinguished by more or less than the usual quantities of rain have been observed to return at certain intervals, there appears to be no ground for connecting them with that astronomical period.

The only indications of rain or fair weather upon which any reliance may be placed are those which have been noticed by the late Sir Humphry Davy, in his 'Salmonia;' and as his explanations are founded on physical conditions, a brief statement of them may with propriety be introduced in this place.

One of the speakers in the Dialogue inquiring why the clouds in the west being red, with a tinge of purple, should portend fair weather, is answered that the air, when dry, refracts more of the red and heat-making rays than when moist; and as dry air is not perfectly transparent, those rays are reflected in the horizon. It is added that a coppery or yellow sun-set foretels rain; but that, as an indication of approaching wet weather, nothing is more certain than a halo round the moon, since it is produced by precipitated water: the larger the circle is, the nearer are the clouds; consequently the more ready to descend in rain.

In explaining why a rainbow in the morning betokens rain, and one in the evening fair weather, it is stated that the bow can only be seen when the clouds depositing the rain are opposite to the sun; thus in the morning the bow is in the west, and in the evening in the east: and as the rains in this country are usually brought by westerly winds, a bow in the west indicates that the rain is coming towards the spectator; whereas a bow in the east indicates that the rain is passing away from him.

The indications of fine weather from swallows flying high is explained by stating that the insects on which these birds feed delight to fly in a warm stratum of air; but warm air, being lighter than that which is moist, occupies a higher part of the atmosphere, and therefore the birds then find their prey in the upper regions. On the contrary, when the warm air is near the surface of the earth, the insects and birds are there also; and then, as the cold air from above descends into it, a deposition of water takes place. The opinion that sea-birds come to land in order to avoid an approaching storm, is stated to be erroneous; and the cause assigned is that, as the fish upon which the birds prey go deep into the water during storms, the birds come to land merely on account of the greater certainty of finding food there than out at sea.

It may be observed here, that the kind of cloud which is designated cirrostratus [Clouds] is almost always followed by a depression of temperature in the atmosphere, and by wind or rain. For indications of the weather, which are afforded by the oscillations of a mercurial column, see Barometer.

WEAVER BIRDS, *Ploceinæ*, a subfamily of Fringillidæ, in which article and in Vidua the opinion of zoologists as to their place in the system will be found.

The genus *Ploceus* (Weavers, *Tisserins* of the French is thus defined by Mr. Swainson.

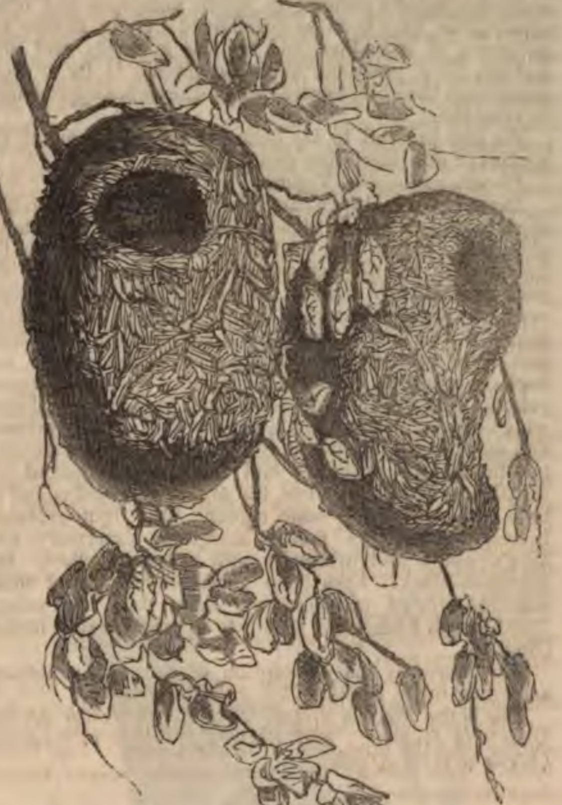
Size small. Bill conic, but with the culmen slightly bent, and the tip entire. Under mandible less thick than the upper. Claws large, very long. Wings pointed; but complete than others. This therefore I conceive to amount nearly to a proof that the animals added to it at different times, as they found it necessary, from the increase of their family, or rather of the nation and community.'

One of these bird-towns is also figured in Mr. Wood's 'Zoography,' and we here endeavour to present a sketch of part of the plate.

African nests.

Another weaver's nest, that of *Ploceus icterocephalus*, Sw., brought together with the male, female, and eggs, from South Africa to Mr. Swainson, is thus described by him :—'The nest is somewhat kidney-shaped, seven inches long, and four and a half broad: it is attached to a very slender branch, from which there are four other young shoots, which serve as so many holds for its support, and to which it is firmly fixed by bendings of strong grass leaves. The whole is very compactly made of the same materials, interlaced most ingeniously, and far more firmly than what is seen in the chaffinch or other of our most skilful builders: the lining is the heads or panicles of the grasses, thus uniting softness and coolness, the latter being an obvious advantage in so sultry a climate. The aperture is lateral, near, but not upon, the top, so that it serves the purpose of a window to the inmates, who are sheltered overhead by the convex top of the nest. There is something very ingenious in the construction of this opening, which is not, as it first appears, round, but semicircular, the arch being bound round with a stronger band than usual, and the plane or base, much stronger, and composed of straight pieces of the stalks of grass, evidently for the purpose of giving to that part upon which the birds perched greater strength and substance.'

Mr. Swainson, after remarking that lateral openings to the nests of African birds are very common, goes on to observe that the rains of South Africa and of tropical America are, perhaps, equally violent while they continue; but then the small leaved and scanty foliage of the trees in the former locality leave the nests of such birds as are upon them much more exposed to these torrents than are the nests of the birds of Brazil, where the foliage is particularly thick and broad; and he inquires whether this may not be one of the causes, at least, why nature has so especially taught the African birds to construct their nests in the manner alluded to? Snakes, he observes, are equally common in both regions, yet, with the exception of the Hangnests, and a very few others, as *Synallaxis garrulus* [SYNALLAXIS], and *Donacobius vociferans*, &c., he declares that he is unacquainted with any other Brazilian birds which depart from the ordinary style of building.



Nests of Ploceus icterocephalus.

Dr. Smith, in his *Zoology of South Africa*, a considerable portion of which he accurately observed with the eye of a philosophical zoologist, expresses his decided opinion that the fear of injury from small quadrupeds and snakes operates upon the birds of that country in their choice of trees overhanging pools of water as the localities for their nests. 'There can be no doubt,' says he, 'that parental affection dictates the choice. All the birds of South Africa are liable to have their nests robbed by small quadrupeds and snakes, and as no position is so likely to secure them against such misfortunes as those we have mentioned, they are doubtless selected under that conviction.'

Most deadly enemies do these same snakes appear to be to the South African birds, and the same distinguished author, in his elaborate account of the varieties of *Bucephalus capensis*, *Boom-slange* of the colonists, which he does not consider poisonous for reasons which he states in his work, gives the following description, which, while it shows the natural dread of the birds, affords a very interesting illustration with regard to the alleged fascination of serpents. 'The *Boom-slange*,' says Dr. Smith, 'is generally found upon trees, to which it resorts for the purpose of catching birds, upon which it delights to feed. The presence of a specimen in a tree is generally soon discovered by the birds of the neighbourhood, who collect around it, and fly to and fro, uttering the most piercing cries, until some one, more terror-struck than the rest, actually scans its lips, and almost without resistance becomes a meal for its enemy. During such a proceeding the snake is generally observed with its head raised about ten or twelve inches above the branch round which its body and tail are entwined, with its mouth open and its neck inflated, as if anxiously endeavouring to increase the terror which it would almost appear it was aware would sooner or later bring within its grasp some one of the feathered group. Whatever may be said in ridicule of fascination, it is nevertheless true that birds, and even quadrupeds, are, under certain circumstances, unable to retire from certain of their enemies; and, what is even more extraordinary, unable to resist the propensity to advance from a situation of actual safety into one of the most imminent danger. This I have often seen exemplified in the case of birds and snakes; and I have heard of instances equally curious, in which antelopes and other quadrupeds have been so bewildered by the sudden appearance of crocodiles, and by the grimaces and contortions they practised, as to be unable to fly or even move from the spot, towards which they were approaching to seize them.'

We now proceed to lay before our readers some of the species of this interesting group of birds.

Ploceus spilonotus, Vigors.

Description.—Upper part of the head gamboge-yellow slightly glossed with honey-yellow; sides of the head, chin, and a narrow line stretching from the latter to the breast, dark liver-brown verging on black; sides of the neck immediately behind the ear coverts, breast, belly, vent, and under tail coverts, light gamboge-yellow, lateral fronts of the breast tinted with saffron-yellow. Lower part of the back and sides of the neck, interscapulars, and back, liver-brown, each feather broadly tipt with lemon-yellow; rump yellow, blotched with liver-brown. Lesser wing coverts, primary and secondary quill coverts, primary and secondary quill coverts and quill feathers, light chocolate-brown, the primaries and their coverts edged externally with king's-yellow, the others tipt and edged on both vanes with the same colour. Tail light greenish-brown, the feathers faintly margined externally with king's-yellow, and internally with primrose-yellow. Bill brownish-black. Eyes deep vermilion-red. Feet flesh-coloured, tinted with brown; claws pale horn-colour. Total length from point of bill to tip of tail seven inches. (Smith.)

The above is the description of the *male;* nothing, according to Dr. Smith, is known of the *female.*

This is the *Ploceus stictonotus* of Smith (*South African Quarterly Journal*); and *Ploceus flaviceps* of Swainson (*Birds of West Africa*).

Ploceus spilonotus, yellow-crowned Weaver.

Locality and Habits.—Dr. Smith states that this Weaver inhabits the districts bordering on the south-east coast of Africa; but he had not seen nor heard of its having been found to the westward of Kafirland. It is rare, and generally is seen on the banks of rivers. From the trees that overhang the waters these birds suspend their nests of a somewhat kidney form, composed of blades of grass so closely interwoven as to form a complete protection against the weather. Dr. Smith, who gives this account, states that the female lays three or four eggs of a delicate greenish blue, and about the size of those of the Common Sparrow. Mr. Swainson says that his specimen was received from Senegal.

Of *Ploceus capensis*, Smith, (*Ploceus abyssinicus*, Cuv.), Dr. Smith states that it is diffused over the more southerly districts of South Africa, and that flocks of from ten to forty individuals are often to be seen on or near the edges of marshes and rivers. From the trees or shrubs which fringe these, they suspend, he says, their nests, five or six of which are sometimes attached to a single branch. These nests are somewhat kidney-shaped, with the entrance towards the upper end, and directed downwards. Dr. Smith adds that trees which overhang pools of water are invariably preferred, and the twigs which approach nearest the water are commonly best supplied with nests.

The head-quarters of *Ploceus subaureus* and *Ploceus ocularius* must be looked for, according to Dr. Smith, to the northward of the Tropic of Capricorn: at least the paucity of specimens to the southward of it would, in his opinion, warrant such an inference. During a residence of fourteen years in South Africa, he only met with four specimens of *Ploceus ocularius* and ten of *subaureus.* The specimens of *subaureus* procured by himself were all killed in the neighbourhood of Algoa Bay, and those contained in the collections submitted to his inspection were either obtained in the same locality or more to the eastward.

Dr. Smith states that there does not appear among the individuals of *Ploceus ocularius* any disposition to congregate—at least he rarely found more than the male and his female associated together, and these were generally discovered in retired situations, well supplied with trees, from a branch of some of which is suspended the nest formed of delicate fibres of bark closely interwoven, so fashioned as to present, when complete, the form of a retort. The three bluish-white eggs are sparingly spotted with dusky brown—the large extremity having the largest and most numerous spots. Upon these eggs the male and female sit alternately, and, while so occupied, are so devoted to their duty, that they may with the greatest ease be taken in the nest alive.

Philetærus lepidus, Smith.

Description.—Figure rather slender; bill more compressed than in *Euplectes;* culmen slightly arched from the base; commissure sinuated; legs and toes strong; tarsi in front covered by transverse plates, the margins of which are distinctly defined; outer and inner toes nearly of equal length; claws pointed and much curved, the hinder one not so long as in the typical species of *Euplectes;* wings, when folded, reaching to about the middle of the tail. First or spurious quill-feather very short, often scarcely discernible; second, third, and fourth, nearly of equal length, and the longest; extremity of the tail slightly rounded. (Smith.)

Male.—Dr. Smith describes the top of the head, the nape, and the back as of a drab-brown; back and sides of the neck and interscapulars umber-brown; each feather bordered with pale isabella colour; chin and a stripe at the base of the bill which terminates on a line with the eye, black. Wings and tail light umber-brown; tertiary quill feathers broadly edged and tipt with isabella, of which colour are the tail-feathers, also, at their extremities. Sides of the head, under part of the neck, breast and belly pale isabella; flanks pale rusty brown; on the front of each thigh a deep black stripe; the feathers margined with yellowish-white. Bill and legs a pale horn-colour, the former slightly clouded with brown. Eyes dark brown.

Female.—Differing from the male in having the feathers of the back and sides of the neck and interscapulars light brown instead of umber-brown.

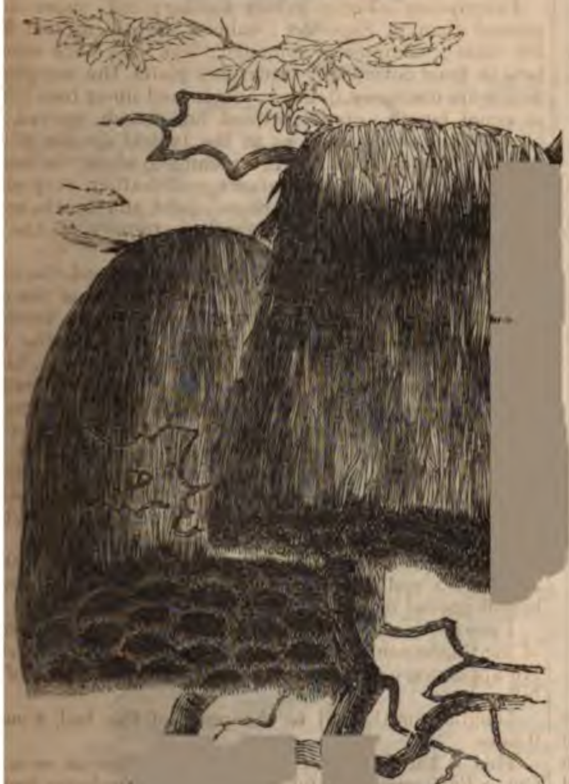
Young.—Head streaked with brown, the patch in front of the thighs consisting of perfectly distinct black blotches. No appearance of black on the chin or at the base of the bill.

Length from the bill to the point of the tail, 4 inches 9 lines.

This is the *Loxia socia* of Latham; *Ploceus socius* of Cuv.; *Philetærus lepidus* of Smith; and *Euplectes lepidus* of Swainson.

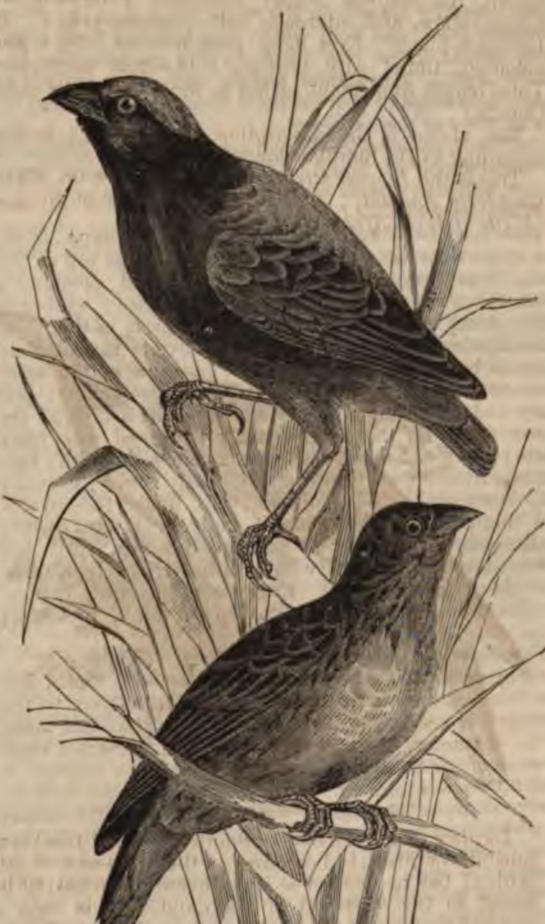
Geographical Distribution and Habits.—Dr. Smith states that the banks of the Orange River appear to constitute the southern limit of the range of this species, which was only obtained in great abundance in the districts round Latakoo far from water. 'The most striking peculiarity,' adds Dr. Smith, 'observed in this species is the extraordiary manner in which a number of individuals associate, nd build their nests under a common roof. When a nesting place has been selected, and the operation of building the nests is to be commenced *ab initio*, the community immediately proceed conjointly to construct the general covering which interests them all; that being accomplished, each pair begins to form their own nest, which, like the roof, they construct of coarse grass; these are placed side by side against the under surface of the general covering, and by the time they are all completed, the lower surface of the mass exhibits an appearance of an even horizontal surface, freely perforated by small circular openings. They never use the same nests a second time, though they continue for many years attached to the same roof. With the return of the breeding season, fresh nests are formed upon the lower surface of those of the preceding year, which then form an addition to the general covering. In this manner they proceed year after year, adding to the mass, till at last the weight often becomes such as to cause the destruction of its support: upon which a new building is selected. They appear to prefer constructing these nests upon large and lofty trees, but where such do not occur, they will even condescend to form them upon the leaves of the arborescent aloe (*Aloe arborescens*), as occasionally happens towards the Orange River. The commencement of the roof is firmly interwoven with the branches of the trees to which it is intended to be suspended; and often a great part of a principal branch is actually included within its substance. Each female lays from three to four eggs, which are of a bluish-white colour, and freely mottled towards the large end with small brown dots. When once this species has attained maturity, it never afterwards exhibits any change in respect to colours. The male has no summer tints which he throws aside in winter, as is the case in *Euplectes*. Seeds, and occasionally small insects, constitute the food.'

The Sociable Weaver-bird. (Smith.)



Nests of the Sociable Weaver-bird, and see ante, p. 171.

Euplectes taha, Smith.



Euplectes taha.
Upper figure, male; lower figure, female. (Smith.

Description.—Male ; summer plumage. Crown of head, back, upper and under tail-coverts, vent, and a narrow oblique stripe on each side of the breast immediately in front of the shoulders, bright yellow shoulders, quill-feathers, and tail, grey-brown ; shoulder feathers, and the outer vanes of the quill-feathers, faintly edged with dirty-white ; insides of shoulders pale cream-yellow verging on white ; thighs pale yellow freckled with brown. Space in front of the eyes, sides of the head, stripe on each side of back adjoining the bases of the wings and all the under parts of the body as far as the vent, deep brownish-black. Bill light umber-brown, the lower mandible lightest. Feet and claws yellowish-brown ; eyes brown.

Male ; winter plumage. Above, pale yellowish-brown ; head, neck, and interscapulars freely dashed with longitudinal brownish-black stripes or blotches, and the back and upper tail coverts with faint narrow stripes of the same colour. Eyebrows yellowish-white ; ear coverts pale rusty brown ; under parts of body greyish-white, throat and breast tinged with sienna-yellow, and these as well as the flanks variegated by longitudinal brown streaks. Bill, particularly the lower mandible, lighter than in summer.

Adult Female.—Coloured in summer and winter nearly the same as the male in winter. (Smith.)

Geographical Distribution and Habits.—Dr. Smith states that this species does not appear to extend south of 26°, at least he discovered no individuals before he reached that latitude. The natives more to the southward seemed to be unacquainted with the bird. In the districts to the north of 26°, however, it was common, and large flocks were often observed among the trees near the banks of rivers. Dr. Smith further remarks that though they were generally among trees at the time he passed through the country, he was informed that they leave them at the commencement of the breeding season, for the reeds which skirt the rivers here and there, and from which they suspend their nests. They are, he states, very destructive to gardens, like *Euplectes oryx*, in the summer, and the natives are obliged to watch their crops to prevent them from being devoured by one or other of their species.

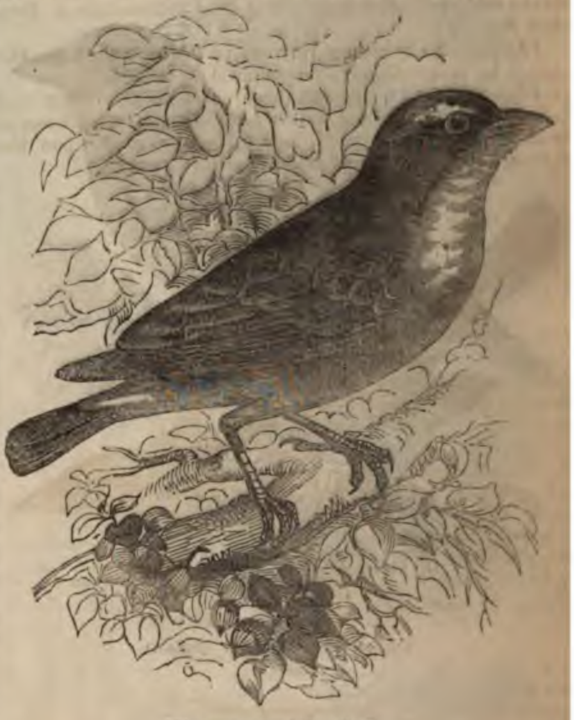
Dr. Smith enumerates the following species of *Euplectes* as inhabitants of South Africa :—*oryx* (*Loxia oryx*, Linn.), *capensis* (*Loxia capensis*, Linn.), and *taha*.

Plocepasser mahali (*Agrophilus*, Sw.).

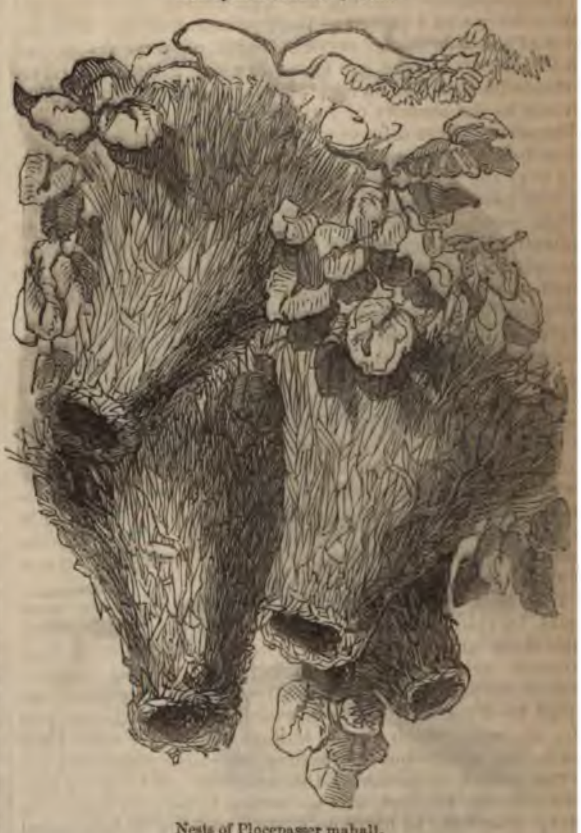
Description.—Forehead, top of the head, nape, lores, and stripe from the angles of the mouth to the top of the neck, liver-brown ; sides of the head and ear-coverts broccoli-brown, tinged with yellowish-brown ; eyebrows broad, dusky white. Upper and lateral parts of the neck, interscapulars, back, and lesser wing-coverts intermediate between broccoli and wood brown ; last row of the lesser wing-coverts broadly tipped with pale cream-yellow ; primary and secondary quill-coverts light liver-brown, the former narrowly, the latter broadly margined with rusty white ; rump and upper tail-coverts yellowish white ; tail-feathers liver-brown, tipped and narrowly edged externally with rusty white. Chin, throat, vent, under tail-coverts, and thighs dusky white ; breast, belly, and flanks, dirty cream-yellow, inclining to pale wood-brown. Bill dull yellowish brown, shaded with brownish red ; legs, toes, and claws same colour. Eyes deep brownish orange. Length from point of bill to tip of tail 6 inches 6½ lines.

Female very similar to male in colour. (Smith.)

Geographical Distribution and Habits.—Dr. Smith first saw this bird upon a tree on one of the tributaries to the Orange River. The nests in figure and texture had many of the characters of those of *Ploceus*, but resembled those of some of the South African *Pyrgitæ* in the manner in which they were armed. The walls of each nest were entirely composed of stalks of grass, the thickest extremities of which were so placed as to protrude externally for several inches beyond the compact structure destined to contain the eggs. Thus each nest appeared armed with numerous projecting spines, and bore considerable resemblance to the body of a porcupine with its spines partially erected. Several of the *Pyrgitæ*, Dr. Smith remarks, arm their nests after the same fashion, but they select for the purpose the delicate twigs of shrubs or brushwood, instead of stalks of grass. The object of both is, he observes, to offer an obstacle to the advance of snakes towards the eggs and young. Dr. Smith adds that a solitary specimen of *Plocepasser* is seldom seen, and that the bird is disposed to congregate. He met with small, and even occasionally with large flocks, as far north as the Tropic of Capricorn. Twenty or thirty nests were to be seen upon one tree. Seeds and insects are the food, and, in search of these, the bird passes much time upon the ground. If disturbed when thus feeding, the flock move away in a body to a neighbouring tree, where they remain till they are satisfied that they may return to their employment.



Plocepasser mahali. (Smith.



Nests of Plocepasser mahali.

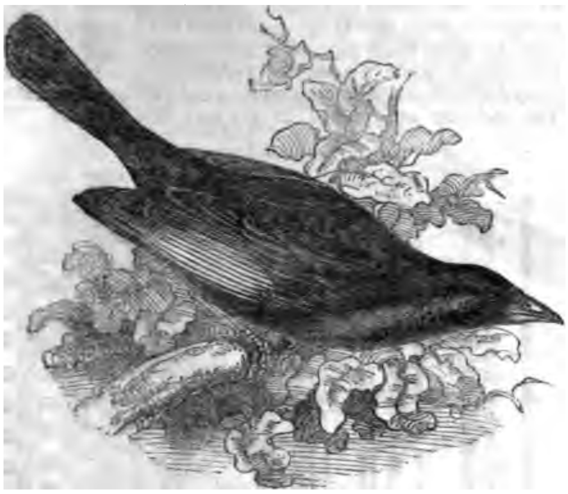
Dr. Smith notices two species, *Plocepasser mahali*, Smith, and *Plocepasser superciliosus* (*Agrophilus superciliosus*, Sw.).

Textor erythrorhynchus.

Description.—Head, upper and under parts, the last half of each primary quill, all the secondary quills, and the tail, blackish-brown; first half of each primary quill white, outer vanes of a few of those nearest to the secondaries margined with the same colour almost to their points. Bill light yellowish-red, clouded with shades of purple-red; legs and toes yellowish-brown, the former tinted with yellowish-red; claws livid umber-brown. Eyes dark brown.

Female.—The brown tint more distinct than in the male; in other respects very similar in colour.

Young.—Dusky liver-brown; feathers of breast and belly broadly margined with white. Slight indications of such white margins are often to be observed upon the feathers of the sides and body in adults. (Smith.)



Textor erythrorhynchus.

Geographical Distribution and Habits.—'It was not till after we had passed to the northward of the 25th degree of south latitude,' says Dr. Smith, 'that we discovered this bird; and, if we are to believe the natives, it rarely extends its flight farther to the southward, which they attribute to the scarcity of buffaloes south of that parallel. Whenever it was discovered, it was always in attendance upon herds of the animals just mentioned, and either flying over the members of which the group was composed, or else perched upon the back of some individual animal. While perched, it appeared generally to be employed in collecting articles of food from the hide; and while so occupied it passed quickly from one part of the buffalo to another, without the latter appearing to bestow the slightest attention upon its movements. On opening the stomachs of the specimens we procured, we found what we had been led to expect, namely, that its food consisted in part at least of parasitical insects; and that to obtain them it selected the company in which, as has already been remarked, we always found it. According to the evidence of the natives, it also frequently alights upon the ground, examines the excrement of the buffalo, and from it collects certain articles of food. Sometimes a number of individuals were observed associated with the quadrupeds in question, frequently only one or two, and on many occasions we encountered troops of buffaloes without even one in attendance.

This bird, besides being of service to its huge associates by ridding them of many of the insects with which their skins are infested, also performs for them another valuable service. On observing any unusual appearance in the neighbourhood, its attention is immediately directed to it; and, if alarm is eventually excited, the bird flies up, upon which all the buffaloes instantly raise their heads, and endeavour to discover the cause which had led to the sudden departure of this sentinel. If they are successful in the attempt, and see reason to fear for their own safety, they take to flight in a body, and are accompanied by the birds who forewarned them of their danger. On the herd again halting to feed, the birds return to their avocation, and pursue a course similar to that just described, provided the like circumstances recur. We never found this bird attaching itself to any quadruped but the buffalo, nor did we ever find the latter with any other attendants, though we found in the country in which both exist two other birds in the habit of feeding upon parasitical animals, namely *Buphaga Africana* and *erythrorhyncha*. These restricted their visits exclusively to the *rhinoceros*.' (*Zoology of South Africa.*)

WEAVING. If we take the term 'weaving' in its broadest sense, as applying to the process of combining longitudinal threads into a superficial fabric, it will have relation to the whole series of textile manufactures; not only those which are prepared in the loom, but likewise net-work, lace-work, and hosiery. We shall endeavour therefore in the present article to complete the details of manufacturing many textile fabrics which have been partially described in former articles; and as, to effect this, some sort of classification will be desirable, we propose, after briefly noticing the state and progress of weaving among the antients, to proceed thus:—*Plain Weaving; Pattern Weaving; Double Weaving; Cross Weaving; Chain Weaving; Pile Weaving; Power Weaving.* Under many of these headings we shall have to enter into some details; but in other cases very little more will be necessary than a reference to former articles.

From many passages in the Bible, and from the general character of dress, it is apparent that woven fabrics were known in very early times. In all probability weaving was practised before spinning; that is, the combination of reeds, strips of leather, or rude fibres into a material for dress, by a process analogous to that of weaving, preceded the practice of spinning yarn from a congeries of elementary fibres.

Sir J. G. Wilkinson, in his work on Egypt, (*Manners and Customs of the Antient Egyptians*), observes, 'The Egyptians, from a most remote era, were celebrated for their manufacture of linen and other cloths, and the produce of their looms was exported to, and eagerly purchased by, foreign nations. The fine linen and embroidered work, the yarn and woollen stuffs, of the upper and lower country, are frequently mentioned, and were highly esteemed.' The same authority states that the looms, found depicted on the tombs at Thebes, are of an exceedingly rude construction; but he does not think that this circumstance militates against the production of fine fabrics, since it is known at the present day that the Hindu produces exquisite muslins on his rude loom. In a specimen of mummy-cloth, examined by Mr. Thompson, the texture was close and firm, yet elastic; the yarn of both warp and weft was remarkably even and well spun; the weft was single, while the warp-yarn consisted of two fine threads doubled together; and it was observable, in that as well as in other specimens, that the number of threads to an inch in the warp uniformly exceeded that in the weft, a difference not commonly observable in European fabrics. Mr. Thompson examined Egyptian cloths brought to England by Salt and Belzoni, and found that the 'selvages' were well made, that striped goods similar to modern ginghams were often made by the Egyptians, and that indigo was used as one of the dyes. Wilkinson gives copies from some of the pictures at Thebes, Beni Hassan, and Eileithyas, representing weavers at their looms; in one instance the loom appears to be horizontal; while in another it is vertical, with the weft driven upwards; and from representations of five different sorts of shuttles, it would appear that they were generally about half a yard in length.

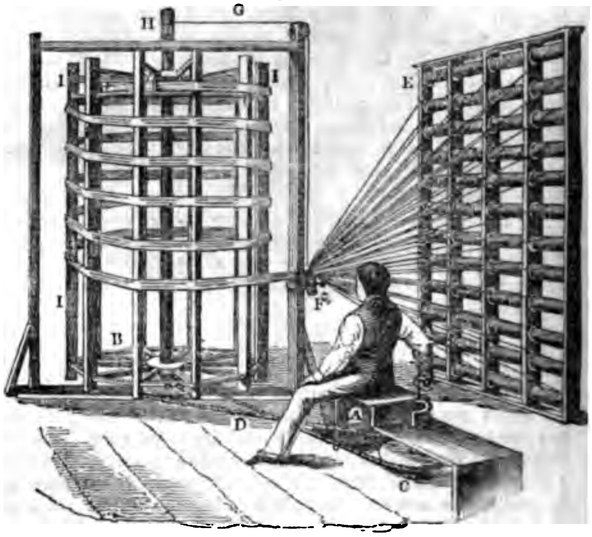
Mr. Yates (art. 'Tela,' Smith's *Dictionary of Greek and Roman Antiquities*) has collected most of the authentic details respecting the art of weaving among the Greeks and Romans, from which we may select a few illustrations. Weaving was carried on as a distinct trade in the larger towns; but every considerable private establishment had also a loom at which the females of the family were employed; the weaving being carried on chiefly by female slaves, while the superintendence rested with the mistress and her daughters. In large houses a particular room was set apart for this occupation. The Greeks and Romans differed from the Egyptians in this, that the weaving was among the last-mentioned people performed by men, while among the Greeks and Romans it was a female employment. The shawls furnished to the temples were woven by women, in some cases attached to the more opulent temples, but in other cases independent of them: thus, the sixteen women who lived together in a building destined to their use at Olympia, wove a new shawl every five years, to be displayed at the games which were then celebrated in honour of Hera, and to be preserved in her temple. Plato mentions one of the most important differences between the warp and the weft, viz. that the threads of the former are strong and firm in consequence of being more twisted in spinning; whilst those of the latter are comparatively soft and yielding; a comparison which is strictly applicable at the present day. Mr. Yates gives two wood-cuts to show the analogy between the antient Greek loom and the modern Icelandic loom; both having the warp-threads vertical; whereas in the improved looms of modern times the warp is always horizontal. The Greeks evidently understood much of what is now termed 'mounting a loom,' that is, arranging strings in such a manner as to separate the warp-thread into two or more groups, between which the weft may be introduced: the leash (*μίτος*) being one such string, and a woven pattern being termed *δίμιτος*, *τρίμιτος*, or *πολύμιτος*, according as it contained two, three, or more groups of strings, or, as we should now say, 'leaves of heddles.' After the weft was thrown, it was driven up close, either by a kind of bat, called a 'spatha,' or by a kind of comb; both of which appear to be combined in the 'batten' or 'lay' of the modern loom. The 'checks' produced by having different coloured warp threads, and 'stripes,' formed of multi-coloured wefts, were known to the Greeks and Romans; as were likewise numerous kinds of fancy weaving derived from these two combined. Mr. Yates concludes with this remark: 'As far as we can form a judgment from the language and descriptions of antient authors, the productions of the loom appear to have fallen in antient times very little, if at all, below the beauty and variety of the damasks, shawls, and tapestry of the present age.'

If we consider the above details, and at the same time mark the mode of proceeding by the Hindu weaver at the present day, we shall have the means of forming a judgment of the practice of weaving in all countries and in all times, so far as it differs from modern European weaving. The Hindu weaver takes his station under the trees, where he stretches his warp-thread between two bamboo rollers, which are fastened to the turf by wooden pins. He digs a hole in the earth large enough to contain his legs when in a sitting posture; and then, suspending to a branch of a tree the cords which are intended to cause the raising and depressing of the warp-threads, he fixes underneath two loops for his toes, by which he produces a substitute for treddles. His shuttle acts also as a batten or lay, and completes his simple arrangements. With such rude apparatus as this is the process of weaving conducted in nearly all the villages throughout India. We will now compare these methods with the mode of procedure in modern Europe.

Plain Weaving.—By the term 'plain weaving' we mean the weaving of all varieties of textile manufacture, whether of silk, cotton, woollen, or linen, in which the weft threads interlace uniformly among the warp threads without producing twills, checks, stripes, sprigs, or any variety of figures. Calico, Irish linen, and plain silk are good representatives of this kind of weaving. If we examine any of these, we shall find that the cross threads pass alternately over and under the long threads, no one thread passing over or under two other threads at once. In the language of weavers, the long threads are called *warp*, *twist*, *caine*, or *organzine*; while the cross threads are called *weft*, *woof*, *shoot*, or *tram*. Twist is the general term applied to the kind of yarn used for cotton warp; organzine to that for silk warp; and some of the other terms have in like manner only partial application: if therefore we speak simply of *warp* and *weft*, we shall avoid ambiguity, and be sufficiently correct for the object in view. The warp is always affixed to the loom or weaving machine; while the weft is contained in the shuttle, a small boat-like instrument. The winding of the weft on the spindle which runs through the shuttle is a simple matter; but the arrangement of the warp in the loom is very important, and must be understood before we can follow the details of weaving.

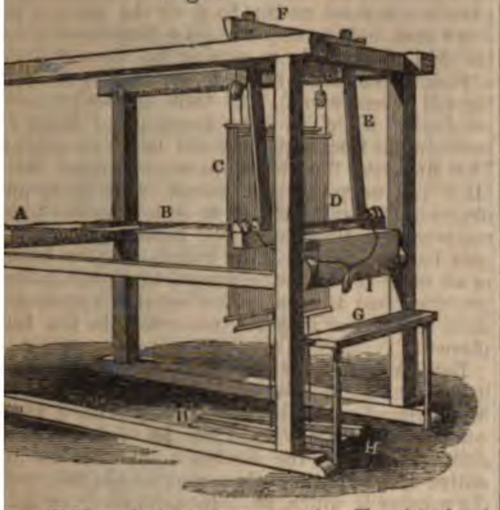
st operation consists in laying the requisite num- together to form the width of the cloth: this ig. Supposing there to be 1000 threads in the width of a piece of cloth; then the yarn, wound on the bobbins as it leaves the hand of the spinner, must be so unwound and laid out as to form 1000 lengths, constituting when laid parallel the warp of the intended cloth. The antient method was to draw out the warp from the bobbins at full length in an open field; and this is still practised in India and China; but the climate of Europe is too uncertain for such a method, and hence the *warping-frame* was devised. This is a large wooden frame fixed up vertically against a wall, the upright sides being pierced with holes to receive wooden pins, which project sufficiently to receive the clue or group of yarns. The warper, having placed the bobbins of yarn in an adjacent frame, ties the ends of all the threads together, and attaches them to one of the pins; then gathering all the threads in his hand into one clue, and permitting them to slip through the fingers, he walks to the other end of the frame, where he passes the yarns over the fixed pin. He walks from end to end of the frame, attaching the clue of yarns to the pins each time, until he has unwound from the bobbins enough yarn to form the warp. But this method, although still followed in some places, has yielded to the use of the *warping-mill*, a much more convenient piece of apparatus. The bobbins are placed in a frame E (*Fig.* 1). The warper, sitting at A, rotates the vertical reel, or cylinder B, by means of the wheel C and the rope D. The yarns from all the bobbins, collected together in a group at F, there pass through a sliding piece, which, through the intervention of the cord G and the revolving shaft H, rises and falls. By this arrangement it is easy to see that when the handle is turned by the warper, the clue becomes wound spirally on the reel. The diameter of the reel is so regulated, that when the spiral equals the intended length of the warp, the clue of yarns is twisted round pins at I I, and then by a reverse motion of the handle is wound spirally down again; and so on up and down alternately until the grouped clues of yarns constitute a sufficient number for the width of the warp. Certain minor adjustments are at the same time made, to facilitate the subsequent operations of the weaver. The more modern warping-machines we shall have to mention when we come to 'power-weaving.'

Fig. 1.



When the warp is completed on the warping-mill, the warper takes it off and winds it on a stick into a ball, preparatory to the process of *beaming*, or winding it on the beam of the loom. The threads, in this latter process, are wound as evenly as possible on the beam; a separator, ravel, or comb being used to lay them parallel, and to spread them out to about the intended width of the cloth. Arrangements are then made for *drawing*, or attaching the warp-threads individually to certain mechanism of the loom. This we may illustrate by *Fig.* 2, representing the common loom in its simplest state. The yarn-beam is at A, capable of revolving on its axis, and of allowing its threads to be drawn out in a horizontal layer B. At C are two leaves of heddles or healds, each leaf consisting of a number of strings ranged vertically, attached at bottom to

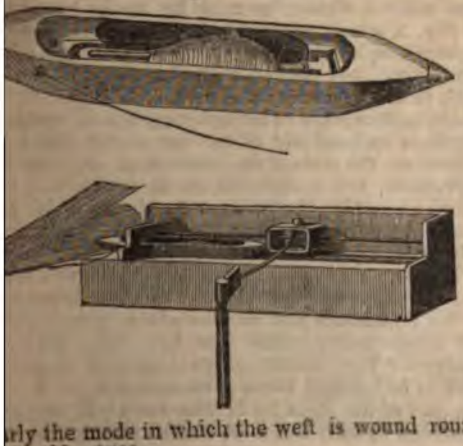
Fig. 2.



lles H H, and at top to a cross-bar F. At about dle of every heddle or string is a loop or eye, which the warp-yarns are drawn, one through ; and the passing of the yarns through these nstitutes the process of *drawing*. Half of the ns, that is, every alternate yarn, pass through the one leaf of heddles, and the other half through leaf; and as the two leaves are so connected by s to cause one to rise when the other sinks, the omes divided into two portions, one above the ar the anterior end of the loom. The weaver drives the shuttle by means of the handle I, and every successive weft-thread by the batten, lay, E, suspended from F. The succession of movest be noticed somewhat more in detail in the graph.

re three movements attending every thread of h the weaver throws across the warp. In the e he presses down one of the two treadles, by e of the two halves of the warp is depressed, orming a kind of opening called the 'shed.' Into at the second movement, he throws the shuttle g the weft-thread, with sufficient force to drive the whole web. Then, at the third movement, the batten, which is a kind of frame carrying at edge a comb-like piece having as many teeth as threads in the warp, and with this he drives up l of weft close to those previously thrown. One weft is thus completed, and the weaver proceeds nother in a similar way, but in a reverse order, y depressing the left treadle instead of the right, rowing the shuttle from left to right, instead of t to left. In the commonest mode of weaving e is thrown by both hands alternately; but about ago John Kay invented the 'fly-shuttle,' in string and handle are so placed that the weaver the shuttle both ways with one hand. The flyillustrated in CHECK; while *Fig*. 3 will show

Fig. 3.



rly the mode in which the weft is wound round the spindle or pirn of the shuttle, and the most improved arrangement for driving the shuttle into the open shed of the web. The spindle of the shuttle contains enough weft for several shoots or throws; the weft unwinding as the shuttle travels along, and forming the 'selvage' of the cloth when the shuttle returns in the opposite direction.

In cotton and some other fabrics, the warp-yarns must be 'dressed' as the weaver proceeds, that is, rubbed over with some kind of vegetable mucilage, such as paste or size, for the purpose of giving them tenacity, of diminishing friction by smoothing down the little hairy filaments of the yarn, and of imparting a smoothness or gloss. In hand-weaving, the weaver suspends his operations from time to time, in order to apply dressing to his warp. He first applies a kind of comb to the warp, to clear away knots and burrs; then lays on the paste with a brush; and lastly dries the paste by a current of air excited by a large fan. The more modern and complete 'dressing-machine' we shall have to notice in connection with '*power-weaving*.'

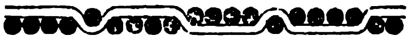
In weaving plain silks, calicos, and other webs of moderate width, there are two leaves of heddles and two treadles, for dividing the warp into two parcels. In weaving broader webs, such as floor-cloth canvas, the heddles and treadles are equally simple, but more power and dexterity are necessary in throwing the shuttle, since the width of the web is sometimes as much as eight yards. In weaving very narrow webs, such as ribands, galloons, &c., there would be a waste of power and of time if only one shuttle were thrown across a distance of two or three inches at each movement; and there has consequently been devised a kind of loom called the 'engine-loom,' in which several shuttles work several webs at one time in each machine; this has been fully explained in RIBAND. Various details concerning plain woven goods will be found under COTTON; LINEN; MUSLIN; SILK.

Pattern-weaving.—The number of woven webs which can come under the designation of plain weaving is much smaller than that of those now to be considered. Whenever the warp and weft are of the same colour, and intersect each other in regular order, so as to produce a uniform surface totally divested of pattern, we may deem that 'plain-weaving;' but every day's experience shows that pattern, of some kind or other, is a more prevailing characteristic of woven fabrics.

In the first place we may take the case in which all the threads of the warp are of one colour, and all those of the weft another colour: this produces the peculiar effect called *shot* patterns, but involves no new arrangements as to weaving. Next come the two varieties known respectively as *stripes* and *checks*. A stripe is a pattern in which parallel lines run either along or across the warp; while a check is an alternation of rectangles like a chess-board, or more properly like the varieties of Scotch plaid. The production of a stripe depends either upon the warper or the weaver: the production of a check depends upon both. If the stripes are of different colours, and extend lengthwise of the cloth, then the warper so disposes the threads of his warp that the two colours shall succeed each other at regular intervals; but if the stripes are of the same colour, but of different quality as to fineness, then the warper uses two qualities of warp in alternate succession. If the stripes extend across the cloth, the warper arranges his threads as for plain weaving; but the weaver uses two or more shuttles, carrying two or more coloured wefts, and throws the shuttles at regular intervals in succession. If a check is to be produced, the warper first produces his alternation of colours in the warp, and the weaver then throws in wefts of different colours by using two or more shuttles, so that the interlacing of the long stripes with the cross-stripes produces the check, the pattern of which depends on the comparative width of the various stripes. The manner of using the combined shuttles is described under CHECK.

The next to be noticed is the production of the *twill*, a very extensively adopted variety of woven work, since it comprises satin, bombazeen, kerseymere, and numerous other kinds. In the twill, the weft-threads do not pass over and under the warp-threads in regular succession, but pass over one and under two, over one and under three, or over one and under eight or ten, according to the kind of twill. The effect of this is, to produce a kind of diagonal ribbed appearance, either on the 'right' or the 'wrong' side of the cloth, and a smooth and glossy appearance on the other, according as the one thread is crossed above or below by the weft. *Fig.* 4 will assist our comprehension of this point. If we suppose the round dots to be sections of successive warp-threads and the white double line to be one thread of weft, we shall see that the weft passes over four, under one, over four; then under four, over one, under four; and if the specimen were continued, we should see that these cycles of changes succeed each other in regular order. This arrangement furnishes the 'twill' for some particular varieties of cloth; and the weaver has thus a kind of numerical formula for diaper, dimity, dornock, damask, bombazeen, satin, kerseymere, &c.; each one having a certain order of succession in which the weft crosses the warp. (A few particulars will be found under Bombazeen and Damask.)

Fig. 4.



Now in order to allow the weft to pass under four or more threads at once, some mechanism must be devised for elevating all those four at one movement, or of keeping them stationary while every fourth thread is depressed. If the weft always passed under the same four threads, no cloth would be produced, for no reticulation would be made; but the groups of four passed under by one weft-shoot are not the same as those crossed at the next following shoot. Hence more than two leaves of heddles are required, and more than two treadles to work them. There must, in such a case as we have above supposed, be five leaves of heddles, to each of which every fifth warp-thread is attached; and to each of these leaves a treadle is appropriated: so that when one treadle is pressed down, one fifth of the warp-threads becomes drawn out of the horizontal plane; when another treadle is depressed, another fifth is affected; and so on. The weaver, by the management of his treadles, has the power of raising or depressing four-fifths of his warp-threads, in groups of four each, leaving every fifth thread stationary; and in this state of things he throws his shuttle. By various combinations among his five treadles, he can produce many varieties of movement, which give rise to different kinds of twill.

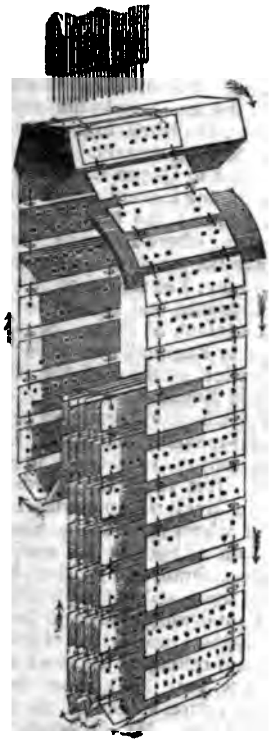
When, instead of or in addition to a twill, the weaver has to produce sprigs, flowers, spots, or any kind of figure, a great increase of complexity occurs. The weft may pass over four and under one at one part of the width of the cloth; over two and under two at another; over one and under four at another; according to the part of the figure which may happen to occur at any particular part of the width of the cloth. Hence the order in which the warp-threads must be depressed or elevated varies continually, and the number of leaves of heddles would become so numerous that the loom could not hold them, nor could the feet of the weaver move the requisite treadles. This difficulty gave rise to the invention of the *draw-loom*, in which strings are so arranged that a boy can draw down the requisite warp-threads preparatory to the movement of the shuttle. The draw-loom, from the immense number of its vertical and horizontal strings, is a very incomprehensible piece of apparatus to a stranger, whether seen actually at work or represented in an engraving; but its principle is simple enough. The warp-threads pass through eyes or loops in vertical strings, each thread having one string; and these strings are so grouped that the attendant boy, by pulling a handle, draws up all those warp-threads which are necessarily elevated for one particular shoot of weft; and when a different order of succession is required, he pulls another handle. Hence it follows that the arrangement of the strings and handles must be preconcerted with especial reference to one particular pattern; and this is called 'cording the loom.' The cording would sometimes take one man three or four months, and would then only serve for one particular pattern.

Early in the present century two inventions were made with the view of rendering the draw-loom more automatic. One of these, called the 'draw-boy,' not only superseded the necessity of employing a boy to pull the handles, but removed, by the unerring certainty of its operation, all possible chance of mistake in pulling the wrong handle. This was a very ingenious arrangement of mechanism by which a treadle, worked by the foot of the weaver, gave a vibratory motion to a curved lever which drew down some of the warp threads and elevated others; and the skill consisted in so causing the lever to travel along a rack or toothed bar as to act upon different warp-threads in succession. The draw-boy has been very much employed, while another invention, equally ingenious perhaps, has from various causes failed to come into use. This latter was the *automatic carpet-loom* of Mr. Duncan. Here the warp-threads, instead of being elevated and depressed by the handles as in a draw-loom, or by the reciprocating lever as in the draw-boy, were moved by pins inserted in a rotating barrel, the pins being placed in an order of succession according to the pattern to be produced, just as those on the barrel of a street-organ or a musical-box are disposed according to the tune to be played.

But the draw-loom, the draw-boy, and the barrel-loom have been alike eclipsed by the exquisite apparatus of M. Jacquard, which is very properly named after the inventor. A brief sketch in No. 50 of the 'Penny Magazine,' taken from the Evidence given before the Committee of the House of Commons on the Silk-trade, shows the manner in which M. Jacquard, like too many other inventors, was treated for his ingenuity. Jacquard's apparatus is not a loom: it is an appendage to the loom, intended to elevate or depress the warp-threads for the reception of the shuttle. There is a hollow prismatic box, whose surfaces are pierced with a great number of holes; and to each face of the box is fitted a card also perforated; or rather, there are for each particular pattern to be woven, a large number of cards, all of equal size, and equal in size to each face of the box. The perforations in the cards, where they occur, are correspondent in position with some of the holes in the box; but in almost every card the holes are fewer in number than those on each face of the box. All the cards are linked together by hinges or joints, in such a manner that as the box rotates on a horizontal axis, the cards in succession lie flat on the several faces of the box. The cards for one pattern may be one or two hundred in number, and all form an endless chain. The box may have four, five, or more faces, according to circumstances. The principle of action may perhaps be explained thus:—Supposing each face to have one hundred perforations, then there are a hundred small bars or needles ranged in a group in exactly the same order as the holes in the faces of the box, the ends of the bars being immediately opposite the holes. Each bar or needle is a lever by which certain warp-threads are governed, in such a way that when the bars are moved longitudinally, the warp-threads become elevated or depressed. Now if the box have a reciprocating motion, so that one of its faces shall strike against the ends of the bars, the ends of all the bars will pass into the holes in the box, if the face be not covered with a card; but if it be covered, some of the bars will pass through the holes of the card into the holes in the box, while others, at the unperforated parts of the card, will be driven aside. Thus the bars became unequally acted on, and they in their turn act unequally on the warp-threads, depressing some, raising others, and leaving the remainder stationary; and the cards are so perforated as to lead to the production of a pattern from this inequality of action. The mode in which the cards lie on the box may be seen in *Fig.* 5, which represents a form of the Jacquard apparatus employed in the bobbin-net machine. The box is pentagonal, and pierced with a small number of holes on each face. The cards are numerous, joined in an endless chain, and capable of being brought into contact with all the faces successively of the box as the latter revolves. Above are the ends of the bars which, by a reciprocating movement, are brought in contact with the box. The manner in which the bars act on the threads need not be shown here, as the principle of the Jacquard apparatus relates merely to this movement of the bars.

The Jacquard apparatus was first intended for and applied to silk-weaving; but it has been found applicable to the bobbin-net and various other fancy manufactures. Its characteristic value has been thus stated by Mr. Porter:—'The elaborate specimens of brocade which used to be brought forward as evidence of skilfulness on the part of the Spitalfields weavers of former days, were produced by only the most skilful among the craft, who

Fig. 5.



bestowed upon their performances the most painful amount of labour; the most beautiful products of the loom in the present day are however accomplished by men possessing only the ordinary rate of skill, while the labour attendant upon the actual weaving is but little more than that demanded for making the plainest goods.'

Double Weaving.—In all the fabrics hitherto noticed, there is but one layer of threads, formed by the intersection of the weft among the warp, both weft and warp being individually single. But there has long been practised the weaving of a kind of double cloth, composed of two webs, each consisting of separate warp and weft, but both sets interwoven at intervals. The junction of the two webs is formed by passing each of them occasionally through the other, so that each particular part of both is sometimes above and sometimes below. Kidderminster or Scotch carpeting is almost the only kind of double-cloth now woven in this country; and it will therefore be sufficient for us to refer to the article CARPET for details.

Cross Weaving.—This term may be conveniently applied to those varieties of woven fabric in which the warp-threads, instead of lying constantly parallel, as in all the cases hitherto noticed, cross over or twist around one another, thus forming a plexus or interlacing independent of that produced by the weft. *Gauze* and *Bobbin-net* may be taken as the chief representatives of this kind of fabric. The former has been already slightly treated on [GAUZE], and we will here glance rapidly over a few remarkable points in the history of the latter.

The production of light cross-woven goods, previous to the extraordinary development of the bobbin-net manufacture at Nottingham, was carried on only to a limited extent. *Net* was the generic name for these goods, and according as slight deviations were made in the mode of crossing the threads, so were distinctive names given to the material produced; such as whip-net, mail-net, patent-net, drop-net, spider-net, Paris-net, balloon-net, &c. All these varieties were produced at the loom, with warp-threads stretched horizontally, and weft-threads thrown across by means of a shuttle; and the difference between them depends on the manner in which the warp-threads were made to cross one another, and in which the weft-thread was thrown. In the *bobbin-net* of later times however the plexus is produced by a machine very different from the common loom, and among the most remarkable which our textile manufactures afford.

In 1777 a machine was invented at Nottingham for the manufacture of a kind of net on a principle somewhat similar to that of stocking-weaving; but this was soon superseded by another which manufactured what was termed *point-net*, invented by Mr. Lindley, and afterwards improved by Mr. Taylor and Mr. Flint. The point-net became so highly approved, that there were no fewer than a thousand machines at work at the beginning of the present century. Next succeeded what was called the warp-machine, which produced *warp-net* in successful competition with the *point-net*. Still however the net produced did not afford a good imitation of the bobbin-lace or pillow-lace; and the Nottingham manufacturers threw out every inducement for the development of a machine which should produce such an imitation. At length, in 1809, Mr. John Heathcoat, a stocking-weaver of Loughborough, availing himself of an ingenious principle involved in a machine for making fishing-nets, invented a few years before by Robert Brown, of Nottingham, produced and patented the *bobbin-net* machine, one of the triumphs of modern ingenuity. From this time a new field of industry became opened, into which capital and skill rapidly entered. The traverse-warp machine of Mr. Brown, the straight-bolt machine of Mr. Morley, the pusher-machine of Messrs. Mart and Clark, the circular-bolt machine of Mr. Morley, and the lever-machine of Mr. Leavers, were successive improvements on Heathcoat's bobbin-net machine, involving its main principle, but working it out more effectually.

The main points of difference between the bobbin-net machine and the common loom may be thus stated. In the former the warp-threads are vertical; in the latter they are horizontal: in the former the weft is wound on a brass bobbin so thin as to pass between the adjacent threads of the warp; in the latter it is contained in a shuttle an inch or more in width: in the former the transit of the weft-thread, while passing between the warp, is at right angles to the plane of the web; in the latter it is parallel with that plane: in the former the successive meshes or intersections are driven up close to those before made, by a series of pointed wires catching in the loops; in the latter they are driven up by the lay or batten: in the former there are sometimes as many as three thousand bobbins or weft-carrying implements to one machine; in the latter there are seldom more than one or two shuttles: in the former each bobbin twists its weft-thread round a warp-thread by a series of oscillatory movements like those of a pendulum; in the latter the twisting is effected rather by the movements of the warp than those of the weft.

The activity to which the invention of the bobbin-net machine gave rise was quite extraordinary, and the profits accruing to the various inventors were at first very large. In 1809 five guineas a yard was given for bobbin-net which can now be equalled for eighteen-pence; and quillings or edgings, which obtained 4*s*. 6*d*. per yard in 1810, can now be equalled for three-halfpence. This enormous change has been due partly to the inordinate profits which were reaped in the first instance, and partly to the immense production which those high profits induced, and which has since overstocked the market. Dr. Ure states that 'For several years after its first invention, about the year 1810, it was no uncommon thing for an artisan to leave his usual calling, and betaking himself to a lace-frame, of which he was part proprietor, realize by working upon it 20*s*., 30*s*., nay, even 40*s*. a day. In consequence of such wonderful gains, Nottingham, the birth-place of this new art, with Loughborough and the adjoining villages, became the scene of an epidemic mania. Many, though nearly devoid of mechanical genius, or the constructive talent, tormented themselves night and day with projects of bobbins, pushers, lockers, point-bars, and needles, of various forms, till their minds got permanently bewildered: several lost their senses altogether; and some, after cherishing visions of wealth, as in the old time of alchemy, finding their schemes abortive, sank into despair and committed suicide.' ('Cotton Manufac.,' vol. ii., p. 350.) From certain statistical details which Mr. Felkin, of Nottingham, furnished to the Factory Commissioners about ten years ago, it appears that at that time the quantity of cotton used annually in England for bobbin-net was about 2,387,000lbs., value about 200,000*l*.; that this was made into thirty million yards of net, value nearly two millions sterling; that 160,000 persons were employed in spinning, doubling, weaving, mending, pearling, finishing, and embroidering the net; that the fixed and floating capital invested in the bobbin-net manufacture reached as high as two millions sterling; and that there were from four to five thousand bobbin-net machines then in England. Some of these machines produce net twenty-quarters or five yards in width; and it may with truth be said, that such a machine, with its three or four thousand delicately-constructed brass bobbins, and provided with a Jacquard apparatus, is one of the most exquisite pieces of mechanism which our manufactures can exhibit.

Chain-Weaving.—We may perhaps apply this term to a mode of using threads in which a series of loops is formed by a continuous thread, each loop or link being so connected with others as to form a kind of chain; and this chain-work may either be worked upon a ground woven at the loom, or may constitute the woven material itself. In the common 'sampler-work,' practised by children, a piece of woven worsted or silk is covered with figures or letters by coloured threads, worked with the needle, the woven piece being held in the left hand. In the 'lace-running' and 'tambouring,' largely carried on in and near Nottingham, the operation approaches more nearly to a kind of weaving; for the bobbin-net, which forms the ground, is stretched horizontally on a frame (see 'Penny Magazine,' No. 705), and the lace-runner works a series of ornaments in the net by a needle threaded with coarse cotton, the pattern being previously marked on the net. In the process of 'tambouring' net, the cotton thread is carried to and fro between the meshes of the net by means of a very fine and small hook, which gives to the decorative figure thus produced much more the appearance of chain-work than the instance above noticed. In the tambouring of muslin, which was said in the early part of the present century to have occupied twenty thousand females in Great Britain, the muslin is stretched over a hoop, and there kept in its place by an outer hoop fitted close to it: the hoops are then held either between the knee and the chin of the operator, or else supported by a kind of pedestal, while the work-woman produces a kind of chain-work on the surface of the muslin. About thirty years ago Mr. Duncan invented a very ingenious tambouring machine, which he fully described in Brewster's 'Edinburgh Encyclopædia;' but it does not appear to have maintained a permanent footing. More recently a method has been introduced at Manchester of embroidering silk goods by means of an ingenious instrument whose movements are governed on the principle of the pantograph. [PANTOGRAPH.]

Another kind of weaving which, coming midway between common weaving and needle-work, and combining something of both, may be ranked in the present class, is that which relates to rug-work and tapestry, in which, by a series of links, loops, or stitches, various coloured threads are interwoven into a plexus or web, having an ornamental device on its surface. The details given under BAYEUX TAPESTRY, GOBELIN, and TAPESTRY, will suffice to convey an idea of this kind of weaving; while LACE will afford a brief view of the mode of combining threads into a fabric by the labours of the cushion-lace workers of our midland and western counties.

The manufacture of *stockings*, whether by the humble process of knitting or by the use of the stocking-frame, is in strictness to be called 'chain-weaving;' for the fabric itself is actually produced by a series of links or loops in a thread of worsted, cotton, or silk. In the process of knitting, still carried on to a small extent in secluded country districts, polished steel needles or wires are used to link threads together into a series of loops, closely resembling in their character the loops produced in tambouring. But this method has been almost entirely superseded by the ingenious *stocking-frame*, which we proceed next to notice.

A singular confusion pervades the early history of the stocking-machine, which neither Beckmann nor any other inquirers have succeeded in removing. There is a strange jumble of persons, places, and dates in the accounts given of the invention and the inventor; but the version most generally received, and which is deemed to be corroborated by a picture and an inscription in the Stocking-weavers' Hall, runs nearly thus: William Lee, of St. John's College, Cambridge, was about the year 1589 expelled from the university for marrying contrary to the statutes. Having no fortune, the wife was obliged to contribute to their joint support by knitting; and Lee, while watching the motion of his wife's fingers, conceived the idea of imitating those movements by a machine. According to another version, Lee, while yet unmarried, excited the contempt of his mistress by contriving a machine to imitate the primitive process of knitting, and was rejected by her; but both accounts agree that the stocking-frame was invented by Lee, and at about the date assigned. Having taught the use of the machine to his brother and the rest of his relations, he established himself at Culverton, near Nottingham, as a stocking-weaver. After remaining there five years, he applied to Queen Elizabeth for countenance and support; but finding himself neglected both by her and by her successor James I., he transferred himself and his machines to France, where Henri IV. and his sagacious minister Sully gave the inventor a welcome reception. On the death of the king, Lee shared in the persecution suffered by the Protestants, and is said to have died, from grief and disappointment, at Paris. Some of his workmen made their escape to England, and under Aston, who had been Lee's apprentice, established the stocking manufacture permanently in England.

In the year 1663 Charles II. granted to the Frame-work Knitters' (stocking-makers) Society of London a charter, which had been refused to them a few years before by Oliver Cromwell. Six years afterwards the number of stocking-frames in England amounted to 700, employing 1200 workmen, of whom three-fifths made silk stockings and the others worsted: for cotton was not then ranked among English manufactures. By the year 1714 the number of frames had increased to 8000 or 9000. Some years after this, the Frame-work Knitters' Company attempted to control not only the manufacture of the fabric itself, but also the making and selling of the stockings; but the project failed. By the year 1753, about twenty years after the introduction of cotton stockings, the number of frames in England was 14,000. Mr. Jedediah Strutt, of Belper, invented, in the year 1758, a machine for making ribbed stockings: he patented the machine, and the patent was twice contested, first by the hosiers of Derby, and then by those of Nottingham; but the validity of the patent being established, the inventor enjoyed it for fourteen years. This rib-stocking frame was one of the contrivances which led by gradual improvements to the net-machines.

The common stocking-frame exhibits a quadrangular arrangement of upright posts, connected by cross-pieces at the top, and having on one side an additional piece of framing to support the weaver's seat. Near where the weaver sits is placed a series of needles, which serve the place of knitting-needles in forming the loops; they are not straight needles, nor yet what would be termed hooks, but something midway between the two; and the number of them depends on the coarseness or fineness of the stocking. This degree of fineness is represented, for no adequate reason that we are aware of, by the number of loops contained in three inches of breadth, which varies from about fourteen to forty; and hence the terms 40's, 14's, &c. as applied to hosiery. The stocking-frame is provided with a series of vibrating levers, called *jacks*, and these jacks, aided by other intricate apparatus, throw the stocking-yarn into such curvatures as to enable the needles to form the loops. The weaver has a bobbin of yarn at one side of his frame, from which he unwinds enough to lay across all the wires; he then, by moving certain treadles with his feet and levers with his hands, forms this length of yarn into a row of loops; and at the next movement, when forming another row of bends or loops, he links the one row into the other, so as to form a kind of chain, which chain, extending both lengthwise and across, constitutes the web of the stocking. The precise mode of proceeding, even if described at much length and illustrated by figures, is exceedingly difficult to comprehend, and we shall therefore not enter into details unsuitable to our limits. Suffice it to say that one continuous thread forms both warp and weft, if we may apply these terms to the stocking-web; and as the thread is not by this operation tied into knots such as occur in making nets, the meshes are loose, and may be easily undone if not secured at the edges, but at the same time the web acquires a degree of elasticity which no other form of woven plexus presents.

A few statistical details, and a notice of a machine for making twelve stockings at once, will be found under HOSIERY; while the following, from the evidence collected by the Factory Commissioners, will show the mode of conducting the stocking-trade. There are three classes of operatives engaged: the 'winders,' who put the silk, cotton, or thread on the bobbins: the 'stockingers,' 'or frame-work knitters,' who work the thread up into a knitted fabric; and the 'seamers,' who make the stockings out of the pieces thus produced. The 'winders' are generally children, who can wind thread enough for half a dozen machines each; the 'knitters' are men, women, and youths, who hire both the winders and the seamers; and the 'seamers' are women. Some of the stocking-frames are owned by the workmen who weave the stockings; some are lent out to the men by the owners at so much per week for each frame; while other persons are renters of what is termed a 'shop of frames,' containing eight or ten frames, let, with standing-room, &c., to the workmen. The hosier or manufacturer lets out his frames at about a shilling a week each to the holders of a shop of frames; and these latter charge that same sum, or perhaps three pence more, to the journeymen or real workers, with the addition of three pence for 'standing' or shop-rent; and three pence for the trouble of taking in the week's wörk to the manufacturer; because all the men working in one 'shop of frames' work for one house; and the owner of the shop seems to act as a sort of agent between the real employers and the workmen.

Pile Weaving.—If we examine a piece of silk velvet, or any kind of fustian, such as velveteen, moleskin, or doe-skin, or a Turkey or Wilton carpet, we shall find that in any or all of these fabrics the warp and weft threads are almost concealed by a kind of down, nap, or pile, which imparts a peculiarly soft and smooth texture to them. It may seem strange to class together such very different materials as silk velvet, fustian, and Turkey carpeting; but the classification is strictly correct, because all of them owe their characteristic beauty to the downy surface which they present. Fustians are in fact a kind of cotton velvet, as Turkey carpeting is a woollen velvet.

The weaving of these pile-fabrics, so far as regards the decussation of the warp and weft threads by means of the shuttle, resembles that of plain fabrics, or of pattern-fabrics, according to the nature of the design. But there is, besides the warp and weft properly so called, another kind of warp, whose threads are left standing in loops above the general surface till cut, and the cutting of which constitutes the pile. In some kinds of fustians the pile is cut so as to give a smooth velvet surface; while in other kinds it is cut into parallel cords, forming corduroy and such like fabrics. The cutting used formerly to be done by peculiarly shaped knives held in the hand; but some very ingenious machines have been contrived for effecting it more quickly and correctly. For the application of this peculiar manufacture to different fabrics, see Carpet; Fustian; Velvet.

Power-Weaving.—In all the kinds of weaving hitherto noticed, whether in relation to plain goods, figured goods, double cloth, bobbin-net, stockings, or velvet fabrics, we have uniformly spoken of the weaving-machine as being worked by hand, or rather by hand and foot, for a treadle is an almost invariable component part of such a machine. We have however now briefly to notice the important steps by which the steam-engine has been brought to bear on this department of industry.

In the 'Philosophical Transactions' for 1678, a loom, invented by M. de Gennes, is described as 'a new engine to make linen cloth without the aid of an artificer,' by applying water-power as the moving force. The advantages are thus enumerated: '1, That one mill alone will set ten or twelve of these looms at work; 2, the cloth may be made of what breadth you please, or at least much broader than any which has been hitherto made; 3, there will be fewer knots in the cloth, since the threads will not break so fast as in other looms, because the shuttle that breaks the greater part can never touch them. In short, the work will be carried on quicker and at less expense, since, instead of several workmen, which are required in making up of very large cloths, one boy will serve to tie the threads of several looms as fast as they break, and to order the quills in the shuttle.' This description remarkably well expresses the excellences of the power-loom of the present day; but we have no evidence that De Gennes' machine ever came into use. At various times during the last century, M. Dolignon, M. Vaucanson, Mr. Austin, and Mr. Miller contrived looms which were to be worked by a winch, by water-power, or by some contrivance more expeditious than the common hand-weaving. A model of Mr. Austin's machine is deposited in the museum of the Society of Arts; and Mr. Porter, in his 'Treatise on the Silk Manufacture,' has given a representation and description of its mode of action. The first power-loom for weaving cotton fabrics was put up by Mr. Austin in the factory of Mr. Monteith, near Glasgow, in 1798; but before that time another machine had been invented, whose history is curious and interesting.

The Rev. Dr. Cartwright, brother of the late Major Cartwright, happened, in 1784, to be in conversation with some gentlemen concerning Arkwright's spinning machinery. It was observed that, so soon as Arkwright's patent expired, so many mills would be erected, and so much cotton spun, that hands would not be found to weave it. Cartwright remarked that Arkwright must, in that case, invent weaving machinery; and the idea, thus suggested by himself, seems to have taken hold of his mind; for he soon afterwards endeavoured to form a machine which should imitate the three movements in weaving. He succeeded so far as to produce a machine, which he patented in 1785; and another, for which a patent was obtained in 1787. He tried to establish a power-loom weaving factory at Doncaster, but failed: Messrs. Grimshaw also endeavoured to set Cartwright's machines at work at Manchester, but similarly failed from various causes; and, after many years of labour, many patents, and an expenditure of 40,000*l.*, Dr. Cartwright was compelled, in 1808, to ask for a grant from Parliament as a return for his losses and exertions. Parliament awarded him 10,000*l.*

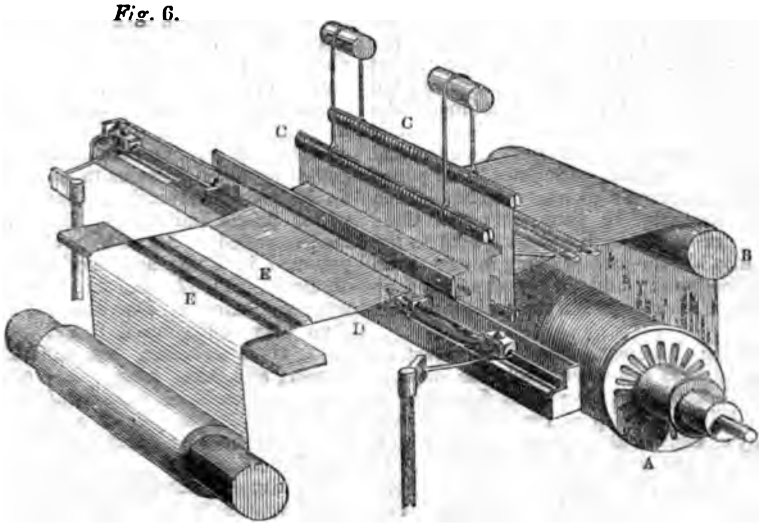
One cause which delayed the adoption of power-looms was the necessity for stopping the machine frequently, in order to dress the warp as it unrolled from the beam, which operation required a man to be employed for each loom, so that there was no saving of expense. In the year 1802, Mr. Radcliffe, a cotton manufacturer of Stockport, aided by a workman, Thomas Johnson, made many contrivances with a view to remedy this inconvenience, and at length produced the admirable 'dressing-machine' of modern factories, by which the warp is dressed before it goes into the loom. At a subsequent period Mr. Horrocks and Mr. Marsland, both of Stockport, made other improvements, which brought the steam-engine fairly into use for weaving operations, and thus power-looms became established. Still more recently, Mr. Roberts, of the firm of Sharp and Roberts, at Manchester, has brought the power-loom to a state of high perfection; and every year adds more and more to the number of such looms employed in manufacturing districts.

The application of the power-loom renders necessary the employment of other machines likewise, to effect those preparatory operations which, in hand-loom weaving, are effected by very simple means. If we take a piece of calico as the representative of plain fabrics generally, the mode of proceeding in power-loom factories may be shortly sketched as follows:—

The *warping-frame*, instead of being employed on the same principle as the warping-mill sketched in a former page, is so arranged as to be worked by steam-power. Several bobbins, arranged with their axes parallel and horizontal, in a compartment at one end of the frame, yield the yarn which is to be collected into a warp. The yarns, proceeding from the bobbins, pass under some rollers and over others, until all are brought into a parallel layer, a comb of fine wires being employed to separate the yarns equidistant. The yarns are then collected and coiled on a cylindrical beam, which is removed from the *warping-frame*, and transferred to the *dressing-machine*. This latter is a large piece of mechanism, by which the contents of eight rollers from the warping-frame are collected on one roller or beam, which is to form the warp-beam of the loom; and in their passage the yarn-threads are coated with the paste or mucilage-dressing, and dried. Four of the rollers are placed at one end of the machine, and four at the other; and the yarns, proceeding from thence, pass between rollers, of which the lowermost dips into the paste, and becomes thus coated with it: they then pass under and over brushes, by which the paste is rubbed into the fibres; then over a steam-heated copper box, by which they are dried, and, lastly, are wound on the warp-beam. In the 'Penny Magazine,' No. 684, will be found a representation and description of a machine employed in the sail-cloth manufacture, by which the yarns are drawn from two or three hundred bobbins, arranged through a comb or reed, coated with paste, rubbed with the brushes, dried over the steam-heated boxes, and wound on the warp-beam; thus combining both warping-frame and dressing-machine in one.

The preparation of the warp in the loom, comprising what are called the 'drawing' and 'mounting,' is more simple for the power-loom than for the hand-loom, but is still somewhat intricate. When however this is effected, steam-power does all the rest: it forms the shed or division of the warp into two parts; it throws the shuttle; it drives up the weft with the batten; it unwinds the warp from the warp-roller; and winds the woven material on the cloth-roller. Part of these operations may be illustrated by *Fig.* 6, in which some of the mechanism is omitted to render the rest more clear. The warp, unwinding from the beam A, and bending round the roller B, passes through the two leaves of heddles CC, by which the shed is formed for receiving the shuttle at D; and after the action of the batten (not here shown) the finished cloth E results.

Fig. 6.



The pressing, finishing, dressing, &c., which the woven goods receive, whether woven by the power-loom or the hand-loom, depend, of course, on the nature of the fabric. One of the most important of these, by which the plain goods become diversified with ornament, is detailed under CALICO PRINTING.

With a few remarks on the recent progress of power-weaving, we shall conclude. Mr. Baines, about eight or nine years ago, arrived at an opinion, from the estimates of Messrs. Cleland, Kennedy, Greg, Bannatyne, and others, that there were, at that time, 85,000 power-looms in England, and 15,000 in Scotland; and he stated that while power-looms were rapidly increasing every year, there was no proof that hand-looms had diminished. The number of the latter, at various times between 1824 and 1833, has been estimated at from two to three hundred thousand. Up to the year 1833, the weaving by power-looms was chiefly confined to calicoes and fustians, but it is gradually being employed for other fabrics. There is one cotton factory at Stockport in which 1300 power-looms are employed in weaving calico; and many other factories exhibit an equal, or nearly equal, amount of operations.

What must be the ultimate effect of this system upon the fortunes of the hand-loom weavers it is difficult to say. A boy or a girl, managing two power-looms, can produce three or four times as much cloth in a given time as the best hand-weaver; and cloth, too, which is much more uniform in its texture. The wages per piece become thus driven down step by step, and the hardly-earned pittance of the hand-loom weaver is scarcely sufficient for his support. The Parliamentary documents, published within the last ten years, comprise several large folio volumes relating wholly to inquiries made into the condition and prospects of the hand-loom weavers. In Mr. Hickson's notes and observations on this subject, forming one of the Parliamentary papers for 1840, he gives a comparative view of the present state of the four principal classes of hand-loom weavers, and then considers the various arguments which have been brought forward in support of certain remedies for the present depression. The conclusion at which he arrives is similar to that of Mr. Baines, who, shortly before, had hailed with satisfaction the fact that many hand-loom weavers had gone to work in the steam-[illegible] deeming it the only remedy for their present [illegible] son's words are:—'The trade of hand-loom weaving is not only incapable of improvement, but of remaining in its present state. The best friends of the weaver are those who would advise and assist him to transfer his labour to other channels of industry. If he cling to the hand-loom, his condition will become worse from day to day. A few of the more skilled class of weavers may indeed maintain their position, but the fate of the many (unless their intelligence and foresight avert it by change of occupation) is decreasing employment, decreasing wages, and ultimate destitution.' (*Reports from Commissioners*, 1840, vol. ix., p. 659.)

WEB. [WEAVING.]

WEBBE, SAMUEL, an eminent composer of that part-music which we may justly claim as national, was born in the year 1740. His father, who held an office under the British government at Minorca, dying suddenly, and leaving his property in such a state that his family never profited by it, his widow was unable to give her son a liberal education, and at the age of eleven he was apprenticed to a cabinet-maker. On the completion of his term, however, he abandoned a pursuit so little suited to his expansive mind, and commenced the study of the Latin language. But his mother dying shortly after, he was reduced to the necessity of following the example of J. J. Rousseau, and copied music as a means of subsistence, though knowing but very little of the art. This led to an acquaintance with a German, named Barbandt, organist of the Bavarian chapel, who initiated him in the principles of music. His unwearied industry and patience enabled him not only to support himself by copying, but to acquire, in addition to the Latin, a knowledge of the French and Italian languages. He now began to give lessons in music, and soon after to compose, and was so successful in the latter attempt, that, at the age of twenty-six, he gained a gold prize-medal from the Catch-Club for the best canon. In 1768 he was rewarded, by the same elegant society, by a medal for his simple but beautiful glee, 'A generous friendship no cold medium knows,' which immediately established his reputation.

From the year which first witnessed his success as a composer, to 1792, Mr. Webbe had twenty-seven medals awarded to him by the same club, for glees, catches, canons, and odes. But it is worthy of remark, that four of his finest works, including that matchless production, 'When winds breathe soft,' failed in obtaining the golden honours bestowed on works of far inferior merit. And it must be confessed that some of his medals were given him for compositions now forgotten; among which too many were the reward of useless pieces of musical mechanism, called canons.

In 1784 Mr. Webbe was appointed to succeed Mr. Warren Horne, as secretary of the Catch-Club; and in 1787, on the establishment of the Glee-Club, he became a professional member and the librarian. It was for this society he wrote both words and music of his popular glee, 'Glorious Apollo.' But amidst his professional avocations he found time to acquire a considerable knowledge of Greek, and even of Hebrew, and to become conversant in many branches of polite literature. 'He even wooed the Muses, and of several of his works the poetry, as well as music, is supposed to have been from his pen. He also excelled in fencing and dancing, and added to his various accomplishments a simplicity of manners and benevolence of disposition, which endeared him to a large circle of acquaintance, among whom were some of the most distinguished persons of the day.' (*Harmonicon.*)

Mr. Webbe's glees, &c. amount to the large number of one hundred and seven. Besides these, he produced masses (being a Roman Catholic), anthems, single songs, &c., some of which are yet well known, particularly 'The Mansion of Peace,' and 'From glaring show.' He died in 1817, leaving a son (named after his father), a sound musician and an accomplished man, who inherited some of his parent's musical talent.

WEBER, CARL-MARIA VON, one of the most distinguished of the German school of music, left, among other interesting manuscripts, an autobiography, which has supplied us with much of the substance of the following memoir.

He was born in December, 1786, at Eutin in Holstein. His education was of a very liberal kind, and conducted with the utmost care; and as his father was a musical man, who had acquired a considerable reputation as a violinist, he, almost unconsciously, led his son in pursuit of music particularly, while he encouraged his study of the fine arts generally. His mind was also rendered contemplative by the retired manner in which his family lived, and by the few visitors at his father's house, who were chiefly middle-aged men of various professions and accomplishments. Precautions were taken to keep him from associating with wild playmates; and thus he was early taught to find company in his own thoughts; to live, as he says, in the little world of his own imagination, and to seek therein his occupation and his happiness. His time was principally divided between painting and music. Of the former he successfully cultivated several branches, working alternately in oil, in water-colours, and in crayons. He likewise acquired some degree of skill in the use of the etching-needle, but he did not follow up these employments with ardour, and they were silently suffered to be discontinued. Music got full possession of his mind before he was conscious of its influence, and at last entirely supplanted her sister art. His father frequently changed his place of residence, and this led to as frequent a change in his son's masters, who too often undid what had been done; an evil however which Weber, in after life, thought more than compensated, by compelling him to become his own instructor, and to depend on his own energies. He analyzed, compared, and reflected, and sought to deduce well-grounded principles, especially in music, from what he had heard, read, and thought. To Hauschkel, of Hildburghausen, he was indebted for his skill as a piano-forte player; and he mentions in warm terms of gratitude the advantages he derived from this master during the years 1796 and 1797.

His father, now observing the great and decided development of his son's musical talents, took him to Salzburg, and placed him under the tuition of Michael Haydn, brother of the illustrious composer, and himself a very learned musician; but though the pupil laboured with earnestness and industry, his progress was not equal to his expectations. The master was then at an advanced period of life; was grave, not to say severe, in his manner. There was in fact too awful a distance between old age and childhood. At Salzburg, in 1798, his father, as an encouragement, printed his first production, consisting of six *fughetti*, which was very favourably noticed in the German 'Musical Gazette' of that year. Shortly after this he went to Munich, where he received lessons in singing from Valesi, and in composition from the organist of the chapel-royal, M. Kalcher, to whose kind and luminous instructions, he says, he was indebted for much important knowledge, particularly with respect to the treatment of subjects in four parts, the laws of which, he adds, should be as familiar to the composer as those of syntax and metre to the poet; for it is such knowledge alone that will enable him to present his ideas to his hearers with perspicuity and effect.

He now applied to his studies with unabated vigour, and found a preference for dramatic music growing rapidly on him. Under the eye of his master he composed an opera, 'Die Macht der Liebe und des Weins' (The Power of Love and Wine). He also wrote a grand mass, several sonatas and variations for the piano-forte, violin trios, songs, &c., all of which however he candidly tells us were 'wisely committed to the flames.'

About the same time the art of lithography was first discovered, and the restless activity of the youthful mind, which embraces with eagerness all that is novel, again diverted the young composer's attention from his legitimate pursuit, and excited in him a wish to rival the ingenious inventor of that art. He procured the necessary tools, and setting himself vigorously at work, at length almost fancied himself the original inventor: at least, he says, he felt sure that he had devised a more perfect system, and could construct more perfect machinery. Impressed with this belief, he urged his father to remove to Freyburg, where all the necessary materials could be more readily procured. The mania however quickly left him: the mechanical nature of his new occupation, the fatigue and annoyance attending it, and, above all, its tendency to cramp and deaden the more intellectual faculties, soon determined him to abandon it, and he returned with increased zest to his musical pursuits.

Weber now set to music Steinsberg's opera, 'Das Waldmädchen' (The Wood-girl), which was performed in 1800, and spread further than, at his maturer age, he thought desirable. It was, he says, a very crude jejune work, though in some parts not altogether destitute of invention. The whole of the second act was composed in ten days, a youthful affectation of promptness which he honestly acknowledges, condemns, and deplores. Being called to Salzburg, he there, in 1801, composed 'Peter Schmoll.' In 1802 his father proceeded with him on a musical tour to Leipzig, Hamburg, and Holstein, in all which places he diligently collected and studied the theoretical writers on music. He then felt himself impelled towards that great resort of musical talent, Vienna. There, in addition to the society of other eminent masters, including the immortal Haydn, he became acquainted with the Abbé Vogler, who generously opened to him the treasures of his mind. By his advice he abandoned many favourite projects, suggested by the fervour of youthful inexperience, and dedicated nearly two years to the study of the great masters, analyzing their compositions, and thus discovering their mode of carrying out their ideas and of employing their means. An invitation to fill the situation of music-director at Breslau offered him a new field for exertion and fresh opportunities of gaining a knowledge of effect. He there re-touched several of his earlier works, and composed the greater portion of the opera of 'Rübezahl,' which, strange to say, afterwards appeared as the composition of Professor Rode. In 1806 that true lover of the art, Prince Eugene of Würtemberg, invited Weber to his court at Carlsruhe, where he produced two symphonies, several concertos, &c.: but the evils of war obliged him to move, and proceed on a professional tour, under very unfavourable circumstances, though common enough at that turbulent period. This brought him to Stuttgard, where he resided for some time in the house of the Duke Louis of Würtemberg, and completed his opera of 'Sylvana,' or rather re-modelled it on his former work, 'Das Waldmädchen,' producing during the same period several other compositions.

In 1810 Weber set out on another professional journey in Germany, which he traversed in various directions. At Frankfort, Munich, Berlin, Vienna, and other places his operas were performed, and his concerts well attended. In Vienna he found his venerable friend, the Abbé Vogler, devoting the remnant of his life to the instruction of his pupils, Meyerbeer and Gansbacher. At Darmstadt, in 1810, he composed 'Abon Hassan.' From 1813 to 1816 he directed the opera at Prague, after having completely re-organised that establishment. Then he lived for some time unoccupied. Subsequently he accepted an engagement to found a German opera at Dresden, and this appointment, which he held till his decease, absorbed, during the first two years, nearly the whole of his attention. But his account of himself and his compositions seems to have been discontinued in 1818, and we have no means of filling up the interval between that period and 1822, in which year he brought out, at Berlin, his greatest work, 'Der Freischütz,' the text, or *libretto*, by his friend and countryman Kind. Not only the novelty and beauty of the music, but the deep thought it evinced, immediately excited an extraordinary sensation in the north of Germany; and a copy of the work having been sent to London and obtained by the editor of 'The Harmonicon,' an extract from it appeared, in January, 1823, in the first number of that periodical. This gentleman lost no time in mentioning the opera in strong terms to the proprietor of the English Opera-House, who, fearing to incur the expense of getting it up, declined the attempt. From the same quarter it was then recommended to Drury Lane, and afterwards to Covent Garden, but with a similar result. However, other specimens of the work, and among them the beautiful Cavatina, appearing in the 'Harmonicon,' and public attention having thus been called to it, the opera was at length performed, July 23rd, 1824, at the English Opera-House, and produced as great an effect in London as it had done in Berlin. In the following October it was given at Covent Garden theatre, and in November at Drury Lane, with the most brilliant success at both houses. On the 8th of December 'Der Freischütz,' under the title of 'Robin des Bois,' was brought out in Paris, at the Odéon, and though it did not make the same powerful impression on a French as on an English audience, its effect was sufficiently flattering to the composer, who nevertheless had great reason to complain of the surreptitious means by which his music had been procured, and of the imperfect manner in which it had been prepared. His two expostulatory letters to the manager of the Odéon on this subject were published in the 'Harmonicon,' vol. iv., p. 41.

In November, 1823, Weber produced at Vienna his 'Euryanthe,' which was not at first received with the enthusiasm his 'Freischütz' had excited. It is perhaps too serious, and certainly not written in a popular manner; but the more it became known, the more it was admired, and the overture is one of the composer's happiest flights of genius.

In 1825 Weber received a visit at Dresden from Mr. C. Kemble, then the spirited lessee of Covent Garden theatre, for the purpose of inviting him to compose an opera for the English stage, and to superintend its production in London; an engagement which he willingly undertook. The terms were five hundred pounds. Mr. Planché provided the drama, which was entitled 'Oberon, or the Elf-King's Oath,' and founded on Wieland's celebrated poem. In 1826, on the 12th of April, it was brought out, and though at first some of its beauties were not discovered by those who were unaccustomed to music of so original and high an order, yet they were fully felt by competent judges. The author was greeted in the most cordial manner by the audience, and thoroughly satisfied with his public reception and the success of his work, which had twenty-seven representations, twenty-four of which were conducted by the composer. But it was now apparent that he was suffering under pulmonary disease. His journey to London in an unfavourable season, and his arrival in February, in the worst weather possible, aggravated his malady: nevertheless he bore up manfully against his sufferings. On the 26th of May he had a benefit concert at the Argyll Rooms; 'but we regret to add,' says the 'Harmonicon,' 'and blush for our country when we state, that the room was not much more than half full, and among the company were very few—two or three at the utmost—of the highest class. M. von Weber had scarcely strength enough left to get through the business as conductor. At the conclusion he threw himself on a sofa, and was so exhausted as to create considerable alarm in the by-standers.' On Monday, the 5th of June, early in the morning, he was found in a lifeless state in his bed. His funeral was delayed a considerable time by the endeavour to obtain permission to deposit his remains in St. Paul's Cathedral; but this could not be granted in a Protestant church, as his friends resolved to have a Requiem sung at his obsequies, he having always professed himself a member of the Church of Rome. At length the interment took place, on the 21st of June, in the Roman Catholic Chapel, Moorfields; and the followers, consisting chiefly of distinguished professors and amateurs, were so numerous as to fill sixteen mourning coaches.

Weber was a man who would have stood prominent in any station of life demanding the exertion of quick powerful intellect. His mind, naturally strong and active, was enlarged by education, and highly cultivated by extensive reading and the society of literary and scientific friends. His manners were calm and polite, and his conversation was remarkable not only for good sense, but for a degree of pleasant sententiousness which closely bordered on wit. His morals were irreproachable, and he well supported, on every occasion, the character of an honourable gentleman. He left a widow and two sons to deplore the untimely loss of an excellent husband and father.

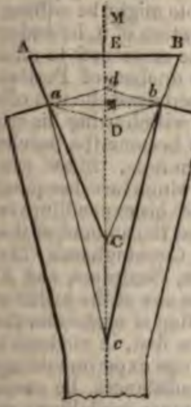
WEBSTER, JOHN, like many of his great dramatic contemporaries, has left few authentic records of his career, beyond his works. We know not where he was born nor where he was educated. The earliest notice we find of him is in the papers of Henslowe, where he is mentioned as writing plays in conjunction with Dekker, Drayton, Middleton, Munday, Chettle, Heywood, and Wentworth Smith. The first work of his own which he published was 'The White Devil.' This was printed in 1612. In 1623 was published his other great play, 'The Duchess of Malfi.' 'Appius and Virginia' was printed in 1654. These are the works upon which the fame of Webster is principally built; and certainly they exhibit him as one of the foremost of that great band of writers who rose up as the later contemporaries and the successors of Shakspere. His pathos is occasionally too laboured, and his command over pity and terror is carried far beyond the region of pleasurable emotion. But he is essentially a great dramatist, accomplishing his purpose with a terrible earnestness which few have equalled. He thus speaks of himself in the address to the reader prefixed to the 'White Devil:'—'To those who report I was a long time in finishing this tragedy, I confess I do not write with a goose-quill winged with two feathers; and if they will needs make it my fault, I must answer them with that of Euripides to Alcestides, a tragic writer: Alcestides objecting that Euripides had only, in three days, composed three verses, whereas himself had written three hundred; "Thou tellest truth, (quoth he) but here's the difference; thine shall only be read for three days, whereas mine shall continue three ages."' The works of Webster were first collected and edited by Mr. Dyce, in 1830.

WEDEL, GEORG WOLFGANG, was born at Golsen in Lusatia, where his father was a Protestant minister, on the 12th of November, 1645. His early studies were pursued at the college of his native place, from whence he was sent to Jena, where, after having taken his degree of Master of Arts, he graduated in medicine. He was distinguished whilst a student for his knowledge of languages and mathematics, as well as for his poetical powers. After taking his degree in medicine at Jena, he visited other universities for the sake of improvement, and then commenced the practice of his profession at Gotha. Here he remained till 1673, when he was invited to fill the chair of medicine at Jena. He occupied this chair for upwards of fifty years, and died on the 6th of September, 1721. Few men have left behind them more works than Wedel, and among a nation of laborious writers he was one of the most laborious. He published several distinct works in various departments of medical science, and upwards of three hundred academical dissertations. All his works display great research as well as learning. He was not only a good classical scholar, having had it in contemplation at one time to publish an edition of the Greek Bible, but he was well versed in Oriental literature, especially the Arabic. In his medical opinions he was a disciple of Van Helmont and Sylvius, and he adopted without enquiry the absurd opinions of these writers on the action of medicines. Amid the immense mass of his writings there is much curious and interesting matter, but his mind was too much occupied with the opinions of others to have any of his own, so that his influence has been much less than many whose writings do not amount to a tithe of that of his own. He had a large private practice, and was remarkable for his kindness to the poor and his punctuality in all public matters, so much so that all his biographers express surprise at the great amount of his labours. He was held in much esteem by the men of his day. He was a member of the Leopoldine Academy, under the name of 'Hercules,' and also a Fellow of the Royal Society of Berlin and

other learned societies. He was first physician to
uke of Saxe Weimar, and also to the Elector of
nce; and in 1694 he was created a count-palatine,
ıade an imperial counsellor. He was married for the
time in his sixty-third year, and had several children
s marriage. He died suddenly from disease of the
in the seventy-seventh year of his age. Although a
inous writer, he was not in advance of his age in
ific acquirements. It is not therefore a matter of
se that he was a believer in astrology, an art which
rsued with much zeal. It is too often the case in
edical profession that those who linger over the re-
of past experience fail to cultivate their powers of
ation and reflection, and thus become the dupes of
s that have scarcely in fact a shadow or show of

lel had several sons, who were distinguished men in
dical profession. **Ernest Wedel** was born in 1671,
ied in 1709. He followed in the footsteps of his
He published a work on the diseases of orators,
Iorbis Concionatorum,' which went through two edi-
Johann Adolph Wedel was the successor of his
and was born in 1695. He has also written a large
r of works, the chief of them academical disserta-

following are some of Wedel's numerous works:—
ogia,' 1674, Jena, 4to.; 'Exercitationes Pathologicæ,'
Jena, 4to.; 'De Medicamentorum Facultatibus
cendis et applicandis Libri Duo,' 1678, Jena, 4to.
ork has been translated into English. 'De Medica-
um Compositione extemporanea ad usum hodier-
ccommodata,' 1678, Jena, 4to. This work is still
well of, and Wedel has still the reputation of
been an accomplished prescriber.
graphie Medicale; Jöcher, *Allgem. Gelehrt.-Lexi-*
loy, *Dict. Historique de la Médecine*.)
DGE, in Mechanics, is a prism of wood or metal
base is a triangle: it is employed to remove two
from one another laterally, or to rend asunder the
f a body; an edge which is parallel to the geo-
l axis of the prism being introduced between the
or parts of the body, and the whole wedge being
iven forward by a percussive force, as the stroke of
ner. The nature of percussive force, and of the
ce which a yielding material opposes to the motion
edge being, however, imperfectly known, it is usual
ider the motive-power and the resistance as simple
es, or weights, in estimating the conditions of
ium when a wedge is employed as a machine.
ABC represent the section of a wedge perpendi-
to the mathematical axis; and for simplicity, sup-



is section to be an isosceles triangle. The plane
through AB, perpendicular to ABC and to the
is called the head or back of the wedge: the planes
through AC and BC perpendicular to the paper
led the sides; and their line of section, passing
h C, is called the edge.
motive-power is applied to the head of the wedge;
y be supposed to act in the direction MC perpen-
ly to that plane, and passing through C in the
Let the material which is to be rent asunder be in
t with the sides of the wedge in lines passing
h *a* and *b* perpendicularly to the paper; and let
o parts yield as if they were capable of turning
about some point *c* in the direction of MC, produced if necessary: then it is evident that the effect of the wedge will be the same as if a section of the latter, perpendicularly to the axis, were *abc*. Imagine *ad*, *bd* to be drawn perpendicularly to *ac* and *bc*; then those lines will meet at a certain point, as *d*, in the line MC: imagine also the parallelogram *adb*D of forces to be constructed; then *d*D or 2*d*N will represent the motive force, and *da* or *db* the pressure which that force exerts at *a* or *b* perpendicularly to *ac* and *bc*. Let P represent the motive force, and R the pressure at *a* or *b*; then, in a state of equilibrium, the latter will represent the reaction of the material in the direction *ad* or *bd*; and we have,

$$\mathrm{P} : \mathrm{R} :: 2d\mathrm{N} : da.$$

But the triangle *a*N*d* is similar to *c*N*a*; therefore

$$d\mathrm{N} : da :: a\mathrm{N} : ac,$$

and consequently $\mathrm{P} : \mathrm{R} :: 2a\mathrm{N}\ (=ab) : ac.$

The position of the point *c* where the separation of the material is supposed to take place varies for different materials, and can only be estimated, or found from experiment: if it were supposed to coincide with C, we should have

$$\mathrm{P} : \mathrm{R} :: 2a\mathrm{N} : a\mathrm{C};$$

or by similar triangles *ab*C, ABC,

$$\mathrm{P} : \mathrm{R} :: \mathrm{AB} : \mathrm{AC}.$$

If the force of the wedge at the points *a* or *b* were to be estimated in the direction N*a* or N*b*; as when it is required, neglecting friction, to find the force with which a given pressure P in the direction MC, on the head of the wedge, would make a body at *a* or *b* slide in a direction perpendicular to MC: then, R′ representing that force, and *c* coinciding with C, or *ad* being now perpendicular to AC, we should have

$\mathrm{P} : \mathrm{R}' :: 2d\mathrm{N} : \mathrm{N}a$, or as $2a\mathrm{N}$ to NC, or as AB to EC.

The point *c* still coinciding with C, let θ represent the angle ACE, or half the angle of the wedge: then

$$\frac{a\mathrm{N}}{a\mathrm{C}} = \sin.\ \theta, \text{ or } \frac{\mathrm{AB}}{\mathrm{AC}} = 2\ \sin.\ \theta;$$

also $\mathrm{AB} : \mathrm{EC} :: 2 \sin.\ \theta : \cos.\ \theta$:
it follows, radius being unity, that

$$\mathrm{P} : \mathrm{R} :: 2 \sin.\ \theta : 1, \text{ or } \mathrm{P} = 2\mathrm{R} \sin.\ \theta;$$

also $\mathrm{P} : \mathrm{R}' :: 2 \sin.\ \theta : \cos.\ \theta$, or $\mathrm{P} = 2\mathrm{R}' \tan.\ \theta$;
where R and R′ represent the pressures perpendicular to AC and to EC, respectively.

If it were required to find an equation for the motion of a wedge when acted upon by a force of percussion, a process corresponding to that which follows must be employed.

Let, as before, ABC be a section of the wedge, which may be supposed of iron: let it be introduced between the parts of a body which can yield only in a lateral direction; and let it be driven by a mass of iron falling upon it from a point at some given height above it. Both the wedge and the hammer, or falling body, must be understood to be elastic; and it will be convenient to represent the latter by a parallelopiped of iron whose base is equal to the rectangular head of the wedge: let the height of such solid be represented by P, and let the space through which it is supposed to fall be represented by h; then, by Dynamics, $2gh$ will be equal to the square of the velocity of impact. In like manner let the friction of the wedge, estimated in a direction parallel to CM, be represented by the weight of a parallelopiped of iron whose base is the rectangular head of the wedge; and let the height of such parallelopiped be represented by Q.

When the collision takes place, both the falling body and the wedge will be compressed in the direction of their length. Let the linear contraction of P be represented by p, and that of the wedge, supposed at present immoveable, by q (both p and q coinciding in direction with MC). Then if ϵ represent the modulus of elasticity (or the height of a vertical column of iron, having a base equal to the head of the wedge, whose weight would, by the compression it causes, reduce the height P or Q of the supposed masses of iron to zero) and the forces of compression be assumed proportional to the contractions which they produce, we shall have $\frac{\epsilon p}{\mathrm{P}}$ and $\frac{\epsilon q}{\mathrm{Q}}$ for the forces by which the falling body and the wedge are respectively compressed in consequence of the collision; or the forces by which they tend to recover their original state: let these be represented by mp and nq respectively; or, in terms of the force of gravity, by mgp and ngq. Then ngq will represent the motive force by which the movement of the falling body is resisted after the impact, or $-\frac{ngq}{P}$ will represent the retardative force against that body.

But from the equality of action and re-action we have $mp=nq$; whence $p=\frac{nq}{m}$, and $p+q$, or the sum of the compressions, is equal to $\frac{n+m}{m}q$: let this be represented by s; then $q=\frac{ms}{n+m}$ and $\frac{ngq}{P}=\frac{mngs}{(n+m)P}$. Now, by Dynamics, accelerative or retardative force is represented by $\frac{vdv}{ds}$, v here being the velocity of the falling body at any time t between the instant of impact and that at which its motion is extinguished by the resistance: therefore

$$\frac{vdv}{ds}=-\frac{mngs}{(n+m)P},$$

and integrating, V representing the velocity at the instant of impact, at which time $s=0$,

$$v^2=V^2-\frac{mng}{(m+n)P}s^2.$$

But when the wedge begins to move, the friction is equal to the force by which the falling body is compressed; therefore, making Q equal to $\frac{mns}{n+m}$ $(=nq)$ we have $s=\frac{(n+m)Q}{nm}$; which being substituted in the above equation, we have

$$v^2=V^2-\frac{(n+m)gQ^2}{mnP}.$$

Now the wedge being uniformly resisted by friction while moving in consequence of the impact, the retardative force f, expressed in times of gravity, will be $\frac{gQ}{P+W}$, W representing the weight of the wedge in terms homologous to P. Therefore since, by Dynamics, $s=\frac{v^2}{2f}$; if we represent the space through which the wedge moves in the direction MC by z, we have, on substituting for v^2 and f their values, and for V^2 putting its equivalent $2gh$, where h is the height due to the velocity V,

$$z=(P+W).\left(\frac{h}{Q}-\frac{(m+n)Q}{2mngP}\right).$$

The values of m and n, that is, of $\frac{\epsilon}{P}$ and $\frac{\epsilon}{Q}$, may be found, since ϵ, the modulus for iron, is known to be about 10,000,000 feet; and consequently the relation between z and Q can be determined in numbers.

WEDGWOOD, JOSIAH, was born on the 12th of July, 1730, at Burslem, in Staffordshire, where his father, Thomas Wedgwood, and some other members of his family, were engaged in the manufacture of pottery; a branch of industry then in so very imperfect a state that, independent of the supply of porcelain from China for the use of the higher classes, England imported large quantities of porcelain and various kinds of earthenware from France, Holland, and Germany, for domestic use. His education was very limited; and the low social position of the class from which he sprung is implied, rather than distinctly expressed, by the local historian, Simeon Shaw, who remarks that 'scarcely any person in Burslem learned more than mere reading and writing until about 1750, when some individuals endowed the free-school for instructing youth to read the Bible, write a fair hand, and know the primary rules of arithmetic.' The little opportunity that Wedgwood had for self-improvement is further indicated by the circumstance stated by Shaw, that at the age of eleven years Josiah worked in his elder brother's pottery as a *thrower*, his father being already dead. The small-pox, which left an incurable lameness in his right leg, so as afterwards to require amputation, compelled him to relinquish the potter's wheel. After a time he left Burslem, and entered into partnership with a person named Harrison, at Stoke; and during this partnership, which was soon dissolved, his talent for the production of ornamental pottery is said to have first developed itself. He then became connected with a person named Wheildon, with whom he manufactured knife-handles in imitation of agate and tortoiseshell, melon table-plates, green pickle leaves, and similar articles. Wheildon however was deriving considerable profit from other departments of the pottery business, and was unwilling to embark in the new branches for which Wedgwood had so great a predilection. Wedgwood therefore returned to Burslem in 1759, and set up for himself, in a small thatched manufactory, where he continued to make such ornamental articles as are mentioned above. His business being prosperous, he soon took a second manufactory, where he made white stone-ware, and a third, at which was produced the improved cream-coloured ware by which he gained so much celebrity. In 1763 two of his relations, who had worked a considerable pottery, retired from business, but he continued industrious and persevering, 'and certainly,' observes Shaw, 'there was room then for such a person, in a manufacture gradually rising into celebrity, and in whose several branches he soon acquired eminence.' Of the new cream-coloured ware, of which an account is given under EARTHENWARE, vol. ix., p. 243, Wedgwood presented some articles to Queen Charlotte, who thereupon ordered a complete table service, and was so pleased with its execution as to appoint him her potter. Several other kinds of ware invented by Wedgwood are mentioned in the article above cited, where also is given a quotation from the 'Travels' of Faujas Saint Fond, which shows how widely the fame of Wedgwood's pottery had spread before the time at which the traveller wrote, about the commencement of the French revolution. Wedgwood opened a warehouse in the metropolis, at which the productions of his ingenuity might be freely inspected, and in his partner, Mr. Bentley, who managed the London business, he found a valuable coadjutor, whose extensive knowledge in many departments of literature and science, and acquaintance with many eminent patrons of art, greatly assisted him in the higher branches of his manufacture, and especially in obtaining the loan of specimens of sculpture, vases, cameos, intaglios, medallions, and seals, suitable for imitation by some of the processes he had introduced. Some persons intrusted to him valuable sets of oriental porcelain for the like purpose; and Sir William Hamilton lent specimens of antient art from Herculaneum, of which Wedgwood's ingenious workmen produced the most accurate and beautiful copies. While Wedgwood was prosecuting these branches of his art, the Portland or Barberini Vase was offered for sale, and, considering that many persons to whom the original was unattainable might be willing to pay a handsome price for a good imitation of it, he endeavoured to purchase it, and for some time continued to offer an advance upon each bidding of the duchess of Portland, until at length, his motive being ascertained, he was offered the loan of the vase on condition of withdrawing his opposition, and consequently the duchess became the purchaser, at the price of eighteen hundred guineas. Shaw states that Wedgwood sold the fifty copies which he subsequently executed at fifty guineas each, but that his expenditure in producing them is said to have exceeded the amount of the sum thus obtained. According to Allan Cunningham's 'Lives of the most eminent British Painters, Sculptors, and Architects' (vol. iii., p. 286), Flaxman was one of the artists employed by Wedgwood in the preparation of models for the beautiful works of art which he was the first, in modern times, to execute in pottery. By numerous experiments upon various kinds of clay and colouring substances, he succeeded in producing the most delicate cameos, medallions, and miniature pieces of sculpture, in a substance so extremely hard, and so well adapted to resist all ordinary causes of destruction or injury, that they appear likely to exceed even the bronzes of antiquity in durability. Another important discovery made by him was that of painting on vases and similar articles, without the glossy appearance of ordinary painting on porcelain or earthenware; an art which was practised by the antient Etruscans, but which appears to have been lost since the time of Pliny. The indestructibility of some of his wares rendered them extremely valuable for the formation of chemical vessels, particularly those exposed to the action of acids. The fame of his operations was such that his works at Burslem, and subsequently at Etruria, a village erected by him near Newcastle-under-Lyme, and to which he entirely removed in 1771, became a point of attraction to numerous visitors from all parts of Europe.

The result of Wedgwood's talent and energy not only obtained for him extensive patronage and an ample fortune, but were also of the highest importance to the commercial interests of his country. Almon observes that his new wares, his improved forms and chaste style of decoration, and the judgment displayed in all his productions, which were chiefly executed by artists of his own forming, turned the current in this branch of commerce, while the national taste was improved, and its reputation raised in foreign countries. 'His inventions,' says this writer, 'have prodigiously increased the number of persons employed in the potteries, and in the traffic and transport of their materials from distant parts of the kingdom; and this class of manufacturers is also indebted to him for much mechanical contrivance and arrangement in their operations; his private manufactory having had, for thirty years and upwards, all the efficacy of a public work of experiment.' In evidence before a committee of the House of Commons, in 1785, Wedgwood stated that from 15,000 to 20,000 persons were then employed in the district called the Potteries, and much greater numbers in digging coals for them, and in various and distant parts of England, and even Ireland, in raising and preparing flints and clay for the earthenware manufacture; 50,000 or 60,000 tons of those materials being annually conveyed to Staffordshire by coasting and inland navigation. The importance of the manufacture which he had so materially assisted in raising to this prosperous state is further illustrated by the statement that although many of the states of Europe had prohibited the admission of British earthenware, and others had loaded it with intolerable duties, five-sixths of the quantity made were exported. Wedgwood's success also led to the establishment of improved potteries in various parts of the continent of Europe, as well as in several places in Great Britain and Ireland.

In addition to the attention bestowed by Wedgwood upon the manufacture with which he has inseparably connected his name, he deserves remembrance for the public spirit displayed by him in the encouragement of various useful schemes. By his exertions and the engineering skill of Brindley a navigable communication between the eastern and western coast of the island was completed, by the formation of the Trent and Mersey Canal, for which he cut the first clod on the 17th of July, 1766, and which was completed in 1770. By means of this undertaking water-communication was established between the pottery district of Staffordshire and the shores of Devonshire, Dorsetshire, and Kent, whence some of the materials of the manufacture are derived; while the greatest facilities were afforded for the exportation of the finished articles. Wedgwood also planned and carried into execution a turnpike-road, ten miles in length, through the Potteries. He was the founder and one of the principal leaders of the association called 'The General Chamber of the Manufacturers of Great Britain,' instituted in consequence of Mr. Pitt's propositions, in the year 1786, for adjusting the commercial intercourse between Great Britain and Ireland; an association by whose prompt and energetic interference most serious evils were averted from the manufacturing interests of this country, and whose proceedings upon the subsequent occasion of a commercial treaty with France, published in the Appendix to Almon's 'Anecdotes,' contain some curious information respecting British commerce and manufacturing industry.

Wedgwood's pyrometer is fully noticed elsewhere. [Pyrometer, vol. xix., pp. 164, 165.] He was a fellow of both the Royal Society and the Society of Antiquaries, and, as noticed in the article referred to, contributed some papers to the 'Philosophical Transactions.' In private character he is said to have been exemplary, and to have made the most liberal use of the ample means which his successful and honourable career placed at his disposal; but authorities are singularly deficient respecting his personal history. He died at Etruria, where he had erected a handsome mansion, as well as manufactories and residences for his workmen, on the 3rd of January, 1795, in his sixty-fifth year.

(Shaw's *History of the Staffordshire Potteries*, published at Hanley in 1829, pp. 180-194; Macpherson's *Annals of Commerce*, iii., 381-383; Almon's *Biographical, Literary, and Political Anecdotes*, ii., 164-174; *Gentleman's Magazine* for January, 1795, p. 84.)

WEDNESBURY. [Staffordshire.]

WEDNESDAY. [Week.]

WEEDON BECK. [Northamptonshire.]

WEEDS. Every plant which grows in a field other than that of which the seed has been sown by the husbandman is a weed, and, in as much as it interferes with the intended crop, should be carefully eradicated. It is a proof of good cultivation, when few weeds appear amongst the growing crops; and many of the operations of tillage are intended chiefly for their destruction. One of the principal uses of summer fallows is to destroy the weeds, which come up in spring, and which would shed their seeds in summer, if they were not destroyed before the seeds ripen. When roots are sown in drills and carefully hoed, they produce the same cleansing effect, and supersede the fallow: but in heavy loams which have been neglected and overrun with weeds, a clean fallow is sometimes indispensable, before any improved method can be adopted. When a farmer enters on lands which are in a foul state, it is the cheapest way, in the end, to sacrifice a crop and thoroughly purge his fields from weeds, especially those which have vivacious roots, and cannot be extirpated by simple ploughing. The mode of doing this must depend on the nature and duration of the weeds, whether their roots are perennial or die off after the plant has borne seed. Annual weeds are most readily extirpated by repeated harrowings, by which the seeds are brought within the influence of the atmosphere and when they have fairly vegetated may be buried or rooted out, and by exposing their roots to the influence of a hot sun they are effectually destroyed. The seeds of annual weeds are chiefly brought on the land in the manure which is made in the yards, where the cattle fed on hay or straw swallow the seeds, which pass through them undigested. By exciting a great degree of fermentation in the mixture of dung and litter some of the seeds may be destroyed, but many of them will keep their vegetative powers even after having been exposed to a considerable heat: and, as it is not advisable to let the manure undergo a great degree of decomposition before it is carried on the land, many seeds always escape destruction, and vegetate as soon as they are placed in a favourable situation. Those which are buried deep lie dormant for a long time, and vegetate as soon as the plough brings them up again.

The experienced farmer knows well what peculiar species of weeds infest his fields, according to the soil and situation; and by studying their habits, time of flowering and of ripening their seed, he learns the best mode of destroying them.

One of the great advantages of composts made with human excrements mixed with earths and mineral substances is, that they introduce no weeds into the soil. It is reported that in China, where the dung of cattle is little used, in comparison with human excrements, no weeds are to be found in the fields: and if more attention were paid to the preservation of this highly-enriching manure and its proper application to the soil, much expense would be saved which is now unavoidably incurred in destroying weeds.

Feeding sheep on roots and corn, while they are folded on the land, is another mode of manuring a field, without introducing weeds, especially if no hay is given them, except clover-hay of the second crop, which is generally most free from the seeds of weeds. It would be impossible to enumerate all the various weeds which may infest our fields. This would be giving a flora of all the British plants; but we will select some of the most common and troublesome to the farmer, with such an account of each as may suggest the most ready means of destruction.

Of the annual weeds we may mention the following noticed by Professor Low in his elements of practical agriculture.

Sinapis arvensis, or Wild Mustard, usually called charlock, is a weed the seeds of which being of an oily nature will remain dormant in the soil for an indefinite time, if buried above six inches. Hence some farmers fear to deepen their ploughings, which otherwise would be very advantageous, because they have found that, in some soils, a ploughing beyond six inches deep will cause the crop to be overrun with charlock so as to choak it with its yellow flowers. It only requires a little resolution, and an outlay, which will be well repaid in the end, to destroy this enemy. Hoed crops will destroy the plants as they come up. Winter tares which may be cut before the charlock perfects its seeds, will help to destroy it, and if they are succeeded by turnips there will be little charlock left in autumn. Wherever it appears and raises its yellow flower it must be pulled out, whatever be the cost, and care must be taken to carry the plants out of the field to burn or rot them; for the seeds will vegetate when they are but half ripe in the pods. We have dwelt at length on this weed, because it is one which infests many of our best soils, and which must be eradicated before the land can be properly cultivated.

Somewhat allied to the last is the wild radish, *Raphanus raphanistrum*, which is often also called charlock,—the mode of destruction is the same.

Papaver Rhœas, or Corn-Poppy, infests some soils in particular seasons. If the seed is allowed to ripen and shed it will increase rapidly: good tillage however soon destroys it: clover and tares which are cut while the poppy is in flower generally eradicate it. In some seasons it will appear in great profusion, and in others not a plant will be seen.

Centaurea Cyanus, or Blue-Bottle, is seldom found in any quantity, except where there is a slovenly culture, or two white crops are taken in succession, a practice which, it is hoped, will soon be obsolete.

Chrysanthemum segetum, Corn-Marygold, infests some soils and must be eradicated by careful weeding; when the crops are drilled, this is not a difficult task.

Pyrethrum inodorum, Corn-Feverfew, often called May-weed, as is also the wild chamomile, often infests the crops of corn, and with every care in weeding some of the seeds will be carried to the barn. We may here observe generally, that where the corn is reaped by the sickle and a long stubble is left, the seeds of weeds remain on the land, and although some of them are eaten by birds, yet many are ploughed in after the stubble has been raked off or mown. Whereas if the corn is mown or cut close to the ground, which is called fagging or bagging it, all the weeds are tied up with the corn and go into the barn or stack: and if care be taken in the winnowing and sifting of the corn to separate the smaller seeds from the straw and burn them in a heap, the straw will be clean and the dung of the cattle will contain no seeds of weeds. This is by far the best mode of proceeding; and by careful hoeing and weeding and burning the small seeds, the land may be kept tolerably free from seed-weeds.

The Sow-Thistle, *Sonchus oleraceus*, often raises its head above the corn. The seeds are blown about by the winds, and if the hedges and headlands are not kept clear of them, they will sow themselves in all directions; but it is a conspicuous plant, and easily pulled out by hand before its flower expands. To destroy thistles, in general, it is only necessary to cut them down just as the flower is expanding; the roots will then die, and in a few years, by the united attention of the farmers in a district, thistles may easily be eradicated. In some places the infirm paupers are employed in pulling up all the thistles in the hedges which border the roads, and wherever they make their appearance in the highways and lanes of a parish. This practice cannot be too generally recommended, for the hedges and ditches and the sides of roads and lanes are often perfect nurseries of weeds.

Arctium Lappa (Burdock), is a very common weed in fields; but with a little care it is easily extirpated.

Agrostemma Githago, or Corn-Cockle, is a very injurious weed, because its seeds ripen about the time of harvest, and from its size cannot be easily separated from the corn by sifting; it contains a farina which is oily and when ground with the corn greatly deteriorates the flour. The only mode of extirpation is by hand weeding.

Stellaria media, or Common Chickweed, is a small plant which grows abundantly on light soils which have been abundantly manured. If it be allowed to overspread the ground it will choak the young crops, especially turnips, carrots, and all slow-growing seeds. Drilling the crops and early hoeing them is the best means of destroying this weed; as soon as the crop gets above the chickweed, it is soon destroyed, if the latter covers the ground well. It often does harm to young clover, but the latter soon overpowers it. Tares smother it readily. The same observations are applicable to the *Spergula arvensis*, or Corn-Spurrey, a larger variety of which however is cultivated as excellent food for milch cows.

Galium aparine, or Goose-Grass, also called Cleavers, is a weed which is dispersed by the seeds attaching themselves to the wool of sheep by means of hooks with which they are provided. They increase rapidly, in some soils, if they are not carefully pulled up and the hedges cleared of them.

Urtica urens, Stinging Nettles, generally grow where the ground has been strongly manured, especially where heaps of dung have lain. They are seldom very troublesome and are easily eradicated by repeatedly ploughing, and infest gardens more than fields.

Polygonum Convolvulus, Climbing Buckwheat, is a very troublesome weed, which winds round the stems of the corn and often overtops them. The seeds are said to be nutritious and not to injure the oats when mixed with them; but in wheat it is very destructive, and diminishes the product while it injures the quality of the corn.

All the common grasses are weeds in corn-fields, and in the alternate husbandry are introduced in the regular cultivation. When the grass is ploughed up, if the sods are not covered sufficiently so as to rot, tufts of grass remain which greatly increase to the injury of the next crop. However carefully the land may be ploughed, if it be sown immediately, the roots of grass will be raised to the surface by the harrows. The only remedy is to have them carefully forked out, and carried to some corner or waste spot, there to form the foundation of a dung-heap or compost. When the land is ploughed up before winter and the seed sown in spring, the grass will be rotten and have lost its vegetative power.

The Bearded Wild Oat, *Avena fatua*, is a very troublesome plant and sometimes almost exceeds the true oat in quantity: but this can only be the case with very slovenly farmers. It ripens sooner than the corn and sheds its seeds before harvest. Crops cut green for fodder, such as rye, winter barley, and tares, repeated if necessary, soon destroy this weed, which has no perennial root.

These are some of the most common annual and biennial weeds. They may all be easily destroyed by weeding at the time when they have pushed up their seed-stems and the flower is about to expand; if they are cut up at that time they seldom recover. Hoeing them when very young, unless the weather be dry enough to scorch the roots exposed, often increase them instead of killing them. But the last-mentioned weeds are easily got rid of in comparison with those which have perennial roots, and some of which increase the faster the more the roots are divided. It may be proper to observe that too little attention is paid to the weeds in our upland meadows and pastures. One would imagine that every plant which increases the weight of the hay or covers the ground in spring is wholesome for cattle, whereas many are detrimental when they are eaten for want of better food. Of this kind are the ranunculi, commonly called butter-cups, which, far from deserving this name, are never touched by the cows, so long as they can find other food. Without going the length of ascribing to the butter-cups the power of causing epidemic diseases in cattle, and even in men who eat of the milk and butter of cows who have eaten them, there is no doubt that where the cows are forced by hunger to eat many of them, they may be very injurious to their health and to the production of good milk. As these plants have strong perennial roots, they take possession of rich moist soils to the exclusion of good grasses. When not very abundant the plants may be weeded out by means of a sharp spud or hoe, and the expense will be well repaid in the quality of the hay or pasture. Where they are very abundant the only remedy is to break up the grass in autumn, let it be exposed to the frost in winter, take a crop of corn next season, and lay it rough again the winter after. In the succeeding spring the land may be inoculated with good tufts of grass, and before the next year an improved pasture will have been formed: or, if this is too much trouble, it may be summer-fallowed and sown in August with pure seeds of the best grasses. This is expensive, as a whole year's produce is lost, but the subsequent pasture will be so much better, that the expense may be considered as a profitable investment. The most common species of butter-cup are the Ranunculus *acris*, *repens*, and *bulbosus:* the *flammula* is highly poisonous; but not common, except in marshy pastures.

Senecio Jacobæa, or Rag Wort, is another troublesome weed; but as sheep eat it readily when young, it is easily kept down by pasturing and folding. In moist weather also it is easily pulled up by hand.

Tussilago farfara, Coltsfoot. By its large leaves it kills the finer grasses under it, as moisture is essential to its luxuriance, draining tends to diminish its growth, careful manuring also makes the grasses get the better of it, and choak it when young.

Chrysanthemum Leucanthemum, or Great White One Eye, sometimes abounds in inferior pastures, and is only extirpated by tillage and improving the soil by manuring it well.

We have already mentioned annual and biennial thistles, but the perennials, such as the *Cnicus arvensis*, and *Sonchus arvensis*, or Corn-Thistle, and Sow-thistle are much most difficult to eradicate, as the roots strike deep in the ground and throw up fresh shoots every year. The most effectual mode of destroying them is to draw them out with an instrument like large pincers, made of wood or iron, and called 'a thistle-drawer,' the form of which is well known, and which may be had in most ironmongers' shops. The time to draw the thistles is when the stem is grown sufficiently to give a good hold of the crown of the root. Great care must be taken not to break the root near the ground, but to draw it out completely. In ploughing also a broad and sharp share, cutting horizontally 7 or 8 inches below the surface, will cut off the long roots so as to prevent their making fresh shoots, and when this is done while the thistle is in a growing state the root will bleed and be destroyed. In grass-land they are soon destroyed, if they are carefully cut down with a scythe just as the flower is expanding, and before the seed is formed. If this is done for two or three years, not a thistle will be seen; but then all the neighbouring farmers must agree in a general war upon thistles, whether in the land or in the hedge-rows.

The Dock (*Rumex obtusifolius* and others) is another most troublesome weed both in fields and pastures, and is only to be eradicated by similar means with the thistle. Docks are often left in the field after harvest, where they shed their seed at leisure, whereas they should be collected with as great care as the corn itself, and invariably be burned in heaps: this is the only sure means of destroying the seed. They are often thrown into the roads, supposing that they will be crushed by the wheels of carts passing over them; but it must be remembered, that birds may swallow them, and void them again with their vegetative powers uninjured, if not improved; and that thus they are again sown on the land. Nothing but burning is a sure destruction of the seeds.

Centaurea nigra (Black Knapweed, or Horse-knot) is a coarse plant which chiefly infests pastures, and takes up the room of useful grasses, most animals refusing to eat it. It is only to be eradicated by pulling the plants up by the roots or cutting them close to the ground wherever they appear; manuring the surface highly and mowing the grass soon makes them disappear.

Polygonum amphibium, commonly called Amphibious Persicaria, is found on very wet land, and is best destroyed by draining.

Besides the common couch grass, *Triticum repens*, which is the pest of farmers on light soils, there are a variety of plants which spread both by the roots and by creeping along the surface: of this kind are the different sorts of *quitches*, as they are provincially called, which grow in wet soils; of these the *Agrostis stolonifera*, once so highly praised as fodder under the name of *fiorin*, and the *Agrostis alba* (March bent grass) are the most common; when they take possession of a spot they exclude all other grasses. The only mode of extirpating these it is draining and careful tillage. But to return to the common couch. This weed sometimes takes such possession of the soil that nothing else can thrive in it. It is not a single fallow or cleaning which will get rid of it, but a regular system. Ploughing does often more harm than good by dividing the root (which is in fact an underground stem), and thus increasing the number of plants. The most effectual means of destruction is by the fork. If after the ground has been once ploughed it be forked up carefully in dry weather, and the tufts of couch with their roots be exposed to the hot sun, they may be raked off and burnt; but as these roots contain much nutritive saccharine matter, it is often worth while to wash them, if the adhering earth cannot be beat out, and to give them to horses and cattle to eat, taking care that the litter and dung made at that time be reserved to manure grass land and not arable fields. Heaps of couch may be rotted by pouring urine or the drainings of dunghills over them; and if they are frequently turned will produce a rich compost. Any inconvenience from the extreme vitality of the roots is obviated by using this compost mixed with earth as a top-dressing for pastures.

Another weed with perennial and very vivacious roots, is the *Arrhenatherum avenaceum* (Common Oat-like Grass). The root is bulbous, and the bulbs separated grow again. It is difficult to eradicate, but the means employed to get rid of the couch grass will succeed with this and most other perennial roots. These troublesome weeds may have been wisely dispersed through the soil by Providence, to induce the cultivator to give his land a more perfect tillage than he might have done otherwise. The expense of forking, and what is usually called couching, is generally amply repaid by the finer tilth it gives to the land, and the crops are more certain and abundant in consequence.

There are many other weeds both in arable and pasture land which indicate slovenly culture, and which disappear on careful cultivation: such are briars, furze, broom, and rushes; the last being a well-known sign of superabundant moisture, and only to be destroyed by under-draining. The whole process of cultivation is a continual struggle between the farmer and the weeds natural to the soil he cultivates. The sooner he subdues them entirely, the less will be his subsequent trouble; and the perfection of agriculture is to produce crops of such vegetables as are useful and profitable, and are suited to the soil which is cultivated, while all others are excluded which might interfere with the crops to be raised. That much remains yet to be done in this respect on farms which are looked upon as models of cultivation, will be acknowledged on simple inspection. The almost universal adoption of the system of drilling and hoeing the crops tends greatly to the destruction of useless plants on arable land; much yet may be done by way of improving the produce of meadows and pastures by the destruction of all noxious and useless plants, and the introduction of those which are nutritious and improve the herbage, whether depastured or made into hay; and nothing is so likely to do so as a good system of alternate husbandry, where the best grasses are cultivated as carefully as the plants which are immediately applied to the food of man.

WEEK. This well-known period of seven days, now universally adopted over the Christian and Mohammedan world, appears to be of Hebrew or Chaldæan origin. It has been commonly regarded as a memorial of the creation of the world, according to the Mosaic account, in that space of time; but it is besides the most obvious and convenient division of the lunar or natural month; and it is also, more nearly than any other short term would be, an aliquot part of the solar year of 365 days; so that its commodiousness in these two ways would seem to have been sufficient to recommend its adoption.

Dion Cassius attributes the invention of the week to the Egyptians, from whom he seems to say it was borrowed in later times by the Greeks and other nations (*Hist. Rom.*, xxxvii. 18, 19, and the note in Reimar's edition). The assertion which is sometimes made, that according to Herodotus the Egyptians had a week of seven days, or any other number of days, is a mistake. He simply says (ii. 82) that the Egyptians invented the month, and assigned each day to some deity. It is certain that the week was unknown to the Greeks of the classical ages, and also to the Romans, till it was gradually adopted, along with Christianity, under the later emperors.

The curious passage we have referred to in Dion Cassius is the source of all that is known as to the origin of the names that have been given to the days of the week. The Ptolemaic arrangement of the heavenly bodies according to their distances from the earth is in this order:—Saturn, Jupiter, Mars, the Sun, Venus, Mercury, the Moon (Saturn being the most distant); and it was a principle of the antient astrology that these planets presided in this succession over the hours of the day. Upon this [illegible], if the first hour be assigned to Saturn, it will [illegible] the Sun; 25th (or first hour of the second day) [illegible] the 73rd the 49th (or first of the third day) to the [illegible] or first of (or first of the fourth day) to Mars; [illegible] of the sixth the fifth day) to Mercury; the 121st [illegible] seventh day day) to Jupiter; and the 145th [illegible] to Venus. *Dies Saturni* (the day of Saturn), *Dies Solis* (the day of the Sun), &c., are accordingly the Latin designations that have been given to the days of the week; and from these have been formed the modern names used in different countries, either by literal translation (in the Italian, Spanish, French, and other languages of the Latin stock), or (in the Teutonic tongues) by the substitution, in some cases, for the classical god of the corresponding deity of northern paganism. Thus the deity of the Old Saxons most resembling Mars being held to be Tiw, or Tiu, the day of Mars was called by them, after their conversion to Christianity, Tiwes daeg, whence our Tuesday (and probably also the modern German Dienstag); for a similar reason the day of Mercury received the name of Wodnes daeg (that is, Woden's day), whence our Wednesday (and the old German Odinstag, for which Mittwoche, Mid-week, is now used); the day of Jupiter, Thunres daeg, or Thor's day (whence our Thursday, and the modern German Donnerstag); and the day of Venus, Frige daeg, or Friga's day (whence our Friday).

Dion Cassius however further states that the planetary theory from which the denominations of the days of the week have thus been derived is itself founded upon the doctrine of musical intervals. A highly curious exposition of this idea has been given by the Abbé Roussier, in a Memoir on the Music of the Antients, printed in the 'Mémoires de Trévoux,' for November and December, 1770, and August, 1771.

It is a remarkable fact that the week of seven days is not only a recognised space of time in the antient Brahminical astronomy, but that the days (beginning with Soucravaram, the day of Venus, or our Friday) are named in succession after the same planets or heavenly bodies as among the Greeks and Latins. Upon this subject see Bailly's 'Astronomie Indienne et Orientale,' and various papers by Mr. Colebrooke and others in the 'Asiatic Researches.' The subject of the week in lso discussed by Bohlen, 'Das Alte Indien,' ii. 214.

WEENINX, JAN BAPTIST, called 'the Old,' a distinguished Dutch painter, who excelled in almost every department of painting,—in history, portrait, animal, landscape, and marine painting. He was the son of Jan Weeninx, an architect of Amsterdam, where he was born in 1621, but he lost his father when very young. He was first apprenticed by his mother to a bookseller, but he so perseveringly neglected everything except drawing, that his mother placed him first with a painter of the name of Jan Micker, and then with Abraham Bloemaart at Utrecht, with whom he soon made great progress: he studied afterwards two years with Nicolas Mojert, and acquired his style of execution perfectly. At the age of eighteen Weeninx married the daughter of the landscape-painter Giles Hondekoeter, the grandfather of Melchior Hondekoeter. Four years after his marriage he went alone to Rome, intending to remain only a short time there; but his own inclination, and the many orders he received from the cardinal Pamfili and others, prolonged his stay there to four years, when he was compelled by the importunities of his wife and friends to return to Holland. He died at Utrecht in 1660, aged only thirty-nine. Weeninx painted in large and in small, and was remarkably rapid in his execution. In a single summer's day he painted three half-length portraits of the size of life, with accessories. Some of his small pictures are very highly finished, but his large works have more merit. He was one of the best painters of birds of the Dutch school. Houbraken mentions as an historical piece of great merit by Weeninx, the Prodigal Son, commonly called 'T Pissend Jongetje: it has been engraved in mezzotint by N. Verkolje. There is a clever etching of Weeninx in Houbraken's work, after a portrait by Bart. vander Helst.

WEENINX, JAN, called 'the Young,' was the son and pupil of Jan Baptist Weeninx, and painted in the same style and the same subjects as his father, whom however he excelled in hunting and sporting pieces, and also surpassed in colouring. He was born at Amsterdam in 1644, and after spending some years in the service of the elector John William of the Pfalz, he returned to his native place, and died there in 1719. Jan Weeninx painted likewise in both large and small, and finished all his works with great care. There are many excellent large pictures by him of birds and hunting-scenes in the gallery at Schleissheim near Munich. (Houbraken; Descamps.)

WEEVIL, the name popularly applied in England to the beetles which constituted the genus *Curculio* of Linnæus, now the type of a large family of coleopterous insects, distinguished by the prolongation of the head so as to form a sort of snout or proboscis. The weevils are favourites with the entomologist on account of the singularity and often beauty of their forms and colours. The splendid diamond beetle, the wing-cases of which furnish such gorgeous microscopic objects, is a member of the tribe. Many of them are adorned with the most vivid metallic lustre, and some in intensity and brightness of hue emulate gems, and have been used for purposes of ornament. The family includes very numerous genera and species, and they are distributed widely over the world.

The weevils are interesting in another point of view. Many of them are dangerous enemies to the agriculturist, destroying grain, fruit, flowers, leaves, and stems, and from their numbers often perpetrating serious mischief. Their natural history therefore has been made an object of special researches, in the hope of counteracting their ravages. We shall here give some account of the noxious species.

Weevils attacking the nutritive organs of plants.

The *Rhynchites Betuleti* is a little blue or green beetle, glossed with metallic lustre, which attacks the vine and the pear-tree. It is four lines in length, one-third of which is occupied by its snout. Short spines on the thorax distinguish the male from the female. It attacks the leaves of the plants mentioned, in order to construct its habitation of them, and with a view to their furnishing food for its offspring. It rolls up the leaves and deposits its eggs in the rolls, where they are hatched, the nest afterwards supplying the larvæ with food. As the maggot grows, the rolled leaf and its stalk dry up, and at length fall to the ground on the first high wind, by which time the maggot is fully grown and ready to leave its house, to bury itself in the ground and wait for the spring, when it is to appear in a new garb as a weevil.

The process by which the roll is made is thus described by Köllar: 'When the female has selected a suitable leaf, she cuts the petiole with her rostrum almost half through, so that it hangs down and is more conveniently placed for future proceedings. She then begins to roll the leaf together, generally alone, but sometimes assisted by the male. While this operation is going forward, she also lays her eggs, that is, she pierces the roll, lays an egg in the opening, and pushes it in with her rostrum, in such a manner that it remains on the inner side of the leaf. When she has introduced five or six eggs in this manner, between the different folds, she rolls the remaining part of the leaf entirely together, so that it is impossible to discover, from the outward appearance, in what manner the eggs were deposited.' This beetle is extremely injurious to vineyards by defoliating the vine, after which the grapes will not ripen, and the prospect of a vintage is destroyed. The rolled-up leaves containing its young should be carefully collected and destroyed before the worms have time to arrive at maturity. Its operations are often erroneously ascribed to *Rhynchites Bacchus*. The *Otiorhynchus sulcatus* is another beetle which is injurious to the vine by gnawing off the young shoots. It also attacks the roots of succulent plants.

Nemoicus oblongus is a little weevil only two lines long, with a very short beak, a black head, body, and thorax, and reddish antennæ, feet, and wing-cases. It attacks the young leaves of young fruit-trees, above all those of the peach, and is both a glutton and a epicure, for while it devours most voraciously, it selects only the delicate portions of the leaf, the cellular parenchyma, leaving the midrib and petiole untouched. It appears very early in spring, and after pairing the female deposits her eggs in the ground, the grub feeding on the roots of various plants until the following spring. When these insects are on the trees, they must be gathered with the hand.

There is a very small species of *Rhynchites*, the *R. alliariæ*, scarcely a line and a half in length, and of a steel-blue or green colour, which, by injuring the shoots of young trees and fine grafts, is a source of great annoyance to the planter, sometimes perpetrating great ravages in nurseries, without distinction as to the kind of trees. The following interesting account of the operations of this insect is extracted from Köllar:—

'When the shoot of the tree or graft is about a span long, the female selects one that suits her, and it does not signify to what kind of fruit-tree it may belong. As soon as she has reached the most suitable part of the shoot, she marks the place first by a prick or by a small cut, where she intends to cut off the bud or shoot. She then recedes about a line upwards, and begins (with her head turned downwards), on the side which is not next the tree, to bore with her proboscis, until she reaches the middle of the shoot. With it she also widens the chamber and prepares it for her offspring. She then places herself over the entrance and lays an egg, which is pushed in by the proboscis and conveyed to the proper place. This operation lasts an hour. Immediately after the female returns to the former place, to cut off the shoot, moving it from one side to the other with her proboscis, until she has cut it a certain depth. She then gives some decided thrusts, which she continues, without fatigue, till the shoot only hangs by the under part. When she observes this, she gets up on the point of the twig, to make it fall over by her own weight. It not unfrequently happens that it falls immediately, the shoot having been previously so cut as to remain attached to the stem only by the bark. If the beetle however finds that the pierced shoot does not fall, she turns back to labour again at the same place, and cuts still deeper through the branch; and if she is not able to divide it, she gets up once more to the further extremity, by which means she generally succeeds in bringing the separated branch to the ground. When this labour is over, she feeds upon a leaf, scraping off the epidermis, which serves her as food.' This operation is repeated day after day for the same purpose until the middle of June, at the rate of two eggs a day, the insect reposing under a bent leaf at night. Her work is interrupted by bad weather. When the egg is hatched, usually in eight days, the grub eats the pith of the shoot, which falls off, upon which it leaves its habitation and buries itself in the earth, where it makes a subterraneous vault for its winter residence. When the spring comes, it appears as a weevil to pursue the avocations above described. The beetle is timid, and drops from the leaf when approached, so that, when we proceed to gather them, which should be done in order to destroy them (besides collecting and destroying all fallen and injured shoots where their eggs may be), we must approach with caution to gain our object.

There are two species of weevil which attack the wood of the pine-tree, viz. the *Hylobius abietis* and *Pissodes notatus*; the first is the larger species and usually precedes the latter in its attacks. When the one is plentiful, the other is also abundant, and vice versâ; the cause of this correspondence in numbers being, that they usually only attack such trees as are sickly, but when the supply of sickly trees fails, they are apt to have recourse to the more healthy plants, and thus may destroy valuable plantations. They apparently attack sickly trees in preference, since in such the motion of the sap is sluggish, and there is not so much resin exuded as to oppose and impede their operations. The larger insect attacks both bark and buds, and dangerously wounds such ramifications of the roots as are near the surface of the ground. The wound is an ugly bean-shaped scar. The second species chiefly confines its attacks to the bark and sickly cones. The wounds it makes resemble pin-holes, and are often extremely numerous. On account of their caution and timidity both these insects, although numerous when present, are very difficult to find. The best preventive of their ravages is to root up and burn such young trees in the plantation as are sickly.

There is a species of *Calandra*, the *C. palmarum*, which in South America attacks the pith of the palm-tree. Its larva is called by the colonists 'verpalmiste,' and is esteemed a delicacy.

In the third volume of the Journal of the Royal Agricultural Society of England, Mr. Curtis has given an account of two little weevils, *Ceutorhynchus assimilis* and *C. contractus*, which injure turnip crops by puncturing the leaves of the young turnips, sometimes causing as much damage as the turnip-fly (*Haltica nemorum*). They should be collected from the turnip-flowers left for seed, by shaking the stalks over a bag-net or cloth, and sweeping the insects into a pail of lime and water; the insects should afterwards be destroyed by boiling, as the hardness of their horny coat renders it no easy matter to destroy them otherwise.

Weevils attacking the reproductive organs of plants.

There is a little brown weevil which often destroys our prospects of a plentiful supply of apples. As soon as the spring comes, it goes forth to seek the apple-tree, and when the blossom buds appear, and are full of sap, it deposits its eggs in them, so that the grubs are hatched in the first warm weather, and immediately proceed to destroy the generative organs of the plant, eating up the innermost first. It is called *Anthonomus pomorum*. The affected flowers swell out and form a sort of cup, within which, when we open them, we find the larva in the form of a small white maggot with a black head. The beetle selects the finest apple-blossoms to be the cradles of its offspring. It bores a hole in them with its proboscis, making a canal even to the parts of fructification; then laying its eggs at the entrance, it turns round and pushes them in with its snout as far as it can. This operation it repeats as long as it has eggs to lay, walking from blossom to blossom, choosing the finest and calmest days for its labours. Nothing but gathering the beetles and destroying the affected flowers can arrest their progress in the orchard, and by doing so we may diminish their number, though, it is to be feared, hopes of their extirpation are vain.

There is another weevil of the same genus, the *Anthonomus pyri*, very similar in appearance, which destroys both blossom and leaf-buds of the pear, and which, when not too numerous, may even increase the crop by preventing an overweight of fruit. The ascent of both these beetles up the trunks of the trees may be impeded by circles of papers covered with tar.

The fruit of the plum is destroyed by a weevil called *Rhynchites cupreus*, which sometimes also makes use of the soft spring shoots of plum and apricot trees. The female beetle attacks the plums when they are about the size of almonds. She has two objects in view: first, to deposit her egg in the pulp; and second, to sever the fruit from the tree in order that the larva may bury itself in the earth preparatory to its final metamorphosis. The first purpose she effects by cutting the epidermis with her proboscis, raising it, boring a hole in which her egg is to be laid, and after that has taken place covering it carefully over with the raised skin so as to prevent the access of water. Before she sets about this, she half cuts through the peduncles; and when the egg-laying operation is completed she severs the stalk altogether; the joint operations occupy from two to three hours. It takes the grub five or six weeks to devour the pulp of the plum. If left undisturbed, the beetle never leaves the tree until it has pierced and thrown down every plum it can find. The only remedy or preventive to its destructive industry is to gather and destroy the affected plums. Similar ravages are committed on the apple by another species of *Rhynchites*, *R. Bacchus*, the hue of which is beautiful purple and gold.

In the first volume of the 'Transactions' of the Entomological Society, Mr. W. Christy has made known a weevil, the *Calandra tamarindi*, which destroys tamarind stones. There are sometimes thirty or forty of these weevils in a single stone. He was led to seek for them from finding that the stones of tamarinds sometimes crumbled to pieces in the mouth. In such cases the albumen was perforated in every direction, and the cavities filled with a brownish powder. Those in which he first found the insect exhibited no trace of puncture in the epidermis. It would be curious to ascertain in what manner the parent insect deposits her eggs. If she attack the fruit in an advanced state, she must have to make her way through the external shell, the internal acid pulp, and the leathery envelope of the inside, before arriving at the stone itself.

A more destructive species of *Calandra* is the corn-weevil, *C. granaria*. In this case the maggot also is found in the centre of grains without trace of an aperture. The insect probably lays the egg in the blossom. It is often very abundant in old granaries. The bread made from the affected flour is supposed sometimes to be unwholesome. Perfect ventilation and a constant shifting of the grain are the best remedies. Mr. Mills states ('Ent. Trans.' vol. i.) that a heat of 110 degrees Fahrenheit did not prevent the development of the insect, whilst from 130 to [illegible] killed them.

The *Bruchus granarius* attacks peas and beans, selecting the finest seeds in which to deposit her eggs. The bean and pea fields in Kent suffer sometimes [illegible] this beetle. It is a little, black, punctured [illegible] beneath, with legs of the same colour. [illegible] larger species, common in peas from [illegible] is in North America at times such a [illegible]

States, towards the beginning of the last century, the cultivation of peas was abandoned in consequence of its ravages.

(Köllar, *On Insects injurious to Farmers*; *Agricultural Journal*; and the works cited.)

WEHRGELD, or WEHRE (in Latin 'Werigeldum,' and in some cases 'Compositio'), was a kind of fine for manslaughter, wounds, &c. in use among the antient Teutonic nations, by paying which the offender got rid of every further obligation or punishment. The punishment of death was almost unknown among the Teutonic nations, and was never inflicted for crimes against individuals, but only for crimes and misdemeanours by which the community as such was injured. Tacitus (*Germania*, 12) says that traitors and deserters were hanged on trees, and that cowards and such as were of infamous lives (*corpore infames*) were smothered in marshes; hurdles were thrown over them, by which their bodies were kept down. Several bodies of Germans who were buried in that way, with the hurdles still over them, have been found in the great marshes of Northern Germany. It is very likely that death inflicted for such crimes was less a punishment than a means of getting rid of persons the sight of whom was a disgrace to the community, and for whom there were no prisons. Crimes committed by one individual against another were considered not directly to concern the community. The wounded man, or the relations of him who had been slain, pursued the culprit till they found him ready to satisfy their vengeance by giving them a certain number of cattle and arms. (Tacitus, *Ib.*, 21.) If the parties belonged to different communities, the consequence was a feud between them and their adherents, no community having the slightest authority over another; but if the parties belonged to the same community, the matter was soon settled. The plaintiff called the offender before the community, and if the defendant was found guilty, he was sentenced to pay a certain fine, the wehrgeld or wehre. If the defendant would not or could not pay, his relations were bound to pay for him; the father paid for his children, the master for his serfs, and he who received a stranger in his house was liable for the misconduct of his guest. The plaintiff was not obliged to summon the offender before the meeting: he could pursue his cause with his sword, and thus compel the defender to pay the wehrgeld, which was always proportionate to the offence. If the cause was brought before the community, the plaintiff only received part of the wehrgeld; the community, or the king, when there was any, received the other part. (Tacitus, *Ib.*, 12.) The part paid to the community must be considered as a fine for the breach of peace, and the consequence of the reciprocal obligation of the members of the community to maintain order.

We learn from the written laws of the Teutonic nations that the wehrgeld was for various crimes and misdemeanours, such as murder, manslaughter, infliction of wounds, and grievous bodily harm, robbery, theft, incendiarism, plagiary, rape, sodomy, verbal and real injuries, and several others, such as the violation of a grave (*Lex Salica*, tit. xvii.), by which is understood not only the injury done to the tomb, such as taking the tombstone from one grave and putting it on another, but also stealing a dead body, or its clothes and ornaments. The general Latin name for the fine paid for such crimes is 'compositio;' wehrgeld designating merely the fine for a crime committed against the person of a freeman. The amount of the fine was in proportion to the nature of the crime, to the loss of property or damage resulting from it, and it varied according to the rank of the injured person as well as of the offender. In case of theft or damage, the fine did not exclude either the restitution of the stolen object or the restitution of the damaged thing, if possible.

The following is a short view of the system of the wehrgeld according to the 'Lex Salica,' which is one of the most important of the antient Teutonic laws: the change in the order of the titles has been made for obvious reasons.

Tit. xliii., *De Homicidiis Ingenuorum*:—He who kills a Frank, or a barbarian entitled to the benefit of the Salic Law, pays 8 denarii, or 200 solidi. If he has thrown him into a well or drowned him in water, 24 den., or 600 sol. If he lived with him under the same roof, 24 den., or 600 sol. He who kills a Roman, who is *conviva regis* [TEUTONIC NATIONS], pays 12 den., or 300 sol.; a Romanus possessor, 4 den., or 100 sol.; a Romanus tributarius, 1800 den. (?). Tit. xliv., *De Homicidiis à Contubernio factis*:—The wehrgeld for a freeman surprised and killed in his own house, is 600 sol.; if he is murdered there by a man who lived with him under the same roof, 1800 sol.; if there are several murderers, each pays the same fine, and each is responsible for the other. Tit. xlv., *De Homicidiis in Convivio factis*:—If there are less than seven persons present, they must either name the culprit or pay collectively the single wehrgeld; if there are more than seven, inquiry is made, and the culprit alone pays, if he is detected. Tit. xxxvii., *De Homicidiis Servorum vel Ancillarum*:—If one serf kills another, their masters agree upon the wehrgeld: the serfs are subject to corporal chastisement. If a freeman kills a serf, the wehrgeld is in proportion to the value of the serf. If a serf kills a freeman, the master of the serf may either pay the wehrgeld or give the serf up to the next male kinsman of the defunct. Tit. xix., *De Vulneribus*:—He who has attempted to kill a freeman, but failed, pays 62 sol.; for beating a man on his head, if blood comes and drops on the ground, 15 sol.; for a wound in the head, if three (pieces of) bones come out, 30 sol.; if the brain is laid open and three bones come out, 45 sol.; for a wound between the ribs, if the entrails are touched, 30 sol.; if such a wound will not heal, but keeps open and runs, 62 sol., and 9 sol. for the doctor; for a slight wound without running blood, 3 sol.; if the blood runs, and the wound is made with an iron instrument, 15 sol.; for an assault with attempt at robbery, 30 sol. Tit. xxxi., *De Debilitatibus*:—For a foot, an eye, an ear, or the nose, 100 sol.; for a tooth, 15 sol.; each finger had its separate fine. Tit. xxxii., *De Conviciis*:—He who calls another man one-eyed pays 15 sol.; if he calls him a swineish fellow (concacatus), 3 sol.; if he calls him a fox, 3 sol.; if a hare, 6 sol.; he who calls an honest woman a prostitute, pays 45 sol. Tit. xxii., *De eo qui Mulieri Ingenuæ Manum strinxerit*:—The freeman who ties with a cord the hand or the finger of a free woman, pays 15 sol.; the arm, 30 sol.; if he puts his hand round her arm above the elbow, 35 sol.; if he touches her bosom, he pays 45 sol., which is the same fine paid for a wound made in a man's head, if the brains are laid open, and three bones come out, &c.

The wehrgeld was not the same among the different Teutonic tribes, as may be seen by a comparison of their laws, the editions of which are given in the history of the Teutonic nations. The laws of the Anglo-Saxons deserve particular attention.

(Eichhorn, *Deutsche Staats und Reichts Geschichte*.)

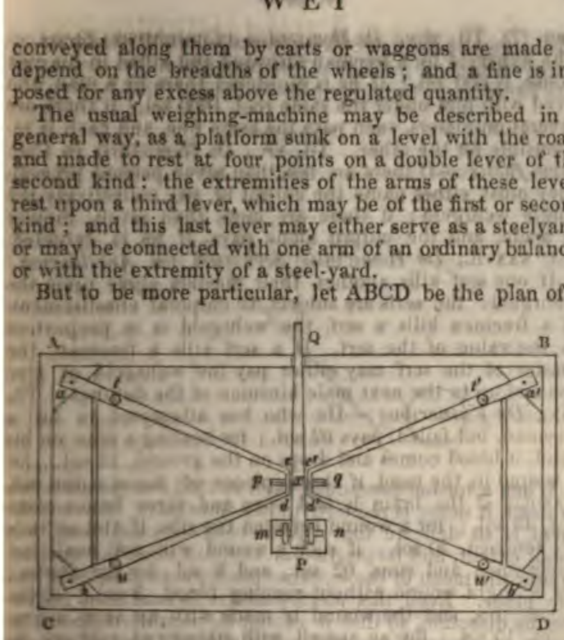
WEIDLER, JOHANN FRIEDRICH, born at Gros-Neuhausen in Thuringia, April 23, 1691, died at Wittenberg, November 30, 1755. He succeeded Wolff in the chair of mathematics at the latter place in 1721. He wrote a large number of works, of some of which the bare mention will be sufficient: as, 'Institutiones Mathematicæ,' 2 vols. 8vo., Wittenberg, 1718, reprinted five times at least; 'De Characteribus Numerorum Vulgaribus,' 4to., Wittenberg, 1727 (this is by J. F. and George Immanuel Weidler); 'Tractatus de Machinis Hydraulicis,' 4to., Wittenberg, 1728 and 1733; 'Institutiones Geometriæ Subterraneæ,' Wittenberg, 1751 (2nd ed.); 'Institutiones Astronomiæ,' 4to., Wittenberg, 1754.

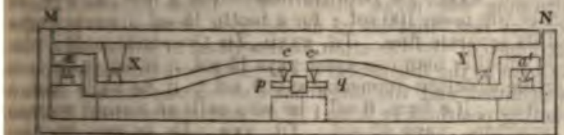
The memory of Weidler is now preserved by two useful works, the 'Historia Astronomiæ,' 4to., Wittenberg, 1741, and the 'Bibliographia Astronomica,' 4to., Wittenberg, 1755, of which the latter also contains supplements to the former. The history of astronomy was, at the time it was published, the most regular, most learned, and most accurate history of a single science which had ever been published; it is to this day a very convenient book of reference, and the more so as it rather should be called the annals of astronomers than the history of astronomy. The second work was taken entire by Lalande into his 'Bibliographie Astronomique,' by which work it is therefore supplanted, except for the supplements.

WEIGHING-MACHINE, is any contrivance by which the weight of an object may be ascertained: under the words BALANCE, SPRING-BALANCE, and STEELYARD, the machines by which materials of comparatively small magnitude are weighed are explained; and we have now merely to describe that which is employed usually at the toll-gates on roads for the purpose of determining the weights of laden carriages. In order to prevent the roads from being too much cut up, the burthens allowed to be conveyed along them by carts or waggons are made to depend on the breadths of the wheels; and a fine is imposed for any excess above the regulated quantity.

The usual weighing-machine may be described in a general way, as a platform sunk on a level with the road, and made to rest at four points on a double lever of the second kind: the extremities of the arms of these levers rest upon a third lever, which may be of the first or second kind; and this last lever may either serve as a steelyard, or may be connected with one arm of an ordinary balance, or with the extremity of a steel-yard.

But to be more particular, let ABCD be the plan of a rectangular pit sunk in the ground, from 8 to 12 feet long, 6 feet broad, and about 2 feet deep, the sides and bottom being lined with brick-work or iron; and let MNRS represent a longitudinal section of the pit perpendicularly to the ground. *abcd*, *a′b′c′d′* are two trapezoidal frames of iron, acting as levers; and each of the side bars, as *ac* or *bd*, has, in the vertical position, the form which is represented by *ac*, *a′c′* in the section. At each extremity *a*, *b*, *a′*, *b′*, in the plan, the frames have a conical steel point which appears at *a*, *a′* in the section; this rests in a hemispherical cavity made in a die or cylinder of the same metal, which is either attached to the iron-work forming the sides of the pit or is supported on a block of stone sunk in the ground at each of the four interior angles; and under the shorter side *cd* or *c′d′* of each frame there is a wedge-like prism of tempered steel having its edge parallel to that side. The ends of these prisms appear at *c* and *c′* in the section.





The bar PQ is an iron lever, which in the above diagram is of the second kind, having at P a pin *mn*, like that of a balance, turning in two steel rings on a pillar of stone sunk in the ground, or of iron resting on the bottom of the box; a steel pin *pq* formed also like that of a balance, with its edge upwards, passes through the bar PQ; and upon this rest the edges of the prisms at *cd* and *c′d′* as shown in the section.

The platform supporting the carriage which is to be weighed, and which is represented at MN in the section, has below it four iron-feet, of which two appear at X and Y; and the under surfaces of these feet are formed with hemispherical cavities which rest on the points of four conical steel pins at *t*, *u*, *t′*, *u′*, on the two lever-frames; consequently the weight on the platform pressing at these four points, the prisms at *cd*, *c′d′* are forced down upon the pin *pq*; and this last then presses down the extremity Q of the lever PQ. This lever itself may be made to act as a steelyard; or, by a rod or chain, the extremity Q may be connected with one arm of a balance or steelyard above the machine; in either case the weight of the carriage may be ascertained.

It is evident, from the nature of the lever, the pressure of the platform itself being balanced by a constant weight at Q, that if W represent the weight of the carriage, $W . \frac{at}{ac} . \frac{Px}{PQ}$ will express the pressure at Q, or the weight by which that of the carriage is determined; and this is independent of the power obtained by a steelyard which may be connected with Q. If $\frac{at}{ac} = \frac{1}{14}$ and $\frac{Px}{PQ} = \frac{1}{16}$, a weight equal to 10 pounds at Q′ will balance a weight equal to 1 ton upon the platform.

WEIGHT. There is nothing to say on the feeling of weight after what has been said in PRESSURE; nor is it possible to give any idea which will be half so good as that which presents itself in raising a heavy body from the ground. The measure of weight is weight itself [BALANCE], and two weights are equal which counterpoise each other when placed at the ends of equal arms of a self-poising lever.

The weight of a body, that is, of a given bulk of known substance, is referred to that of water by what is called the SPECIFIC GRAVITY of the substance. It is said, for example, that the specific gravity of ivory is 1826, when that of water is 1000. This means that any bulk of ivory is more weighty than the same bulk of water in the proportion of 1000 to 1826. When the specific gravity of water is called 1, that of ivory is 1·826. Since a thousand ounces avoirdupois of water are nearly a cubic foot, a more popular notion of the meaning of specific gravity may be given, in this way:—To say that the specific gravity of a substance is 1·826, that of water being 1, is to say that a cubic foot of it weighs 1·826 × 1000, or 1826 ounces nearly. More correctly, from 1000 times the specific gravity (water being 1), subtract three times that specific gravity, and add its 73rd part: the last step may be left out for common purposes. Thus, the specific gravity being 4·817, 4·817 × 1000 − 4·817 × 3 is 4802·549, the number of ounces in a cubic foot.

But it is to be remembered, when weight is to be very accurately taken, that every body is buoyed up to a certain extent by the air; and the weight of a body in air is less than it would be in a vacuum by the weight of its own bulk of air. Now the air varies in weight [AIR] in a manner which may be ascertained nearly by the indications of the barometer. Properly speaking, it varies in a manner depending upon the superincumbent pressure, the temperature, and the quantity of moisture contained in it. A hundred cubic inches of dry air, when the barometer is at 30 inches and Fahrenheit's thermometer at 60°, weigh 31·012 grains. In measuring standards of weight, therefore, close attention must be paid to the state of the air at the time of weighing and to the substance weighed. If an iron weight balance a wooden one in a given state of the atmosphere, for that very reason there cannot be strict equilibrium in any other state of the atmosphere; wood being at least seven times as bulky as iron, the effect produced on the weight of the wood by the alteration of the state of the air is at least seven times as much as that produced on the iron.

WEIGHT OF THE AIR. [AIR.]

WEIGHT OF THE EARTH. This is not the most appropriate name for the subject before us, except in one particular, namely, that the position of the letter W has enabled us to await the completion of the experiments which have been lately* made for the determination of the mean density of the earth.

The quantity of matter which the earth contains must ultimately be our only guide to that of any other planet. The relative masses of two planets can be found by calculation of the effects which they produce upon any third body; but the mass of a planet with reference to any given substance, as water, cannot be directly determined upon any instance except our own earth. Perhaps a problem could hardly be proposed which would seem more impracticable to the ordinary reader than that of determining the mean density of the earth. It amounts to asking this:—If it were required to substitute for the earth a solid globe of the same size, *but of uniform material*, in such a manner that the absolute weight of bodies on its surface should remain the same, and the attraction of the whole on other planets remain the same—what must the material be?

Of necessity this question was started by Newton, whose system was the first in which it became of much interest. Having no means of submitting it to experiment, he made one of those sagacious guesses which, had they been collected and preserved, would alone have kept his memory alive. 'Unde cum terra communis suprema quasi duplo gravior sit quam aqua, et paulo inferius in fodinis quasi triplo vel quadruplo aut etiam quintuplo gravior reperiatur: verisimile est quod copia materiæ totius in terrâ quasi quintuplo vel sextuplo major sit quam si tota ex aquâ constaret.' (*Principia*, iii. 10.) That is, he judged the earth to be between five and six times as massive as the same bulk of water; which is the truth.

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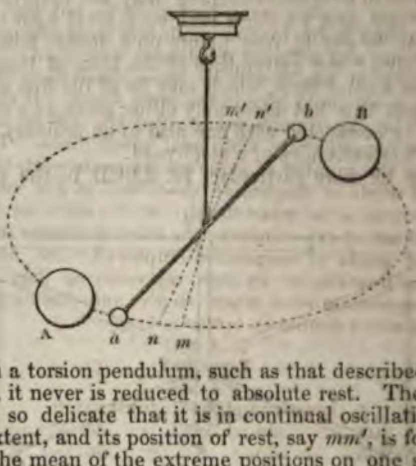
* 'Experiments with the torsion rod for determining the mean density of the earth, forming vol. xiv. of the 'Memoirs of the Royal Astronomical Society,' by Francis Baily, Esq., London, 1843 (published at the end of last [illegible]). See also Lord Wrottesley's Address to the Astronomical Society at their anniversary meeting in February, 1843.

The relative masses of two planets are determined by the observation of their effects upon a third. Two preliminaries are required: first, the great assumption of the theory of gravitation, that any two particles of matter must attract one another with forces which at different distances are directly as their masses, and inversely as the squares of those distances; secondly, the mechanical consequence of this law of action, namely, that two spheres, having their centres at any given distance, attract one another in the same manner as if each were collected in its centre. Without describing the mode of arriving at such a result from observation, suppose it is ascertained that two planets, A and B, whose distances from a third are as 4 to 3, attract that third with forces which are as 7 to 2. If both planets be brought to the distance 1 from the third, the attraction of the first will be made (4 × 4, or) 16 times as great as before, and that of the second (3 × 3, or) 9 times. Consequently, the new attractions will be as 7 × 16 to 2 × 9, or as 112 to 18. But at equal distances the attractions are in the proportion of the masses; therefore these masses are as 112 to 18. Now suppose the radii of the planets to be as 3 to 2; then their solidities are as 27 to 8, and if the densities (mean) are δ and δ', the masses are as 27δ to $8\delta'$. Therefore $27\delta : 8\delta' :: 112 : 18$, or $\delta : \delta' :: 112 \times 8 : 18 \times 27 :: 896 : 486$. If then the mean density of either planet be known, that of the other can be found.

The principle of the preceding process exists in every attempt which has been made to find the mean density of the earth. The earth itself is made one of the planets; some known substance, a mountain or a ball of lead, is made the other planet. The attracted body is not a planet, but a pendulum or a plumb-line, and the effect of the mountain or ball of lead upon the plumb-line is measured, that of the earth being either measured or previously known. The actual attraction of the mountain or ball of lead being thus determined, its effect as it would be if placed at the centre of the earth can be calculated; which effect is to the effect of the earth as the mass of the mountain or ball of lead to that of the whole earth. The result of this process, as usual, is condensed into a formula, in which the mode of making the steps is lost sight of: but the above is not the less the manner in which the experiment must be explained.

The hint given by Bouguer, the experiment of Maskeleyne, and those of Cavendish and Zach, have been briefly described in ATTRACTION. Since their time two repetitions of Cavendish's experiment have been made: the first, by Mr. Reich, of Freyberg, of which an account was published in 1838 (Baily, p. 9.); the second, by Mr. Baily, at the desire of the Astronomical Society, and at the expense of the government. The former obtained the same result as Cavendish, but the experiments were few in number; the latter obtain a result slightly differing from that of Cavendish, but in so many different ways and by so large a number of experiments, that it is impossible to doubt the superior correctness of the conclusion. We shall give such a slight general account of this process (which is substantially that of Cavendish) as our limits will admit, referring to the volume already cited for more detail: very few experiments have been either so well performed or so satisfactorily described.

A TORSION pendulum (76 inches long) was provided, moving on a single or double metal wire, or on a double silk line, the mode of suspension being varied from time to time. At each end was suspended a metal or other ball; and these balls (*a* and *b*) were the principal attracted substances. The whole torsion-rod with the suspension was inclosed in a case, with a glass at one end. Large leaden balls (A and B) of about twelve inches diameter (the attraction of which on the torsion pendulum is the quantity to be measured in the experiment) were made to travel on a frame in such manner that they could quickly be brought up laterally on opposite sides of the balls, as in the diagram. We must leave out the whole account of the precautions against electricity or radiation, the manner of noting the actual position of the pendulum, &c., and confine ourselves to the principle of the experiment.



When a torsion pendulum, such as that described, is left to itself, it never is reduced to absolute rest. The instrument is so delicate that it is in continual oscillation to a small extent, and its position of rest, say *mm′*, is found by taking the mean of the extreme positions on one side and the other. Even this mean position is continually shifting its direction, so that it cannot be permitted to take a series of observations and make use of them all in determining one mean place. The mode of finding the point of rest, that is, of deducing it from observing the extremes of the vibration, is described in the work cited. As soon as the line of rest of the undisturbed pendulum is ascertained, and the large balls are brought into the attracting positions at A and B, on continuing the observation an immediate alteration of the line of rest is seen towards the large balls; say that it becomes *nn′*. Then the position of equilibrium of the pendulum is altered by the angle *nOm*, in consequence of the approach of the balls.* The precautions taken are abundantly sufficient to assure us that the alteration is no consequence of heat, electricity, magnetism, or any of the variable accidents of matter; there is nothing to which it can be referred except that attraction which, when the earth is the agent, we know under the name of weight, and the assumption of which, as a universal property of matter, led Newton to his explanation of the planetary motions. Many of those who were content to receive Newton's hypothesis to this extent, that the planets attract each other, were staggered by the idea that every particle in the universe attracts every other. Such objectors might have here received conviction from the evidence of their own senses, which would have rendered obvious not only the attraction of the balls upon each other, but its transmission through the wood, flannel, and gilding, which it was found necessary ultimately to interpose between the attracting substances and the torsion-rod in order to destroy the effects of radiant heat.

Two observations are necessary, that of the time of oscillation of the pendulum, and that of the displacement of the line of rest which the approach of the larger balls produces. The first observation, the time, enables the observer to deduce the force of torsion, or the quantity of pressure required to produce any given displacement. And in this particular it was found that the pendulum altered its character from one quarter of an hour to another; showing that the instrument was so delicate, that circumstances of which no explanation can be given were continually altering its character. The consequence was, that at every new trial, both the time and displacement had to be scrupulously observed together, in order that to each displacement produced the proper producing attraction might be applied. The complete formula for calculating the mean density of the earth, implies,—1, The calculation of the character of the pendulum, or the amount of attraction necessary to alter its line of rest by a given quantity: 2, The determination of the attraction actually employed, namely, that of the larger balls, by means of the displacement actually observed: 3, The determination of the attraction which the larger ball would exert, if it had been at the centre of the earth, instead of at the distance† employed: 4, The number of times the whole earth would contain such a leaden ball, and its easy consequence, namely, the number of times the whole earth would contain a similar bulk of water: 5. All the necessary corrections for the attraction of the other parts of the apparatus upon the torsion pendulum.

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* In making the experiment the effect was usually doubled by placing the large balls first on one side of the smaller ones, and then on the other, and noting the whole of the double displacement.

† This distance of course was accurately measured.

The larger masses were leaden balls, but the smaller balls attached to the torsion pendulum were changed from time to time, and different substances were used. The following table of results will be more interesting than any description we could give in the same space. It shows the result of the experiments made after the effects of radiation were removed* by additional precautions. The first column is the number of experiments made, with the small balls and mode of suspension described in the third; the second contains the mean density of the earth as deduced from that set of experiments; the third describes the small balls and mode of suspension employed; the numerals, which are fractions of an inch, representing the diameter of the suspension wire, when single, and the distance of the wires when double or *bifilar*:—

No. of Experiments.	Density.	Balls and Suspension.		
8	6·154	brass rod alone	bifilar iron .	·177
20	5·993	do.	do.	·415
28	5·925	do.	do.	·367
42	5·847	2-inch ivory . .	do.	·367
79	5·839	do.	bifilar silk .	·367
51	5·799	2-inch glass . .	do.	·177
20	5·787	2-inch ivory . .	single copper	·0178
20	5·784	2-inch glass . .	bifilar silk .	·415
87	5·774	do.	do.	·367
20	5·766	2-inch ivory . .	do.	·415
20	5·738	2-inch zinc . .	single copper	·0178
40	5·725	do.	bifilar silk .	·367
102	5·719	do.	do.	·177
46	5·717	2½-inch brass .	do.	·367
170	5·716	2-inch glass . .	bifilar iron .	·415
32	5·688	2-inch lead . .	bifilar brass .	·415
43	5·679	1½-inch platina .	bifilar silk .	·177
74	5·674	2-inch lead . .	single copper	·0178
142	5·673	do.	bifilar iron .	·415
111	5·669	do.	bifilar silk .	·177
20	5·668	2-inch zinc . .	bifilar iron .	·415
104	5·658	2½-inch lead .	do.	·415
84	5·652	2-inch lead . .	bifilar silk .	·415
44	5·649	2½-inch lead .	do.	·367
27	5·647	do.	single copper	·0178
46	5·644	1½-inch platina .	bifilar silk .	·367
20	5·641	2-inch zinc . .	do.	·415
120	5·637	2-inch ivory .	bifilar iron .	·415
54	5·635	2½-inch lead .	bifilar silk .	·415
20	5·606	2-inch lead . .	bifilar iron .	·367
92	5·599	2½-inch brass .	single copper	·0219
20	5·586	2½-inch lead .	bifilar iron .	·367
23	5·582	2-inch lead . .	bifilar silk .	·177
86	5·559	1½-inch platina	single copper	·0219
30	5·549	2½-inch lead . .	do.	·0219
50	5·533	do.	bifilar brass .	·380
88	5·525	2-inch lead . .	single copper	·0219
20	5·507	2-inch zinc . .	do.	·0219
50	5·500	2½-inch lead .	bifilar silk .	·380

The results of individual experiments vary considerably, but it is important to observe that there is nothing which indicates that different kinds of matter attract each other according † to different laws. If the large ball of lead exerted different attractions upon particles of brass and ivory of the same weight, the effect would be to give the whole earth one mean density or another, according as the smaller ball is of brass or ivory. Now it is true that the experiments give all manner of results from 5·500 to 6·154, but on examining the results, there appears no evidence whatever of the larger balls attracting the different smaller ones differently. If such were the case, undoubtedly the mean densities obtained from different substances would be different; but though such is the case in the preceding list, and even though it would seem that the lighter balls give the larger densities, yet there is every reason to suppose that the effect is to be attributed to the alteration of the pendulum. Thus it will be seen that there is not so much difference between the results of 2-inch ivory and lead balls suspended in the same way by a single copper-wire, as there is between the results of 2-inch lead balls suspended by bifilar iron wires and the same suspended by bifilar brass wires, and also that ivory balls differently suspended give results which have differences as great as any. The mode of suspension and the effect of merely increasing the weight of the smaller balls, appears much to exceed that of applying different substances; but not according to any law. In fact, the differences are altogether of that character to which the term discordance is applied; following no settled rule, and exhibiting every appearance of as often affecting the truth by a positive as by a negative error. The first three sets, in which a brass rod alone is used, were rather a defiance to the apparatus to fail if it could, than seriously intended to help the result. Almost all the experiments were made with a light wooden torsion-rod, and comparatively heavy balls appended. The trying a brass rod by itself, that is, the attempt at obtaining a mean density by noting the attraction of the larger balls upon the torsion-rod only, was the introduction of an extreme case, to increase confidence in the more ordinary experiments.

The mean of the whole is 5·6747, and, rejecting the experiments of which the character would be *à priori* most doubtful (though it is not certain they ought to be rejected) it is reduced to 5·6604. From the experiments, by the usual rules of the theory of probabilities (see the next article), it is an even chance that the error of this result is within ·04. Cavendish's result was 5·48.

Besides the confirmation of some of the most material points of the theory of gravitation which results from this experiment, it furnishes a presumption of the strongest kind that the earth is solid to the centre, and not, as many have supposed in every age, a hollow shell. The mean density 5⅔ is very much greater than that of the substances which abound at the surface. All common rocks are under 3, and nothing under the ores of the heavier metals comes up to 5⅔. The earth is as massive as if it were all composed of silver-ore, from the centre to the circumference, so that there must be an increase of density towards the centre. If those who think the earth to be a shell were to presume that its solidity ceased at five hundred miles below the surface, they would then be compelled to give to the terrestrial matter, one part with another, a density greater than that of mercury, in order that the whole shell, the hollow part included, might have the mean density which is found by this experiment.

WEIGHT OF OBSERVATIONS.* This term was first applied in the manner stated in the article MEAN. An observer decided the relative merit of his observations by his unassisted recollection of the impression made by them upon his mind at the time, and affixed *weights* to them; that is, supposing A_1, A_2, &c. to be the n results of observation, he attached numbers c_1, c_2, &c. proportional to their presumed goodness, and used $\Sigma cA \div \Sigma c$ instead of $\Sigma A \div n$, for the average. Instead of c_1, c_2, &c. any numbers proportional to them may obviously be used; and in applying the higher branches of the theory of probabilities, it was found that a certain mode of obtaining c_1, c_2, &c., while it gave the above mode of using these numbers in the formation of an average, made them applicable to other important uses. We here give a sketch of the results of this method in its simplest parts.

I. When a number of discordant observations, made under circumstances in which positive and negative errors are equally likely, do not differ much from each other, and when it is exceedingly unlikely that the truth can differ much from the observations, it may be presumed that the chances of the error of any one of those observations lying between x and $x + dx$, and between a and b, are severally of the forms

$$\sqrt{\frac{c}{\pi}}\,\varepsilon^{-cx^2}dx \quad \text{and} \quad \sqrt{\frac{c}{\pi}}\int_a^b \varepsilon^{-cx^2}dx,$$

where c is a constant dependent on the goodness of the observations, and $\pi = 3\cdot14159....$, $\varepsilon = 2\cdot71828....$, as

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* An enormous mass of experiments was made and rejected in the course of the attempts to remove singular discordances, of which no explanation could be given. The mean result of these would not have differed much from those of the more correct sets, but would, of course, have been less satisfactory. The removal of the discordances was due to the suggestion of Professor Forbes, of Edinburgh, who continued to believe they might arise from radiation long after others thought the precautions then already taken must have been sufficient to remove that source of disturbance.

† That it is not the case, is also established without a doubt by pendulum experiments.

* This article is only for the reference of the mathematical Mean will be found as much of it as an arithmetician can use

Even if this law of error do not exist, it is found that the treatment of *a considerable number of observations*, whatever[*] may be the law, is reducible to the same rules as those derived from this law, which is now universally assumed by those observers who apply the theory of probabilities to their results.

2. The constant c is called the *weight* of the observations, and depends upon the various circumstances which determine their goodness or badness. The greater it is, the better is the class of observations to which it applies. It is approximately found, for a given class of observations, as follows:—Subtract each of the observations from their mean, and let e_1, e_2, &c. be the results; then $c = n \div 2\Sigma e^2$. The sum of the squares of the departures from the average may be found by diminishing the sum of the squares of the *observations* by n times the square of the mean; and before doing this any convenient quantity may be struck off from all the observations, provided it is also struck off from the mean.

3. The *probable error* is that within which, taken positively and negatively, there is an even chance an observation shall lie. Thus if there be an even chance (A being the true result) for the result of an observation lying between $A - a$ and $A + a$, then a is the probable error of an observation. To find the probable error, divide ·476936 by the square root of the weight.

4. The weight of the average of observations is the sum of the weights of the component observations. If n observations, A_1, A_2, &c. be made, all of the same weight c, the average is $\Sigma A \div n$, the weight of the average is nc, and its probable error is $\cdot 476936 \div \surd(nc)$. But if the weights be different, say c_1, c_2, &c. then $\Sigma cA \div \Sigma c$ is the average, Σc is its weight, and $\cdot 476936 \div \surd(\Sigma c)$ its probable error. In the former case the probable error of the average may be directly found from the sum of the squares of the reputed errors,[†] by the formula

$$\cdot 67449 \surd(\Sigma e^2) \div n.$$

5. *Ceteris paribus*, the probable error of an average will not be inversely as the number of observations, but as the square root of that number. If p be the probable error of an observation, and P that of the average of n such observations, then $p = \surd n . P$. An observer who takes such a mode as gives the probable error of an observation *twice* as great as it need be, must not hope to indemnify himself for his carelessness by making *twice* as many observations as would otherwise be necessary, but must make *four times* as many.

6. If p be the probable error of an observation, an average, or other result, the following table will be sufficient to connect the probable error with other errors, for any rough purpose of estimation:—

Odds.	Against.	For.	Odds.	Against.	For.
1½	·79	1·25	7½	·22	2·32
2	·64	1·43	8	·21	2·36
2½	·54	1·58	8½	·20	2·40
3	·47	1·71	9	·19	2·44
3½	·42	1·81	9½	·18	2·47
4	·38	1·90	10	·17	2·50
4½	·34	1·98	20	·09	2·94
5	·31	2·05	30	·06	3·17
5½	·29	2·11	40	·05	3·34
6	·27	2·17	50	·04	3·50
6½	·25	2·22	100	·02	3·90
7	·23	2·27	1000	·002	4·90

This table is to be interpreted as follows:—If p be the probable error above mentioned, it is 1½ to 1, or 3 to 2, against the error turning out less than $\cdot 79 \times p$, and it is 1½ to 1 for the error turning out less than $1 \cdot 25 \times p$. It is 8 to 1 against the error being less than $\cdot 21 \times p$, and 8 to 1 for its being less than $2 \cdot 36 \times p$. It is 1000 to 1 against the error being less than $\cdot 002 \times p$, and 1000 to 1 for the error being less than $4 \cdot 90 \times p$.

WEIGHTS AND MEASURES. The subject of weights and measures is one the actual state of which is prosperous in the inverse ratio of the number of books or the length of articles which are written upon it. There is nothing in it which might not, if the most natural and simple system were adopted, be described in a very few pages. We are speaking of course only with reference to a possible time; for, let that time arrive when it may, the history of the past must be a confused and repulsive subject.

In the article STANDARD we have given some idea of the recent history of the attempts which have been made in England to secure a permanent measure of length. These have only succeeded somewhat farther than to the extent of making it possible to restore to the merchant a system sufficiently near to that which now exists, if the latter should be lost; but they have all confessedly failed in perpetuating sufficient exactness for scientific purposes. The same may be said of the French endeavour to create a recoverable standard by the measurement of the earth. [TRIGONOMETRICAL SURVEY, p. 216.] So that in fact we are now come back again to the old notion, that the true way to maintain a measure is to construct accurate copies out of durable material, and to preserve those copies with care.

The measures of time (of which we speak more particularly in YEAR, TIME, PERIODS OF REVOLUTION) are the only usual ones in which a natural standard exists; to which we may add, that in the kindred operation of counting there is something of the same kind. The phenomena of the daily revolution of the earth, and the ten fingers on the two hands, have secured to the whole human race, above the degree of the lowest savages, one mode of assigning periods of duration and large collections of number. But even in these two subjects details have differed considerably in different times and countries; and much more has this happened with respect to measures in which the choice of a standard is purely arbitrary, as in the case of length, surface, capacity, and weight. The angle is another magnitude which has a natural measure [STANDARD, p. 435]; and, as this has never been out of the hands of geometers, a greater uniformity has prevailed in the measurement of angular magnitude than of any other whatsoever. The measures of length obviously regulate those of surface and capacity. There is no other way of defining an area or a solidity, except by describing, for the area, lengths, and for the solidity, surfaces, by which the area or solid may be bounded in a given manner. Measures of weight may be obtained by defining, as standards, given bulks of given substances; and as water is the most common and most easily purified of all substances, it has been chosen by common consent as the referee for such standards. A measure of length then is all that is wanted in the first instance, and most nations, antient and modern, have been in the habit of referring all the resulting measures to those of length alone. Nevertheless, there is no small difficulty in obtaining a comparison of a measure of weight deduced from length with one already existing, in such a manner as to perpetuate the latter, if the utmost accuracy be required. (Kater, *Construction and Adjustment*, &c., 'Phil. Trans.,' 1826.) So that the commissioners who have recently reported [STANDARD, p. 439] advise that the standard of weight shall no longer be deduced from that of length, but shall be simply a piece of metal or other durable substance.

It is not our object in this article to consider weights and measures in a scientific point of view, but simply to give some historical account of the measures actually in use, and some tables of the principal ones, antient and modern. There is no subject whose history is more distinctly divided into three periods, antient, middle, and modern, than that of weights and measures. The antient period, ending with the decline of the Roman empire, during which the classical standards were preserved and employed; the middle period, during which, while the names and relations of the classical measures were preserved among the learned, the standards were lost, and the various differences of national measures began to exist among the people; the modern period, which hardly begins before the seventeenth century, in which the discrepancies of national measures were noted, and the attempts at a system founded upon natural philosophy began to be made.

The origin of measures of length is unquestionably to be found in the parts of the human body; both their usual lengths, roughly speaking, and their names, establish this beyond a doubt. The foot, the digit, the palm, the span, the cubit, &c., are in all languages derived from the same source; nor, in the popular view of measurement, do they materially differ in length. It is also unquestionable that in former times, when authentic measures were not so easily to be obtained, the hands, arms, and feet were much more frequently used than they are at present, when every workman, however humble, is in possession of a measure. George Agricola, presently named, says that in his time (the beginning of the sixteenth century) the French workmen commonly measured a foot by joining the extremities of the thumbs, clenching the fingers, and keeping the thumbs as widely extended as they could: 'vulgo pedem metiuntur opifices manibus in pugnos contractis et porrectis pollicibus altrinsecusque obversis:' nor is this a bad measure of a French foot. At what period the slightly variable measures derived from the living man were first exchanged for a fixed and legal average or other conventional value, whether among the Greeks or Romans, is unknown. All that can be said is, that none of the earlier writers enter otherwise than incidentally upon the question, and that the fixed and legal measures were of early date. Most authors give some little information upon the subject; even the poets are frequently cited for their allusions. Fixing the end of the antient period about the middle of the sixth century (simply because the chain of writers who are cited on antient weights and measures ends there), and omitting names as well known as Homer or Virgil, Hesychius or Suidas, Pliny or Vitruvius, there is direct information on the subject in the works or fragments of Cato, Celsus, Columella, Dioscorides, Galen, Hero, Julius Frontinus, Julius Pollux, Martianus Capella, Modestinus, Oribasius, Palladius, Paulus, Pomponius, Priscian (who wrote expressly on the subject), Proclus, Rhemnius Fannius (who wrote a poem on the subject, often attributed to Priscian), Scribonius, Boetius, Festus Pompeius, Ulpianus, Volusius Maecianus, and Varro.

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[*] That is, provided the law be such as common sense can admit, as representing what actually takes place in human observations. It would not apply for example to a case in which the larger the error the more likely was it to happen.

[†] The departures from the average above mentioned: the average being taken for the truth, these departures are taken for the errors.

It may be convenient to end the middle period and commence the modern with the work of Lucas Paetus (1573), as being the earliest of the writers who are frequently cited for success in their attempts to restore the almost forgotten values of the Roman measures. But this middle period may be divided into that which preceded and followed the invention of printing. All that took place in the former part of it is a blank; we know but the result, namely, the (probably gradual) introduction of measures differing from those of Rome in magnitude, though retaining the same names. Nevertheless the writers, as we have seen in MILE, retained, besides a uniformity of expression, an intended uniformity of meaning: if they had not the Roman foot and mile, they thought they had. When the German mile was introduced, which was about four Roman miles, the latter were called Italian miles. An abundance of passages might be cited from writers of different countries about the beginning of the sixteenth century, when books began to be plentiful, all coinciding in requiring the following explanation, namely, that the learned had among themselves, or believed they had, a system of measures in terms of which they communicated with each other, not recognising nor in any way alluding to the common or vernacular measures. It is our supposition that this system began in ignorance that the national measures really did differ from one another at all, and was continued under the impression that a common system was desirable, attainable, and, by keeping to the Roman measures, attained.

As this point in the history of measures is not alluded to by any metrologist, and as some of its consequences are remarkable, it will be desirable to state some proofs of our assertion. As far as we can find, it was hardly thought necessary, even after the sixteenth century had commenced, and certainly not before, to mention the scale of measures: the Roman system was taken for granted. Roger Bacon, when speaking of a foot or a mile, compares statements of Ptolemy, Pliny, and writers of his own time, without a word [illegible]sion that there could be any difference between the measures; though his own statements from modern [illegible]s [MILE, p. 212] prove that they had a mile very [illegible]t in length from that of the Romans. In the [illegible]'* of Laurentius Corvinus (Basle, 1496), all that he [illegible] measures is in six words, explaining the single [illegible]n which had been made to the Roman system: '[illegible] quatuor [illegible] miliare nostrum [illegible].' [illegible] or Antonius Nebrissensis ('Cosmographiae Introductio, Paris, 1533), lays it down that his own foot and his own pace are those of the Romans, he being a man of moderate stature; and having once arrived at a conclusion respecting the Roman pace, he takes it for granted he has the proper foot of his own time: he adds that he has made some verifications on itinerary distances. This idea of the actual use of the human members was a very common one: George Agricola, whose work, 'De Ponderibus et Mensuris,' was much in use, and several times reprinted (Paris, 1533; Venice, 1535; Basle, 1550, and perhaps oftener), would almost seem to hint, in addition to what we have already cited, that the actual measures of his day, as used among merchants, were taken from the body: the measures of length, he says, are 'membra humani corporis, perticæ, arundines, funiculi.' This can hardly mean that measures, such as the foot, the cubit, &c., were only *originally derived* from the human body; for such an explanation would require us to say that the *arundo* and the *funiculus* were names of measures, which was certainly* not the case. The word pertica is ambiguous; it is both a pole and the measure derived from that pole: had it not been from the double meaning of that word, we should have been quite positive of what we now think by far most *probable*, namely, that Agricola means to say that people in his time measured by the parts of the body, poles, reeds or canes, and strings. This work of Agricola, though intended to be on the weights and measures of his own time, is in reality wholly occupied by discussions on the Greek and Roman measures. He is the first, he says, who in modern times recovered the distinction between the Greek and Roman measures, which had been entirely lost, or at least never mentioned, by his immediate predecessors. It was not uncommon to illustrate the table of measures by drawings of the human body, with descriptions of the foot, palm, &c.; as in the 'Cosmographia' of Peter Apian, reprinted several times in the first half of the sixteenth century. No other reference to a standard of length is given; and the table and drawings are made in such a manner, that nothing but our habit of using other modes of measurement would make any one doubt for a moment that actual reference to the human body is intended. The complete table of the sixteenth century is as follows:—the breadth (not the length, as is particularly stated) of four barleycorns make a digit, or finger-breadth; four digits make a palm (measured across the middle joints of the fingers); four palms are one foot; a foot and a half is a cubit; ten palms, or two feet and a half, are a step (gradus); two steps, or five feet, are a pace (passus); ten feet are a perch; a hundred and twenty-five paces are an Italic stadium; eight stadia, or a thousand paces, are an Italic mile; four Italic miles are a German mile; and five Italic miles are a Swiss mile. It will appear most probable from the preceding statement that the foot was considerably less even than the antient Roman foot of 11·6 English inches; the average human foot certainly has not that length. The table just mentioned, derived, as we shall see, from the Romans in most of its parts, is founded upon a notion which is very near the truth in a well-proportioned man, namely, that the breadth of the palm is the 24th part of the height; the length of the foot, the sixth; and the length of the cubit, or from the elbow to the ends of the extended fingers, the fourth.

It was the practice in the sixteenth century, in which books were written for all Europe, and not for that part of it alone in which the writer lived, to set down on the page printed lines representing the length of a foot, or palm, according to what the page would admit. The term frequently used was 'figurale:' thus a long line extending down the page, marked 'figurale pedis,' means that the length of this line at the time it was printed is that of which the author speaks. No instance was ever produced in which such a line was merely a representation, put down for the purpose of showing subdivisions, or [illegible] it was treated by any succeeding writer as other than an absolute [illegible].

The figured foot, or paper-foot as we may call it, requires to be lengthened, so as allowance for the shrinking of the paper. The surest case in which we can accurately ascertain in what proportion this shrinking has taken place is in the plate of Dr. Bernard's work on English weights and measures, in which a line which is described as 7 English inches has shrunk to 6 inches and 25-thirtieths, or in the proportion of 42 to 41. Other instances give smaller[*] amounts of shrinking: we adopt this ratio of 42 to 41, and the more readily, because the larger allowance we make the more is our final conclusion weakened: this final conclusion being, that the geometers of the sixteenth century used a much shorter foot than the Roman.

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* Remarkable as being [illegible]

* [illegible]

That the mathematicians just named did use a set of measures among themselves, in order to avoid the diversities of popular measures, is established by the express assertion of Clavius, who died in 1612, aged 75, and is therefore a contemporary authority. He says, in his commentary on Sacrobosco, 'Enumerandæ sunt mensuræ quibus mathematici, maximè geometræ, utuntur. Mathematici enim, ne confusio oriretur ob diversitatem mensurarum in variis regionibus (quælibet namque regio proprias habet propemodum mensuras) utiliter excogitârunt quasdam mensuras, quæ certæ ac ratæ apud omnes nationes haberentur.' He then gives the same table as that above. On looking at some of the earlier writers of the sixteenth century, we find a foot which is figured as ten English inches in length, after the shrinking of the paper is allowed for. First Fernel,[†] who measured a degree of the earth, speaks of the foot which he used in two distinct works, the 'Monalosphærium,' Paris, 1526, and the 'Cosmotheoria,' Paris, 1528, in which last the degree is described. In the first work he gives his foot, or 'figuratio pedis geometrici,' which he says is to be chosen with great care, on account of the great diversity of measures. This paper-foot is now within a sixtieth of an inch of nine inches and two-thirds (English), which, increased in the proportion of 41 to 42, is nine inches and nine-tenths. In the second work, he says that five of his own paces, or of those of ordinary men, make six geometrical paces. Now the pace of an ordinary man, or two steps, is almost exactly five English feet; Paucton (p. 187), from actual experiment, gives what amounts to 59 inches and 7-tenths English. At sixty inches per pace, Fernel's foot is then 10 inches (English) exactly: at 59·7 inches it is 9·95 inches. The two descriptions agree so well, that Fernel's foot may be considered as very well determined: nevertheless, Picard, Cassini, Montucla, Lalande, and Delambre have all taken it for granted that by a foot Fernel could have meant nothing but the Parisian foot (12·8 English inches), and have therefore considered him as having (by accident, they suppose) measured his degree with very great correctness, whereas, in fact, he is 15 miles wrong. Budæus (followed by Glareanus and others) had, a few years before (1515), in his treatise *De Asse*, the earliest work on Roman measures, &c., declared that the Roman foot was the same as the Parisian: and Picard, &c. seem to have taken it for granted that Fernel followed Budæus: they might have learnt from Lucas Pætus that this foot of Budæus was 'reprobated by all as having nothing in common with the Roman foot.' The treatise of Stöffler, 'De Mensurationibus,' Oppenheim, 1524, contains his configuration of the digit, palm, and foot, separately, the foot being also divided into palms. These agree exceedingly well with one another, and the foot on the paper is precisely 9 inches and three-quarters (English). This increased in the ratio of 41 to 42 gives 9·98 inches. The author speaks of the digit, &c. as being the celebrated measures which are used by all or most, and gives no hint whatever of his having made a measure for himself. It may here be noted that the English writers of the period make little mention of this book-system, and, when they do mention it, sometimes confound it with the common and popular system. Thus Blundevil, in his 'Exercises,' tells us that the *German foot*, according to Stöffler, is two inches and a half less than ours; alluding, no doubt, to the foot we have just cited.

There is little reliance to be placed on the barley standard; nevertheless, this addition to the Roman system of measures must have been made by some who had tried it: we can hardly suppose that writers would in all cases carefully state that four grains of barley placed side by side give their first and lowest measure, unless they were at least repeating a well-established tradition, founded upon an actual mode of measurement. According to this mode, 64 grains, placed side by side, ought to give their foot: we believe it will be found very difficult to make any barley of our day give more than 10 inches. On trying the first grains we obtained, we found that, by picking out the largest grains, 33 of them just gave more, and 32 less, than five inches: but that, taking the grains as they came, 38 gave only five inches. Not wishing however to trust to one trial, we procured the largest specimens of barley which could be got from two different and distant parts of England, and from these specimens, already selected as choice samples, we picked out the largest grains. In a first sample, 33 grains placed side by side gave five inches; in a second, 33 grains gave five inches and one-tenth; in a third, 33 grains gave also 5 inches and one-tenth. And yet these samples differed apparently in bulk; but on examination we found that the *lengths* of the grains differed materially, their breadths very little. So that the antient English standard, which depended, or was said to have depended, upon the lengths of barley-corns placed end to end, was not founded upon so sure a method as that above described, which depended upon the breadths. The foot of 64 barley-corns derived from the average of the preceding (rejecting that from the smaller grains of the London sample) is 9 inches and eight-tenths of an inch, rather smaller than might be supposed from the other methods of judging, which, however, it must be remembered, have been pushed to their utmost.

We feel persuaded from all that precedes, not only that at the beginning of the sixteenth century there was no distinction made between the measures of the learned and the Roman measures, but that the Roman foot, the foundation of all, was taken to be considerably shorter than the truth, having been probably recovered from the human body. Long after the introduction of sounder notions, we see traces of the same sort of thing. For instance, in the second edition of the mathematical Lexicon of Vitalis (1690), the first edition (1668) being silent on the matter, an article on measures is introduced in which the only authorities alluded to are the 'Dies Geniales' of Alexander ab Alexandro, in which there is nothing but description of antient measures, and the work of George Agricola already cited. The Roman foot was recovered with tolerable ease as soon as it was looked for. Leonard di Portis, an Italian lawyer, gave its length from the Colotian foot hereafter noticed; and Lucas Pætus, another lawyer, wrote elaborately on the antient weights and measures in 1573. Those who would see more of this subject in the sixteenth century must search for the writings of Alciatus, Alcasar, Geo. Agricola, Budæus, Budelius, Capellus, Montanus, Mariana, Lebrixa (Nebrissensis), Neander, Pasi, Pætus, Portius, Villalpandus, &c.

As soon as the middle period is past, the history of weights and measures down to our own time ceases to be European, and, with the exception of those of England and France, we need not, in so short a sketch as the present, give any very close account of the various national measures.

In England, it seems as if the standards were tolerably well settled and widely diffused at so early a period that the writers of this country took comparatively little notice of the system which the continental mathematicians used for their own communications. That the ear of barley and of wheat were actually used in determining the standards, seems[*] to admit of no doubt. The statute 51 Henry III. (A.D. 1266) enacts, 'that an English penny,[†] called the sterling, round, without clipping, should weigh 32 grains of wheat, well dried and gathered out of the middle of the ear; and twenty pence to make an ounce, twelve ounces a pound, eight pounds a gallon of wine, and eight gallons of wine a bushel of London, which is the eighth part of a quarter.' Again, 17 Edward II. (A.D. 1324) provides that three barley-corns, round and dry, make an inch, 12 inches a foot, &c. And the interpretation of the older scientific writers on measures is agreeable to the common meaning of the words. 'Look to the first grounde,' says Oughtred, 'and principle of our English measuring, from Barley-cornes.' But it is so difficult to know how much of the sharp end of a barley-corn must be cut or worn away before it becomes what was called 'round,' that this mode of measuring by the *lengths* of barley-corns is very indefinite. Standards were made at early periods and enforced by various statutes; one of the earliest is one of Edward I. of uncertain date, which directs that a standard of bushels, gallons, and ells, shall be kept in every town, agreeing with the king's measure. With regard to the measure of length, this country has been fortunate, and its standards have, for commercial purposes, fully deserved the name. But the measure of capacity [GALLON] remained various in spite of all acts of Parliament. In the year 1650 there were three distinct modes of determining a wine gallon: 1, From general opinion, which gave 231 cubic inches, and with which, in fact, the gallons in common use agreed, as was proved by the measurements of Oughtred, Gunter, Briggs, and others: 2, The customary standard at the Guildhall, which, though not a legal standard, was considered as such, even by the law-officers of the crown, and which, though in reality only 224 cubic inches, was always taken to be 231 inches: 3, The real legal standard, preserved at the Treasury, containing 282 cubic inches. Oughtred says that the difference between the ale and wine gallons is, 'that because of the frothing of the ale or beer, the quantity becometh lesse, and therefore such liquors as did not so yield froth, as wine, oyle, and the like, should in reason have a lesser measure.' The Report of one of the Committees states that the wine gallon had been gradually shrinking in capacity, until it was arrested at 231 cubic inches by a fiscal[*] definition. That this value was laid down by the statute of 5 Anne, cap. 27, is certain; and the origin of this definition (which is inserted into a statute having nothing to do with weights and measures) seems to have been as follows:—A little after 1700, an information was tried in the Exchequer against one Barker, for having imported more of Alicant wine than he had paid duty for. On the part of the crown it was contended that the sealed gallon at Guildhall (said to contain 231 cubic inches) was the standard. But the defendants appealed to the law which required that a standard gallon should be kept at the Treasury, proved that there was such a gallon at the Treasury containing 282 cubic inches, and established, by the evidence of the oldest persons in the trade, that the butts and hogsheads which came from Spain had always contained the proper number of the real standard gallons. A juror was withdrawn, and the law-officers of the crown took no further proceedings except procuring the above act. A better instance of confusion could hardly be imagined: the legal gallon had gradually been diminished more than 50 cubic inches; the merchants in one particular trade continued to import and to pay duty by the real gallon, and were finally called to account by the attorney-general, who, in common with the rest of the world, had forgotten what the real gallon was, and sued for penalties upon appeal to what was no more a legal standard than the measure in a private shop.

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[*] We have taken the one which is most against us: in the 'Pathway to Knowledge,' (1596; not the work of Recorde under that name, but a translation from the Dutch, of which we can find no mention in bibliographers) a line of six English inches, figured in the translator's preface, has shrunk only by one part out of sixty. With reference to our frequent subsequent citations from this 'Pathway,' we may observe that Jeake, whose ample and laborious account of weights and measures (in his 'Λογιστικηλογία, or Arithmetick [illegible] Reviewed,' London, 1696, but finished in 1674) makes him a [illegible] considers it as a first-rate authority.

[†] [illegible] case in various numbers of the 'Philosophical [illegible]

[*] We do not believe the story of Henry I. ordering that the yard should be of the length of his arm.

[†] A silver penny.

There is something curious about the history of the experiment [GALLON] mentioned by Ward, who was an eye-witness, and wrote just after the statute of Anne, when his account could do no harm. The gallon was found to be 224 (Wollaston afterwards found it to be 224·4) cubic inches, that is, the sealed gallon at Guildhall: but, 'for several reasons, it was at that time thought convenient to continue the former supposed content of 231 cubic inches.' This means, as explained by the Committee of 1758, that the Lords of the Treasury direct an authority to be drawn for gauging according to the Guildhall gallon; the merchants immediately petition to be allowed to sell as they were gauged; the commissioners of customs do not follow the order (which however it does not appear was ever signed); and when the Lords of the Treasury take the attorney-general's opinion upon it, they are recommended to make no change: 'For if the usage of gauging is departed from, he knows not where we shall be, because resort *cannot* be had to the Exchequer for a standard to which almost all the statutes refer; *for* there is none there but what the king will be vastly a loser by.'

The old division of the gallon into that of wine measure, ale and beer measure, and dry[*] measure, was not only unknown to the law, but even to the writers on arithmetic, till the beginning of the seventeenth century. Nor when Briggs, Oughtred, &c. measured the gallons, did they divide them into more than two kinds—for ale and wine. Oughtred, who measured pecks, bushels, &c., and thence found 272¼ cubic inches for the deduced gallon, imagines this to be the ale gallon. It was undoubtedly the old Winchester gallon, before its content was a little reduced by the statute of 1697; this gallon still continued in use in Ireland up to the introduction of the imperial measures; and even in England, as late as 1727, Arbuthnot takes it for the existing dry measure. Perhaps we have the first time in which, and the first person by whom, the distinction of the corn and ale gallon was made, in the following citation from Wyberd ('Tactometria,' 1650, p. 266):—'Now as to Mr. Oughtred's ale gallon of 272¼ inches, the said Mr. Reynolds' (John Reynolds, a clerk in the Mint, often referred to by Wyberd as a mathematician and experimenter) 'indeed alloweth of such a Gallon measure, but not for any liquid thing, but for drie things, as Corne, Coals, Salt, and other dry things measurable by this kind of Measure, and so calleth it the drie Gallon measure: and thereupon he wil have to be 3 severall Gallons (or other like Measures), one for *Wines* (which also serveth for oiles, strong-waters, and the like), another for *Ale* and *Beer*, and a third for *Corne, Coales*, and the like.' Wyberd, rejecting the distinction of the dry and ale gallons, made his wine and ale gallons to be 224 and 266 cubic inches, by a series of carefully conducted experiments: it is singular that a good experimenter, with access to existing standards, and as good an experimenter to suggest something like the actual truth, should not have been able to find out the mere existence of the largest or ale gallon, and it shows the extreme confusion in which the subject was then enveloped.

There has been in various quarters a disposition to suppose that the varieties of gallons arose from the varieties of pounds, since the original definition of the gallon depended upon the pound. This we think exceedingly likely, only we do not imagine that it was done of set purpose, but by confounding one species of pound with the other, in the way of common mistake. There is among most antiquarians a perverse unwillingness to admit human frailty among the explanations of the phenomena of former times, which has caused many an hour to be thrown away in trying to reconcile the Greek musical scales [TETRACHORD], and many more in finding out for the rude forefathers of all kinds of nations an accurate and self-consistent system of weights and measures. Though even in our day, a learned body,[†] legislating for educated men, after declaring in one paragraph that none but troy weight is to be used, has introduced averdupois weight in the very next paragraph,—we never permit ourselves to suppose that such a thing could have taken place in the reign of Henry VIII. or Elizabeth. Now it certainly does happen that there is a close relation not only between the old gallons and the weights, but even between the different versions of the old gallons and the weights. There was a gallon of 282 cubic inches, in the Exchequer as a standard; there was one of 272¼ inches, in common use; there was one of 231 inches, in common use; and there was one of 224 inches, in the Guildhall. Now 282 and 232 are, as near as integers will show it, in the proportion of the pound averdupois to the pound troy, and 272¼ and 224 are as nearly in the same proportion. It is unlikely that this should have been accidental.

Common usage, in the sixteenth century, made more distinctions of measures than have lasted. The editor of the 'Pathway to Knowledge' gives four sorts of pounds as in use: the Tower pound (already mentioned in TROY), the troy and 'haberdepoys,' the subtill, and the foyle. The word *subtill* was not the one mentioned in TARE, at least one would suppose so; let the reader try to understand it himself:—'The poundes subtill, so tearmed for that in in small quantitie it may bee made ratable to represent anye other greater waight whatsoever, as foure penny waight troy, or less to answere in due proportion unto the whole pound Troye, with all his parts, every parte sensible and severally to be handled. This waight is private, to assaye Maisters and such as can make triall of minerals, and not knowne to many other, neither is there any use thereof, in ordinarie accompts.' This seems to mean that any small piece, such as an assayer would cut off for trial, was made to represent a pound, and the fineness expressed in ounces of that small pound would of course represent that of the actual pound. The pound foyle was less than the pound troy by its fifth part, and was used for gold foil and for wire, and for pearls. In the two former cases it obviously means that the workman paid himself for labour and loss by selling four-fifths of a pound of wire or foil at the price of a pound of bullion. And many varieties of measure arise in this way, namely, by varying, not the price of a given amount, but the amount of a given name at a given price. A wholesale bookseller now says that he sells 25 *as* 24, meaning that he who buys two dozen shall have one more; but in the sixteenth century, had this usage existed, it would have been put down that two dozen of books *are* twenty-five.

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[*] We were wrong, we believe, in stating in GALLON that the *wine* gallon was determined by statutes of 1689 and 1697, these related to the other gallons. But there is singular confusion in the Reports of the Committees, which nothing but a new search into the actual statutes will remove.

[*] We do not mean that there was no distinction between liquid and dry measure, but that there was no distinction between the gallons of those measures. Thus Mellis, in the arithmetic appended to his treatise on book-keeping (1588), very distinctly separates the liquid and dry measures, but uses only one gallon, namely that of which the pint is one pound. It may be worth while to add that the mile of 1760 yards is mentioned by this writer four years before it became the *statute* mile.

The preface to the 'Pathway of Knowledge,' already cited, makes no distinction between the ale and wine gallon; it says that the wine gallon is the same as that of ale, and contains eight pounds of wine; it also makes the corn gallon contain eight pounds of wheat.

[†] We allude to the College of Physicians, in the matter of the troy apothecaries' measure, presently mentioned. The mistake was, [illegible], almost inevitable, but it shows what extreme care is necessary.

It is needless to give an account of the old standards of weight mentioned by the committee of 1758, as many of them are lost; a much greater agreement was found to exist between those made at various times than was observed in regard to the standards of capacity. The origin and history of the different weights is alluded to in AVERDUPOIS and TROY; of the standards of length in STANDARD, in which last article will be found an account of the transition to the now established *imperial measures*. The day is probably distant when the English public shall enjoy the advantages of a uniform decimal system of weights and measures—the only one which is sure of stability. An opinion is gaining ground that the best method of ultimately attaining this end is by beginning with the coinage, and this is recommended by the commissioners who have recently reported. [STANDARD.] Nothing, as it fortunately happens, can be easier than this change; the introduction of coins of two shillings each, in place of the half-crown, followed by that of coins of twopence-halfpenny each, might be made without requiring any alteration in the habits or calculations of any one. It is the advantage of this proposition that the two new coins which it requires might be learnt as parts of the old system, before the subsequent alteration of the copper is made. As soon as these coins are well established, an alteration of four per cent. in the copper coinage, or the enactment that *twelvepence-halfpenny* shall pass for the silver shilling, is the whole step requisite to complete the process; and the pound will then consist of ten *two-shilling* coins (under their proper name), the two-shilling coin of ten *twopence-halfpenny* coins (also under their proper name), and the twopence-halfpenny of ten farthings as at present. As soon as this change is made, and the convenience of its arithmetic found by experience, it will not be long before there is a demand for the extension of the principle to weights and measures. And it would be well if those who endeavour to bring about a reform in this matter, would remember that change of coinage is the only change which a government can immediately command—that for one calculation which is made upon goods, hundreds are made upon money—and that, if the small alteration which is required to make the coinage purely decimal cannot be attained, there is little chance of the more extensive changes which the weights and measures will require.

We now describe the English weights and measures as they stood on the last day of the year 1825, immediately before the introduction by law of the imperial measures, with some remarks on their states at different times. As it is not to such an article as the present that the young arithmetician will refer, it will not be necessary to give more than a condensed set of tables. For the modern continental measures which follow, we have to acknowledge great assistance from Dr. Kelly's 'Cambist,' the standard work on the subject.

Troy Weight.—This weight is said to have always been the standard weight of the country: on this assertion we have some doubts; but this is not the place to enter on them at length. The pound is 12 ounces; the ounce is 20 pennyweights; the pennyweight is 24 grains. The pound is 5760 grains. There is but one grain in use, whether troy or averdupois, and a cubic inch of pure water is 252·458 grains (barometer 30 inches, thermometer 62° Fahr.). A cubic foot of water is 75·7374 pounds troy. Wheat and bread were once measured by this weight, but latterly only gold and silver. It is usual to say that precious stones are also measured by troy weight; but, as may be supposed, the measure of these is the grain. The diamond is measured by carats of 151½ to the ounce troy; so that the carat is 3⅙ grains, very nearly. In pearls, the old foil measure already noticed still exists; for the pearl grain is one-fifth less than the troy grain. In the seventeenth century the goldsmiths divided the ounce troy into 24 carats of four grains each for gold and silver: so that the pound troy contained 1152 gold-carat grains. They also divided the ounce into 150 carats of four grains each, for diamonds: so the pound troy contained 7200 diamond-carat grains. But now the CARAT has only the sense noted under that word, for gold and silver; and is altered as above for diamonds.

According to the old statutes, the pound troy is 7680 grains; for 32 grains are to make a pennyweight, 20 pennyweights an ounce, 12 ounces a pound. It is not known when or why the pennyweight was first* made 24 grains. In some old books a grain is 20 mites, a mite 24 droites, a droite 20 peroites, and a peroite 24 blanks. This division of the grain into 230,400 parts must of course have been book-learning: it is said to have been confined to the *moneyers*.

Apothecaries' Weight.—In *dispensing* medicines, the pound troy (Does that weight ever occur in prescriptions?) is divided into 12 ounces, the ounce into 8 drams, the dram into 3 scruples; consequently each scruple is 20 grains. But in buying and selling medicines wholesale, averdupois weight is and always has been used. The 'Pathway,' so often cited (1596), says, 'all physicall drugges' were weighed by averdupois, and Jeake (1674) says that 'many' (only many) of the 'physical doses' are weighed by what we now call apothecaries' weight. The fact seems to be that in the first instance the more precious drugs, as musk, were weighed by troy weight, in the same manner as the more precious metals; and that the common medicines were dispensed by fractions of what was then the common pound, as we shall see under the next head.

Apothecaries' fluid measure.—In 1836, in the new edition of the 'Pharmacopœia,' the College of Physicians prescribed the use of the following measure:—60 minims make a fluid dram; 8 fluid drams a fluid ounce; 20 fluid ounces a pint. For water this is actual weight as well as measure, since the imperial pint† is 20 ounces averdupois of water; but for other liquids the fluid ounce‡ must merely be considered as a name given to the 20th part of a pint. The minim of water is as nearly as possible the natural drop; but not of other substances, the drops of which vary with their several tenacities.

According to Dr. Young (who has reduced them from Vega), the apothecaries' grains used in different countries are as follows:—1000 English grains make 1125 Austrian, 956 Bernese, 981 French, 850 Genoese, 958 German, 978 Hanoverian, 989 Dutch, 860 Neapolitan, 824 Piedmontese, 864 Portuguese, 909 Roman, 925 Spanish, 955 Swedish, 809 Venetian.

Averdupois weight.—The pound is 16 ounces, and the ounce 16 drams: the modern pound is 7000 grains (the same as the troy grains); whence the dram is 27 grains and 11-32nds of a grain. The hundredweight is 112 pounds, and the ton 20 hundredweight. The cubic foot of water is 62·3210606 pounds averdupois. The stone* is the 8th part of the hundredweight, or 14 pounds. The ton of shipping is not a weight but a measure, 42 cubic feet, holding 24 hundredweight of sea-water. In the oldest mentions which are made of *haberdupois* or *averdupois*, the word is not applied to weight, but to goods weighed. A charter of Edward I. speaks, 'de averis ponderis, et de aliis rebus subtilibus:' and no mention is made of averdupois *weight* before the time of Henry VIII. Wingate (quoting Gerard Malynes, whose 'Lex Mercatoria' was published in 1636) says that it serves to weigh 'all kind of grocery ware, as also butter, cheese, flesh, tallow, wax, and every other thing which beareth the name of *garbel*, and whereof issueth a refuse or waste.'

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* Cocker, Wingate, &c. say that a pennyweight is 32 *real* grains, and 24 *artificial* grains.

† The old pint was more nearly a pound, and some of our readers will remember the old saying,—

'A pint's a pound
All the world round.'

The second line of this was certainly not true, and the first only approximately. But under the imperial system the following, which is literally true, may be substituted,—

'A pint of pure water
Weighs a pound and a quarter.'

‡ It is not noted in the 'Pharmacopœia' that the fluid ounce, when it is an ounce, is an ounce averdupois: a preceding sentence in that work implies that medical men are never to use anything but troy weight.

The old merchants' pound, which was 15 ounces [TROY], may have been the origin of the modern averdupois pound. Fleta says everything was weighed by it except gold, silver, and drugs; but it is to be remembered that this does not mean that gold and silver were weighed by troy weight: for it is well known that until a change was made by Henry VIII. in 1527, gold and silver were weighed by the Tower pound of 11¼ ounces. The modern averdupois pound is 14 ounces, 12 pennyweights, all but 8 grains troy. The standards of Elizabeth agree tolerably well with this; but it is to be noticed that unless we suppose two averdupois pounds, one antient, and one modern, there is much reason to doubt whether the averdupois pound was uniform. Dr. Kelly says, 'The old commercial weight of England, which is still retained in Scotland, is about one-twelfth heavier than avoirdupois, the pound being 7600 grains troy....this has been long the weight in England by which the assize† of bread is fixed.' Our suspicion is this, that the old commercial pound, probably differing in different places, though supposed to be uniform, gradually gained the name of averdupois; and that the standards deposited in the Exchequer in the time of Elizabeth, which certainly do not agree with the arithmetical writers of the same date, were probably derived either from this old merchants' pound of 15 ounces troy, or from a selection out of the varying specimens of a pound derived from it. In the 'Pathway' the 'pound haberdepois is parted into 16 ounces; every ounce 8 dragmes, every dragme 3 scruples, every scruple 20 grains;' giving 7680 grains to the pound. This is the probable origin of the old pound which Dr. Kelly mentions, and it happens to contain precisely the same number of grains as the old statute‡ pound before 32 grains took the place of 24 in the pennyweight. And this shows the origin of apothecaries' weight: medicines were dispensed by this old subdivision of the pound, and continued to be so after the pound of Elizabeth's standard had supplanted the old one. It was then natural that this ounce, drachm, and scruple, which were no aliquot parts of the new averdupois pound, but which were aliquot parts of the pound troy, should be referred by arithmeticians to the latter.§ Sir Jonas Moore, who had been surveyor-general of the Ordnance, and could hardly have failed to be correctly informed, gives the same pound and subdivisions. Moore's 'Arithmetic' was first published in 1660. Jeake, as late as 1674, gives the same division and the same pound of 7680 grains; and Harris, as late as 1716, does the same in the third edition of the 'Lexicon Technicum.' Jeake gives several citations tending to show that there was no universal agreement about the pound averdupois. Dalton (the lawyer) and Malynes, he says, agree in making 56 lb. averd. equal to 67½ lb. troy (or $6942\frac{6}{7}$ grains to the pound averd.), but *both* afterwards put 68 for 67½ (which gives $6994\frac{2}{7}$ grains). Others, he continues, affirm the pound averdupois to be 14 ounces, 12 pennyweights troy (giving 7008 grains). The older writers hardly mention averdupois weight: Recorde not at all, Mellis slightly, not subdividing the ounce. Hartwell, an editor of Recorde (1648), mentions this pound of 16 ounces and 7680 grains, divided as above, and says it is used by apothecaries. Oughtred, mentioning Ghetaldi's pound of 6912 grains, compares it only with the English troy pound, without mention of any other. All this shows that, at the beginning of the seventeenth century, there was a complete want of agreement as to what constituted averdupois weight, which continued in some degree till the end. Nevertheless in the middle of the century, Wyberd, who measured for himself, and his friend Reynolds (before mentioned), assert that the averdupois pound is to the troy as 17 to 14 (which gives $6994\frac{2}{7}$ grains, agreeing with Dalton and Malynes), though they say that the then common notion was that the ratio was 73 to 60 (which gives 7008 grains). Ward says that, by a very nice experiment, he found 6999½ grains. Arbuthnot, apparently meaning to cite Greaves, but we cannot find the place, gives the ratio 175 to 144, or $6890\frac{5}{8}$ grains. Down to the statute of Geo. IV., the averdupois pound varied a little, according to the notion of the writer: Dilworth makes it 6999½ grains; Dr. Robert Smith, 7000 grains; Bonnycastle, $6999\frac{23}{24}$ grains. And even since that act came into operation, which declares 'that seven thousand such grains shall be, and they are hereby declared to be, a pound avoirdupois,' an editor of the last-named writer will not obey the statute, but adds the 123rd part of a grain.

Long Measure.—Three barleycorns make an inch, 12 inches a foot, 3 feet a yard, 5½ yards a pole or perch,* 40 poles a furlong, 8 furlongs (1760 yards) a mile. Also 2¼ inches are a nail, 3 quarters of a yard a Flemish ell, 5 quarters an English ell, 6 quarters a French ell. A pace is 2 steps, or 5 feet; a fathom is 6 feet. The CHAIN is 22 yards, or 100 links; 10 chains make a furlong, and 80 chains a mile. The barleycorn is now disused, and the inch is sometimes divided into 12 lines (as in France), but oftener into tenths or eighths. On our older itinerary measures, see LEAGUE and MILE.† The yard is frequently called an ell in old books; *commonly*, Recorde says. Mellis says that both the yard and the ell were divided each into 16 nails. A goad is an old name for a yard and a half. The hand (antiently handful), used in measuring the height of horses, is fixed at 4 inches by 27 Henry VIII., cap. 6. The furlong is probably a corruption of forty-long, from its forty poles: the old derivation, furrowlong, as long as a furrow, seems to us to carry absurdity on the face of it. The etymologists of measures are not always fortunate; Verstegan derives Troy weight from Troynovant,‡ the mythological name for London; and Jeake will have averdupois to be overdupois, because the pound is greater than in troy weight.

Square Measure.—A square perch is 30¼ square yards; 40 square perches are a rood (formerly also farthendele), 4 roods are an acre. The acre is also ten square chains, or 4840 square yards. Four square perches were antiently called a day's work. The rood§ is the same word as rod: Mellis says four *rods* make an acre. The old terms which have come down from 'Domesday Book' at latest, the hide, plowland, carucate, and oxgang, are wholly unsettled as to what magnitudes they meant.

The cubic measures, or measures of capacity, do not immediately depend upon the cubic foot, except in the case of timber. Forty cubic feet of rough timber, or fifty feet of hewn timber, make a load.

The preceding measures have been untouched by the act which introduced the imperial measures. The old measures of capacity, the wine measure, ale and beer measure, and the dry measure, are now replaced by the imperial measure.

Old Dry or Corn Measure.—The gallon is 268·8 cubic inches. Two pints make a quart, two quarts a pottle, two pottles a gallon, two gallons a peck, four pecks a bushel, two bushels a strike, two strikes a comb or coomb, two coombs a quarter (eight bushels), five quarters a wey or load, and two weys a last. In measuring grain, the bushel is struck, that is, the part which more than fills the measure is scraped off. Most other goods were sold by heaped measure, or as much as could be laid on the top of the measure was added. This heaped measure (which was supposed to give about a third more than the other) was at first allowed in the imperial system, but has since been abolished. Coals, which must now be sold by weight, were sold by the chaldron. Three bushels make a sack,[*] three sacks a vat, and four vats a chaldron.

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* There were a great many different stone weights; every one but that of 14 pounds is now illegal.

† Abolished in 1815.

‡ This circumstance and others may lead to the suspicion that the pound of which we now speak (being that which was called averdupois in the sixteenth century) was in reality the old standard. In 1750 Mr. Reynardson published a pamphlet, asserting that the common averdupois pound was the antient standard, on other grounds.

§ The writers of books might invent a pound for this measure, because medicines are not dispensed by pounds, just as they might coin billions, trillions, &c. [NUMERATION], those numbers being never used. But the druggists continued to buy and sell wholesale by averdupois weight.

* In recent times the word perch has been almost confined to the square perch.

† To that article we may add that our [illegible] miles, as distinguished from measured miles [illegible] measured on maps, is mentioned as a [illegible] hemiah Grew ('Phil. Trans.,' [illegible] to have been their reckoning only in the [illegible] by measured miles.'

‡ Mr. Davies Gilbert, in his [illegible] measures, declared for this [illegible] three; observing that the money [illegible] tions each—penny, shilling [illegible]

§ Rod or rood merely means a [illegible] thick. So the word [illegible] says that Satan 'lies floating [illegible] and not the ground which [illegible]

There was antiently a *dell*, or half-bushel (also called a *tovit*), which makes the binary character of this measure almost complete. In the 'Pathway' we do not find the load or wey,[†] and the coomb is also called a *cornook* (by Jonas Moore, *canock*), and the quarter also a seam.[‡] The 'Pathway,' Mellis, and Moore, &c. mention the *water measure* of five pecks to a bushel (11 Henry VII., cap. 4), and always in conjunction with dry measure: it means a dry measure in use at the waterside, and lime, sea-coal, and salt were measured by it. The common dry bushel was called the Winchester bushel; this name is a remnant of the laws of King Edgar, who ordained that specimens kept at Winchester should be legal standards.

Old Wine[§] *Measure*.—The gallon contains 231 cubic inches. Four gills make a pint, 2 pints a quart, 4 quarts a gallon, 18 gallons a rundlet, 31½ gallons a barrel, 42 gallons a tierce, 63 gallons a hogshead, 2 tierces a puncheon, 2 hogsheads a pipe or butt,[‖] 2 pipes a tun. But the pipes of foreign wine depend more on the measures of their different countries than on the above. The rundlet and barrel are generally omitted, but they are both found in writers of the sixteenth century. Mellis gives 18½ gallons, and the 'Pathway' 18 gallons, to the rundlet. Tierce merely means the third part of a pipe, and the puncheon was antiently called the tercian (of a tun). The pottle (of two quarts) formerly existed. The anker of brandy, a foreign measure of comparatively recent introduction into England, is ten gallons.

Old Ale and Beer Measure.—One gallon contains 282 cubic inches. Two pints make a quart, 4 quarts a gallon, 9 gallons a firkin, 2 firkins a kilderkin, 2 kilderkins a barrel, 1½ barrels a hogshead, 2 hogsheads a butt, 2 butts a tun. Up to the year 1803, when the two measures were assimilated[¶] by statute, this was the beer measure, and the ale measure only differed from it in that 8 gallons made a firkin. Nothing above a barrel is mentioned in the oldest tables, and the pottle (two quarts) is introduced. Two tuns were sometimes called a last.

Imperial Measure.—This measure supersedes the old corn, wine, and beer measures. [STANDARD.] The gallon contains 277·274 cubic inches, and is 10 pounds averdupois of water. Four gills are a pint, 2 pints a quart, 4 quarts a gallon, 2 gallons a peck, 4 pecks a bushel, 8 bushels a quarter, 5 quarters a load. Of these the gill and load are not named in the statute, but are derived from common usage. When heaped measure was allowed, three bushels made a sack, and twelve sacks a chaldron. This heaped measure was abolished[**] by 4 & 5 Wm. IV., c. 49, and the abolition was re-enacted by 5 & 6 Wm. IV., c. 63, which repealed the former. These acts leave the higher measures of wine, &c. to custom, considering them apparently as merely names of casks, which in fact they are, and leaving them to be gauged in gallons. It must be remembered that in former times any usual vessel which was generally made of one size came in time to the dignity of a place among the national measures.

Wool Measure.—Seven pounds make a clove, 2 cloves a stone, 2 stone a tod, 6½ tods a wey, 2 weys a sack, 12 sacks a last. The 'Pathway' points out the etymology of the word cloves; it calls them '*claves* or *nails*.' It is to be observed here that a sack is 13 tods, and a tod 28 pounds, so that the sack is 364 pounds. Jeake says this was arranged (31 Edward III., cap. 8) according to the lunar year of 13 months of 28 days each. The reason no doubt was that the multitudes of whose occupation the spinning of wool formed a part might instantly be able to calculate the supply for the year or month from the amount of the day's work; a pound a day being a tod a month and a sack a year.

Tale or Reckoning.—If we were to collect every mode of counting, this would be the largest head of all. The dozen, the gross of 12 dozen, and the score, are the only denominations not immediately contained in the common system of numeration, which are universally received; and in all cases, by a dozen, a score, a hundred, a thousand, &c. were signified different numbers, composed of the arithmetical dozen, score, &c., together with the allowances usually made upon taking quantities of different goods. The 'baker's dozen,' for instance, which has passed into a proverb, arose from its being usual in many places to give 13 penny loaves for a shilling. The increased dozen, hundred, &c. were sometimes called the long dozen, long hundred, &c.; and this phrase is sometimes heard in our own day, when a dear price is called a 'long price.' The 12 dozen was formerly called the *small* gross, and 12 small gross made the great gross. The hundred was more frequently[*] 120 than 100, the thousand generally ten hundred. Ten thousand was frequently called a last; and it is to be observed that the word last was frequently (almost usually) applied to the highest measure of one given kind. The *shock* was always 60; the dicar, or dicker, always 10, as the name imports. In measuring paper (1594) the quire was 25 sheets, the ream 20 quires, and the bale 10 reams. By 1650 the practice of reckoning 24 sheets to the quire (now universal) had been introduced as to some sorts of paper. Tale-fish, as those were called which were allowed to be sold by tale, were (22 Edw. IV., cap. 2) such as measured from the bone of the fin to the third joint of the tail 16 inches at least.

It is impossible for us to describe the various weights, measures, &c. which have found their way into use in the various counties. Dr. Young collected a list, which is printed in the second Report of the Commissioners on Weights and Measures (1820), to which we must refer for the various local barrels, bushels, hundreds, &c., and also for the awm, bag, bale, basket, bat, bay, beatment, billet, bind, bing, boll, bolt, bolting, bottle, bout, box, bucket, bunch, bundle, burden, cabot, cade, canter, caroteel, carriage, cart, cartload, case, cast, cheef, chest, clue, cord, corf, cran, cranock, cut, cyvar, cyvelin, daugh, dish, drop, dupper, erw, faggot, fall, fan, flask, fodder, fotmal, frail, garb, gaun, glean, gunny, gwaith-gwr, hank, head, heap, hide, hobed, hoop, hutch, hyle, incast, ingrain, jar, jug, keel, kemple, kenning, kibin, kishon, kiver, knot, lay, leap, lispound, llath, llathen gyvelin, llestraid, lug, maen, maise, mark, mast, math, measure, meer, meiliaid, merk, mount, mug, oxland, pack, packet, paladr, pared, peccaid, peget, piece, pig, plough land, pocket, poke, pot, pwys, quintal, reel, rees, rhaw, ridge, role, rope, roul, sack, saume, sester, sieve, skain, skin, skron, sleck, spindle, square, stacca, stack, staff, stang, stick, stimpart, stook, stored, sum, table, talshide, tankard, teal, thrave, thread, threave, timber, topston, truss, tub, tunnell, vergée, vragina, waggon-load, wain, warp, web, weight, and windle.

The old Scottish measures vary even more in the different counties than the English. The standard foot was 12·0194 English inches, 3 feet 1 inch make an ell, 6 ells a fall, 40 falls a furlong, and 8 furlongs a mile (1976½ yards). Again, 40 square falls make a rood, and 4 roods an acre. Hence the measures of length and surface are so connected that the Scottish land-chain is the eightieth part of a mile, and its square the tenth part of an acre.

In Scotland the English troy and averdupois weight obtained an early introduction, and were used with the Scottish Troy weight, called also Dutch weight, and with the tron weight. The Dutch weight is as follows:—a drop is 29·722 English troy grains, 16 drops are an ounce, 16 ounces a pound (7608·95 grains), and 16 pounds a stone. This pound coincides with the old English pound already mentioned, very nearly. In the tron weight the divisions are as before; but the drop is 37·588 English troy grains, and the pound 9622·67 of the same.

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[*] In 1596 the sack was four bushels.

[†] Moore makes six quarters, and Ward ten, in a wey.

[‡] This word has been preserved as a measure of glass.

[§] For wine and spirits, cider, mead, oil, honey, vinegar.

[‖] According to Mellis, the butt was a name applied only to half-tuns of malmsey or sack.

[¶] The reader would look in vain for any notice of this in books of arithmetic. Perhaps the statute was not attended to. The distinction of the ale and beer firkin is said by Ward to have existed only in London, an average firkin of 8½ gallons having been enacted for all other parts of England by the statute of Excise of 1689. But it does not follow, in matters of weights and measures, that any change actually was produced, merely because there was an Act of Parliament for it.

[**] It was abolished in Scotland two centuries ago, and re-enacted by neglect in the act of 1825. But the re-enactment did not obtain for it the slightest introduction, according to Mr. M'Culloch.

[*] According to the old adage, the hundred was—

> 'Five score of men, money, and pins,
> Six score of all other things.'

The Scottish liquid gallon was 833·6272 English cubic inches. Four gills made a mutchkin, 2 mutchkins a chopin, 2 chopins a pint, and eight pints a gallon. The Scottish pint was therefore 3 English pints very nearly. They had only one liquid measure; but they had two dry measures; the first for wheat, peas, beans, &c.; the second for barley and oats. In the first the peck contained 553·581 English cubic inches. Four lippies made a peck, 4 pecks a firlot, 4 firlots a boll, and 16 bolls a chalder. The second measure was divided in the same way, but the peck was 807·576 English cubic inches.[*]

On the Irish measures, previous to the introduction of the imperial system, there is nothing to remark, except that the coal bushel contained 10 English corn gallons, the lime bushel 8, the malt[†] gallon 272¼ cubic inches, and the liquid gallon 217·6 cubic inches. The pole was 7 yards, which made the mile equal to an English mile and three-elevenths, and the acre greater than the English acre in the proportion of 121 to 196.

We have not space to enter into the antient history of French measures, for which the reader[‡] may consult Paucton's 'Métrologie,' Paris, 1780. On the measurement of the earth on which the metre depends, see TRIGONOMETRICAL SURVEY, p. 216. The system of measures derived from this great operation was introduced in 1795 (by the law of 18 Germinal, An III., or, to speak intelligibly, March, 1795): not that the survey was then completed, but because, in the hurry to get rid of the old system, it was decided to introduce a 'mètre provisoire' obtained from the existing surveys. The definitive metrical system was introduced in 1799, but it was found impossible to drive out the old subdivisions; accordingly, in 1812, the 'système usuel,' as it was called, was allowed[§] to be engrafted upon the metrical system; in which the measures, &c. were taken from the metrical system, but with the antient subdivisions adapted to them. Even this was very far from entirely driving out the old system. In 1837 a law was passed ordaining that from and after the 1st of January, 1840, no other weights nor measures should be used except those of the pure metrical system, and this law seems to have been effective. In the antient French system the *pied de Roi* was 12·7892 English inches, the aune (at Paris) 46·85 of the same. The toise was six feet. For the itinerary measures see MILE. The *arpent d'ordonnance* was 1 acre, 1 rood, 2 perches (English); the *arpent commun* 1 acre 7 perches, the *arpent de Paris* 3 roods 15 perches English. The *acre de Normandie* was 2 acres 2 perches English. For measuring liquids, the pinte was less than the English quart by its 61st part. Two boissons made a demisetier, 2 demisetiers a chopine, 2 chopines a pinte, 2 pintes a quarte, 4 quartes a setier, 36 setiers a muid (70·8 English gallons). For grain 16 litrons made a boisseau, 3 boisseaux a minot, 2 minots a mine, 2 mines a setier, 12 setiers a muid. The minot was 1·108 English bushels. The principal weight, called *poids de marc*, was the livre of 9216 French grains, or 7555 English grains; 72 grains made one gros, 8 gros an ounce, 8 ounces a marc, 2 marcs a livre. The apothecaries divided the ounce into 2 duelles, the duelle into 4 siciliques, and also into 6 sextules and into 8 drachms, the drachm into 3 scruples, and therefore the scruple into 12 grains.

The new system is called metrical, as derived from the measurement of the earth. Its first measure, the metre, is presumed to be the ten-millionth part of a line drawn from the pole to the equator, and is 39·37079 English inches. All the multiples and subdivisions of every measure are decimal, and are formed by the same prefixes. For 10, 100, 1000, and 10,000, the syllables *Deca*, *Hecto*, *Kilo*, and *Myria* are prefixed; and for tenths, hundredths, thousandths, the syllables *Deci*, *Centi*, *Milli*. Latin[*] prefixes indicate division, Greek prefixes multiplication. Thus the hectometre is 100 metres, and the centimetre the hundredth part of a metre. The metre being thus settled, the other fundamental measures are formed as follows:— For surface or area, the *Are*, which is a decametre square, or 100 square metres, or ·02471143 of an English acre, or 3·9538 English perches.

For solidity, the *stere*, or cubic meter, 35·32 cubic feet English, or 220·09687 imperial gallons English.

For liquid measures the *litre*, or cubic decimetre, ·22009687 of an imperial gallon, or a very little more than a pint and three-quarters English.

For weight the *gramme*, a cubic centimetre of distilled water at the freezing-point, ·00220606 of an English pound averdupois, or 15·442 grains[†] English. The kilogramme is therefore 2·2 pounds averdupois, or, roughly, 50 kilogrammes make a hundredweight. The franc, the unit of money, is divided into 10 decimes, and each decime into 10 centimes. The sous is therefore 5 centimes. The advantage of the whole system, *when established*, is so great, that all who are fully aware of it long for the introduction of a similar one into our own country. A Frenchman, when told that a kilogramme costs 253 francs 74 centimes, sees at once that a gramme costs 25 centimes and 374 thousandths of a centime. An Englishman, wanting to know the price of an ounce when a hundredweight costs 253*l*. 14*s*. 10*d*., must go through the whole of the following process:

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  112               253l. 14s. 10d.
    8                 20
 ----                ----
  896         1792) 5074 (2
    2               3584
 ----               ----
 1792               1490
                      12
                   -----
              1792) 17890 (10
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to get 2*s*. 10*d*. the answer.

The *système usuel*, now abolished, was as follows, the divisions being those of the old system. The toise was 2 metres, and the foot its sixth part. The aune was 3 feet 11¼ inches English. The boisseau was one-eighth of the hectolitre: the litron was 1·074 Paris pintes. The livre was 500 grammes. The arpent was that of the old system.

It is not in our limits to give a complete list of the weights and measures of foreign[‡] countries. We have selected accordingly a number of places from the smaller works on exchange operations, presuming that the best choice we can make is that which includes the most important countries or spots which have large money-dealings with our own country. All the weights, &c. named have been taken[§] for these places from Kelly's 'Cambist.' All the English measures are of course imperial (the gallons being reduced by ourselves into imperial gallons, and each measure is given in English measures.

Austria. The metrical system is introduced in the Italian dominions. In Austria proper, gold and silver are weighed by the Vienna marc of 4333 grains. The pfund is 1·235 pounds averdupois: the metzen is 1·691 bushels. The eimer is 12·444 gallons. The foot is 12·45 inches; the ell, 30·66 inches. The joch is 1 acre, 1 rood, 28 perches.

Bavaria. The Augsburg marc is 3643 grains; 24 lb. commercial weight is 25 lb. averdupois, and 24 lb. carriers' weight is 26 lb. averdupois, nearly. The metzen is 1·515 bushels; the fuder (16 muids) is 31·24 bushels. The foot (half the short ell) is 11·667 inches. The long ell is 24 inches.

Bremen. For gold and silver, as at Hamburg. The commercial pound is 1·098 pounds averdupois. The last is 78·217 bushels. The ohm is 31·562 gallons. The [illegible] or half-ell, is 11·38 inches.

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[*] Our authority for the Scottish measures is 'Tables for converting the weights and measures hitherto in use in Great Britain into those of the Imperial Standards, &c., also abstracts of the jury verdicts throughout Scotland,' &c., by George Buchanan, Civil Engineer, Edinburgh, 1829. This work is as complete as a work can be: the reader may compare it with 'A proposal for the Uniformity of Weights and Measures in Scotland,' &c., second edition, Edinburgh, 1789.

[†] This was the old Winchester gallon, already mentioned.

[‡] On this work, that of Romé de L'Isle (1789) and the anonymous 'Métrologies Constitutionelles et Primitives' (1801), it may be observed that they are all vitiated by the assumption that a very accurate knowledge of the earth's diameter antiently existed, from which all weights and measures, even those anterior to Greek and Roman times, were derived. Greaves had led the way by finding out English weights and measures from the Egyptian pyramid. All particular pursuits have their peculiarities: that of the metrologists has been to imagine some grand and mysterious connection between existing measures and a body of science which they say has been forgotten, but which they have never shown to have had existence.

[§] In 1816 it was enforced, decimal division being prohibited in retail business.

[*] The Latin prefixes suit the French language well enough [illegible] are incongruous and unsightly. Nor has [illegible] the centigrade thermometer ought to have been [illegible]

[†] Dr. Kelly (Cambist, i. 141) makes it 15·131 grains [illegible] reasons.

[‡] There is a large list of the fundamental [illegible] most wanted, in 'Table of Continental [illegible] house (London, Weale, 1836).

[§] We find the weights, &c. in the [illegible] taken, rather different from those in Dr. Kelly [illegible] the best authority, and nothing [illegible] given in it. When a standard [illegible] second-rate writer to differ from [illegible]

Colonies. Follow in general the weights and measures of the mother country, except where they have passed under other governments, in which case there is usually a mixture of the two.

Constantinople. The chequee is 4957 grains. The oke is 2·832 pounds averdupois. The killow (dry) is 7·296 gallons. The almud is 1·150 gallons. The pike is 27 inches. The measures of Turkey are very imperfectly known.

Denmark. The pound for gold and silver is 7266 grains. The commercial pound is 1·1028 pounds averdupois. The barrel is 3·8264 bushels. The viertel is 1·701 gallons. The foot, or half ell, is the Rhineland foot of 12·356 English inches. The toende of corn is 5½ acres.

Florence and Leghorn. The cantaro is 150 pounds of ·74864 pounds averdupois each. The stajo is ·6702 bushels. The barile is 10·033 gallons. The braccio is 22·98 English inches. The saccata is 1 acre 36 perches.

Frankfort. For gold and silver, the Cologne marc. The common pound is 1·03 lb. averdupois. The centner is 112·25 lb. averdupois. The malter is 2·9705 bushels. The ohm is 32·454 gallons. The foot is 11·27 inches, the ell 21·24 inches.

Geneva. The mark is 3785 grains. The *poids fort* is 1·214 pounds averdupois; the *poids foible* one sixth less. The coupe is 21·361 bushels. The setier is 99·53 gallons. The foot is 19·2 inches. The acre is 1 acre, 1 rood, 4 perches.

Genoa. The pound sottile for gold and silver is 4891·5 grains. The pound *grosso* is ·76875 pounds averdupois. The mina is 3·321 bushels. The mezzarola is 32·57 gallons. The palmo is 9·725 inches.

Hamburg. The Cologne marc is 3608 grains; the pound troy is two marcs. The commercial pound is 1·068 pounds averdupois. The last of wheat (30 scheffels) is 10·9 quarters: the ahm is 31·85 gallons. The foot is 11·289 inches. The scheffel (quantity usually sown with a scheffel) of land is 1 acre 6 perches.

Holland. The marc is 3798 grains; the pound is 2 marcs. But the commercial pound is 1·0893 lb. averdupois. The last (variously divided) is 10·231 quarters. The aam (256 pints) is 34·16 gallons. The Rhineland foot is 12·36 inches. There are several ells of about 27 inches. The Rhineland perch is 12 Rhineland feet, and the Rhineland morgen or acre is 2 acres 16 perches.

Ionian Islands. The weights and measures are mostly Venetian and Turkish.

Lübeck. For gold and silver, as at Hamburg. The commercial pound is 1·0685 lb. averdupois. The scheffel is ·92 bushels. The ahm is 31·85 gallons. The foot or half ell is 11·346 inches.

Malta. The pound for gold and silver is 4886 grains. The commercial pound is 1·745 pounds averdupois. The salma is 7·968 bushels. The foot is 11·167 inches. The canna (8 palmi) is 81·9 inches.

Milan. The mark is 3627 grains. The pound *sottile* is ·7206 pounds averdupois: the pound *grosso* is 1·682 pounds averdupois. The moggio (32 quartari) is 4·0234 bushels. The brenta (12 quartari) is 15·71 gallons. The braccio is 23·42 inches. The metrical system is also introduced, with Italian names.

Naples. The pound for gold and silver is 4950 grains. The cantaro grosso is 196·5 pounds averdupois, the cantaro piccolo 106 pounds averdupois. The tomolo is 1·407 bushels. The barile is 9·172 gallons. The palmo is 10·38 inches. The moggia is 3 roods 12 perches.

Netherlands. Since 1820, the French metrical system has been in use, with Flemish names.

Portugal. The marc is 3541·5 grains. The commercial pound is 1·0119 pounds averdupois. The moyo is 22·39 bushels. The almude is 3·6407 gallons. The foot is 12·944 inches.

Prussia. (New system, established 1816.) The Cologne* marc is 3609 grains; two marcs are a commercial pound, or 1·0311 pounds averdupois. The scheffel is 1·5116 bushels. The eimer is 15·11 gallons. The foot is 12·356 inches, the ell two-thirds of a metre. The morgen or acre is 2 roods 21 perches.

Rome. The pound is 5234 grains or ·7477 pounds averdupois. The rubbio (4 quarte) is 8·1012 bushels. The barile (32 boccali) is 12·841 gallons. The foot is 11·72 inches. The builders' canna, of 10 palms, is 87·96 inches.

Russia. There is but one pound, ·9026 of a pound averdupois. The pood is 36 lb. averdupois. The chertwert is 5·7698 bushels. The vedro is 2·7048 gallons. The inch is the English one; the arshine is 28 inches; the foot is 13¾ inches; but the English foot is in common use. The desetina is 2 acres, 2 roods, 32 perches.

Saxony. For gold and silver, the Cologne marc. The commercial pound is 1·0294 lb. averdupois. The Dresden wispel (24 scheffels) is 69·85 bushels; the Leipzic wispel, 91·747 bushels. The Dresden eimer is 14·89 gallons; the Leipzic eimer 16·75 gallons. The Dresden foot is 11·14 inches; the Leipzic foot is 11·13 inches. The acre is 1 acre, 1 rood, 18 perches.

Sicily. The pound is 7 pounds averdupois. The cantaro grosso is 192·5 pounds averdupois; the cantaro sottile is 175 lb. averdupois. The salma grossa is 9·46 bushels; the salma generale 7·59 bushels. The salma of wine is 19·23 litres. The palmo is 9·5 inches.

Smyrna. The chequee is 4958 grains. The rottolo is 1·2748 pounds averdupois. The killow is 11·3 gallons. The pike is 27 inches.

Spain. The Castilian marc for gold and silver is 4800 grains. The commercial pound is 1·0144 pounds averdupois. The fanega is 1·55 bushels. The arroba of wine is 3·538 gallons. The foot is 11·128 inches: the vara is 33·384 inches. The fanegada (for corn-land) is 1 acre, 21 perches.

Sweden. The Mint marc is 3252 grains. The commercial pound is ·9376 lb. averdupois. The dry tunna is 4·028 bushels; the liquid tunna is 48 kanns of ·5756 gallons each. The foot, or half-ell, is 11·684 inches. The tunneland is 1 acre, 35 perches.

United States. The weights and measures are those of England before the late alterations.

Venice. The marc for gold and silver is 3681·5 grains. The pound *peso grosso* is 1·0518 lb. averdupois. The pound *peso sottile* is ·664 pounds averdupois. The stajo is 2·2 bushels. The anfora is 114·1 gallons. The braccio for woollen is 26·61 inches; for silk, 24·8 inches. The foot is 13·68 inches.

We now proceed to the weights and measures of the antients, taking first the relations of the various denominations to one another, and afterwards the fundamental comparisons of their values with the modern weights and measures.

The Romans had a mode of dividing the as or libra which they transferred upon occasion to any unit. The whole, whether an as or anything else, consisted of twelve unciæ, so that the uncia became little more than a name for the twelfth part. The division stood thus—

1½ unciæ was Sescuncia, or Sescunx.
2 . . . Sextans (a sixth).
3 . . . Quadrans (a fourth), or Teruncius.
4 . . . Triens (a third).
5 . . . Quincunx.
6 . . . Semis, or Semissis (a half).
7 . . . Septunx.
8 . . . Bes, or Bessis.
9 . . . Dodrans.
10 . . . Dextans, or Decuncis.
11 . . . Deunx.

The libra of weight was thus subdivided:—3 siliquæ, one obolus; 2 oboli, one scrupulum; 4 scrupula, one sextula; 6 scrupula, one sicilicus; 8 scrupula, one duella; 3 duellæ, one uncia; 12 unciæ, one libra. In later times the uncia was divided into 8 drachmæ of 3 scrupula each. This mode of dividing an integer into 288 scrupula runs through other branches of their system, and is also used in subdivision of a unit. The obolus in the preceding system rather belongs to a later period in which the Greek divisions were introduced, the ounce being made 8 drachmæ of 3 scrupula or 6 oboli each. The uncia appears (as οὐγγία) in the later Greek writers.

In the measures of length the pes, or foot, was divided not only into 12 unciæ, but also into 16 digiti. In such Roman foot-rules as have been found, all have the digital division, some both, but none the uncial without the digital. And 4 digiti are one palmus; 4 palmi, one pes; 1¼ pedes, one palmipes; 1½ pedes, one cubitus; 2½ pedes, one gradus; 2 gradus, or 5 pedes, one passus; 2 passus, one decempeda; 12 decempedæ, one actus;* 1000 passus, one milliare.

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* This weight, established by Charles V. as the standard of the precious metals throughout Germany, has varied in different places from 3606 to 3612 grains.

The jugerum was an area of which the scrupulum (or 288th part) was the square decempeda, or 100 square feet. It was frequently divided uncially, and also as follows:—36 scrupula made one clima; 4 climata, one actus quadratus; 2 actus quadrati, one jugerum; 2 jugera, one heredium; 100 heredia, one centuria; 4 centuriæ, one saltus. The actus minimus was 480 square feet. The versus was 10,000 square feet. The aripennis (whence *arpent*) was a Gallic measure which Columella defines as semi-jugerum, but whether of Romans or Gauls is not clear.

The amphora, or quadrantal,† for liquid measure, was a cubic foot. Four ligulæ made one cyathus; 6 ligulæ, one acetabulum, 2 acetabula, one quartarius; 2 quartarii, one hemina; 2 heminæ, one sextarius; 6 sextarii, one congius; 4 congii, one urna; 2 urnæ, one amphora; 20 amphoræ, one culeus. In Galen the cochleare is the tenth of a ligula.

The modius, or modium, of dry measure, was 16 sextarii, or the third part of the amphora, or cubic foot. The sextarius was divided in the same manner as in liquid measure. The concha is mentioned as a smaller measure than the ligula.

The Greek weights have been discussed in the article TALENT. Six *ὀβολοι* make one *δραχμη*; 100 *δραχμαι*, one *μνα* (mina); 60 *μναι*, one *ταλαντον*. The *χαλκος* and the *λεπτον* are mentioned as subdivisions of the *ὀβολος*, but are not generally recognised.

As to length, the *πους*, or foot, was thus divided:—4 *δακτυλοι* make one *παλαιστη*; 12 *δακτυλοι*, one *σπιθαμη*; 4 *παλαισται*, one *πους*; 1½ *ποδες*, one *πηχυς*; 4 *πηχεις*, one *ὀργυια*; 100 *ποδες*, one *πλεθρον*; 6 *πλεθρα*, or 600 *ποδες*, one *σταδιον* [STADIUM]. The *δοχμη* is the *παλαιστη* in some writers, the *σπιθαμη* in others. The *παλαιστη* is also called *δακτυλοδοχμη* and *δωρον*. The *λιχας* is 10 *δακτυλοι*, the *ὀρθοδωρον* is 11 *δακτυλοι*, the *πυγμη* 18, and the *πυγων* 20 *δακτυλοι*. The *διχας* is half a *πους*, the *βημα* is 2½ *ποδες*. The *ξυλον* is 4½ *ποδες*, and the *καλαμος* 10 *ποδες*. The *σταδιον* was once called *αὐλος*, and the *διαυλος* is two *σταδια*. The *σταδιον ἱππικον* is 4 *σταδια*, and the *δολιχος* is 12 *σταδια* generally, but is variously used. We must also mention the *κονδυλος* of 2 *δακτυλοι*, and the *ἁμμα* of 60 *ποδες*. The Greeks have taken the *σχοινος* (variously described) from the Egyptians, the *μιλιον* from the Romans, and the *παρασαγγης*, which is 30 stadia, according to Herodotus and Xenophon, from the Persians. The *πους φιλεταιριος*, or Philetærian foot, though used by Greek writers, is not originally Greek, and is said to be longer by a fifth than the Roman foot. All writers agree that the common Greek *πους* is longer than the Roman foot by the 24th part of the latter.

The *πλεθρον* in square measure was a square of the side of a *πλεθρον* in length, or 10,000 square *ποδες*. The *ἀρουρα* was the fourth part of the *πλεθρον*; but the Egyptian *ἀρουρα* mentioned by Herodotus is the square of 100 Egyptian cubits.

In liquid measure, 2 *κοχλιαρια* make one *χημη*; 2½ *κοχλιαρια*, one *μυστρον*; 2 *μυστρα*, one *κογχη*; 2 *κογχαι*, one *κυαθος*; 3 *κογχαι*, one *ὀξυβαφον*; 2 *οξυβαφα*, one *τεταρτον*; 2 *τεταρτα*, one *κοτυλη*; 2 *κοτυλαι*, one *ξεστης*; 6 *ξεσται*, one *χους*; 12 *χοες*, one *μετρητης*. The *μετρητης* is said to have been an amphora and a half, and the *κυαθος* to have contained 10 drachms of wine. The *λαγυνος*, or *λαγηνος*, was the same as the *χους*. There were also the *χημη γεωργικη* and the *μυστρον γεωργικον*, rural measures. The *μετρητης* was also called *ἀμφορευς* and *καδος*.

In dry measures, the *μεδιμνος* was one-third larger than the *μετρητης* (or was two Roman amphoræ), and was thus divided:—Ten *κοχλιαρια* made one *κυαθος*; 15 *κοχλιαρια*, one *οξυβαφον*; 4 *οξυβαφα*, one *κοτυλη*; 2 *κοτυλαι*, one *ξεστης*; 2 *ξεσται*, one *χοινιξ*; 4 *χοινικες*, one *ἡμιεκτον*; 2 *ἡμιεκτα*, one *ἑκτος*; 6 *ἑκτοι*, one *μεδιμνος*. There are various descriptions of the *χοινιξ*, from which it may be that there were several measures of the name. The Greeks mention the Persian *ἀχανη* of 45 *μεδιμνοι*, the *ἀρταβη*, of one *μεδιμνος*, and the *καπιθη* of 2 *χοινικες*. The Bœotian *κοφινος* is 3 *χοες*: the Homeric *ἀδδιξ* is 4 *χοινικες*; the *μαρις* is 6 *κοτυλαι*; the *ἀλαβαστρον*‡ is the *κοτυλη*.

The following measures are identical in pairs, if the *μεδιμνος* be two amphoræ:—The *χους* and the congius; the *ξεστης* and the sextarius; the *κοτυλη* and the hemina; the *τεταρτον* and the quartarius; the *οξυβαφον* and the acetabulum; the *κυαθος* and the cyathus.

All the Greek measures above given are Attic: there are some variations of description which, if not erroneous, probably belong to other parts of Greece. It is customary to give the Greek and Roman measures in two collections, without any attempt to distinguish the times at which they were in use; so that Homer and Athenæus, or Herodotus and Galen, may appear as authorities in the same set. There are many other names of measures noted by different writers, some of which are but synonymes of some of those above mentioned, and of others it may be doubted whether they were really names of recognised measures. If the writers of our day were compared in isolated passages as closely as those of the antients, we might probably have a great many measures made for us of which we know nothing: the shells which the grocers use would have good chance of a permanent establishment, and their paper bags could not possibly escape.

The Hebrew measures, though tolerably well settled in their proportions, are very imperfectly known as to their absolute magnitudes. We shall only give here the usual summary, and shall then give some account of the mode of determining the actual magnitude of the Greek and Roman measures. With regard to these Hebrew measures, much uncertainty prevails; the authorities are by no means so numerous as those for the other antient measures, nor has the subject received so much discussion.

The cubit was about 22 inches; four digits make one palm; 3 palms, one span; 2 spans, one cubit; 4 cubits, one fathom; 6 cubits, one reed (Kaneh); 8 cubits, one pole (Arabian); 80 cubits, one measuring-line;* 400 cubits, one stadium; 5 stadia, a Sabbath day's journey; 10 stadia, a mile; 24 miles, a day's journey.

In liquid measures, the bath, or ephah, of about 6¼ imperial gallons, is thus divided:—Four logs make one cab; 3 cabs, one hin; 2 hins, one seah; 3 seahs, one ephah. The caph is three-fourths of the log. For dry measures, besides the cab, seah, and ephah, 5 ephahs make one letech; 2 letech, one Chomer, or Homer. The gomer is the tenth of the seah.

For weight, 60 shekels make one maneh; 50 maneh, one talent of 93·75 pounds averdupois.

We now come to the comparison of the Greek and Roman measures with our own. The Roman foot, the most important of all, has been determined in the following† ways:—1. By feet laid down on sepulchral monuments. 2. By foot-rules obtained in the ruins of Rome and elsewhere. 3. By the distance of mile-stones. 4. By the distance of places. 5. By specimens of the congius. 6. By some obelisks. 7. By the dimensions of buildings. The results are given in lines of 144 to the Parisian foot, and as many dissertations on this subject make great use of the line, it will be convenient to give a table of its multiples in terms of the English inch.

One line ($\frac{1}{12}$ inch French) is ·08881378 English inches.

2 lines . . . are	·17762756
3	·26644134
4	·35525512
5	·44406890
6	·53288268
7	·62169646
8	·71051024
9	·79932402

129·484 lines are 11½ English inches.

The *sepulchral* feet are:—1, that marked on the tomb of one Statilius,‡ found in the Vatican garden in the sixteenth century; 2, that found on the tomb of Cneius Cossutius (Vitruvius mentions an architect of that name), dug up in the garden of Angelo Colozzi§ before 1516; 3, that on the tomb of M. Æbutius; 4, that on a monument without inscription, given by the Marquis Capponi to the Capitoline Museum at Rome. Taking the means of such trustworthy measures as have been made of these different feet, it appears that the Statilian foot is 131·17 Paris lines; the Cossutian, or Colotian, 130·59 lines; the Æbutian 131·14 lines; and the Capponian 130·80 lines.

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* The actus is described as the length of a furrow. If our furlong had been (as some would suppose) a furrow long, it would have been nearer to the Roman actus, not one-eighth of a mile.

† The term quadratus seems to have applied to cubes as well as squares among the Romans.

‡ This word is translated in two of the gospels (*Mark*, xiv. 3; *Luke*, vii. 37) *as alabaster box*; Epiphanius is the authority for the measure, which there is no doubt took its rise from the circumstance of perfumes being commonly inclosed in alabaster boxes of one size.

* Pathil, or Chebel; σχοινος in the Septuagint.

† In the historical account of the Roman foot we have followed J. F. Wurm, 'De Ponderum, &c. Rationibus apud Romanos et Græcos,' Stuttgard, 1821, as to method, verifying several of his statements.

‡ We enumerate these, not for their importance, but because they are so frequently referred to.

§ This foot is figured in the work of Leonardus Portius, the first in which any attempt was made to restore the real Roman measures. It has no place nor date; but being printed by Joh. Frobenius, must be of Basle before 15[illegible]

The first foot-rule was measured by Lucas Pætus, 'De Mensuris et Ponderibus Romanis et Græcis,' Venice, 1573, who found three of them agreeing with each other as far as his means of comparing them went, a copy of which he caused to be engraved on stone and placed in the Capitoline Museum. This was called the *Capitoline foot*, and was frequently regarded as conclusive. Pætus himself makes the foot amount to 128·7 lines; but there is reason to suppose either that his measures are too short or that the standard to which he referred them has been mistaken; for others make his own Capitoline foot to be 130·5 lines. Two other foot-rules give 128·75 and 130·03 lines. There was a porphyry column at Rome (now lost) marked *ποδ. θ*, which was certainly meant for nine Roman feet. An editor of Vitruvius, Philander (1552), makes the Roman foot to be, from this column, 131·63 lines; but Pætus makes it only 130·03. Other foot-rules have been made to give 130·5, 130·93, 132·89, 130·56, 129·24, 131·16, 130·66. Some of these are different measures of the same rule.

Very few consecutive milestones have been found from which to deduce the foot. From one mile in the Appian way, and from two different ones between Nismes and Beaucaire, the foot has been deduced to be 130·60, 130·29, and 130·51 lines. From various recorded distances between towns, subject to the difficulty of knowing precisely from what parts of them the miles were measured, the foot has been found to be 132·34, 128·42, 130·99, 129·31, 132·55 lines. D'Anville, from a collection of such measures, fixes it at 130·8 lines.

A specimen of the congius is yet remaining, which, by an inscription, is declared to have been placed in the Capitol by Vespasian as a standard. The congius is the eighth part of the amphora, or cubic foot. By ascertaining the weight of water which this contains, the foot was estimated by various observers at 131·15, 133·21, and 132·44 lines. From the length of the foot drawn upon the congius itself have been obtained 132·8, 133·5 lines. From another congius preserved at Paris, Auzout found 134·18 lines for the Roman foot.

There are two obelisks at Rome, which were brought by Augustus from Heliopolis. Pliny gives the height of these in feet, or rather, the height of the higher and the defect of the lower from it. Measurement proves that, with respect to the higher, the number of Pliny must be corrupt; but from his difference between the two, as compared with the measured difference, the Roman foot is 137·19 lines.

The method of ascertaining the foot by buildings is as follows:—Any remarkable length, such as that of the whole front of a building, being known nearly in Roman feet, is presumed to be exactly that number of feet which it must be nearly. This supposes that the Roman architects were in the habit of choosing exact numbers of feet when there was no particular reason for breaking a foot. Raper (*Phil. Trans.*, 1760) proceeds in the manner of which the following is an instance:—He finds the distances between the columns in the temple of *Fortuna virilis* to be 9·7106 English feet. If this be an exact number of Roman feet, it must be 10; we know enough beforehand of the Roman foot to say it cannot be 9 or 11. Consequently, if the distance between these columns be a whole number of feet, the foot must be ·97106 of the English foot. By processes of this sort, Greaves found 131·50 lines, La Hire 131·0 and 132·4, La Condamine 130·9, Jacquier 131·08 and 131·14. Raper, who went more into this subject than the others, found by different buildings 131·14, 131·60, 131·62, 131·11, 131·16, 131·05, 131·16, 131·05, and 131·15 for the mean. Wurm, from the Verona amphitheatre, adds 131·12. Raper thought he observed that the buildings subsequent to the time of Titus give a shorter foot than their predecessors: from instances he gets 130·75, 130·33, 130·34, with a mean of 130·34. He refers the change to the destruction of the Capitol (where the standards were kept) in the time of Vitellius.

From all these data Raper's average, adopted by Wurm, is 131·15 French lines for the antient foot, or 11·648 English inches, or ·971 English feet. But Sir G. Shuckburgh made a careful review of the three best modes of obtaining the required result, namely, rules, buildings, and tombs, and obtained ·9672, ·9681, ·9696 of a foot English. (Young's *Lectures*, ii. 153.) The mean of these is ·9683 feet, or 11·6196 inches. Again, if we take a mean of the results given by others, namely, Bernard ·970, Picard and Greaves ·967, Folkes ·966, Raper ·970, we have also ·9683. We take then the Roman foot at 11·62 English inches, which is represented far within the probable limits of error by the following:—61 English feet make 63 Roman feet. We are well aware that eminent authorities of late years prefer 11·65 inches for the Roman foot, but we like to keep as near to the foot-rules as we can, consistently with giving due weight to other modes. Indeed, the question between 11·62 and 11·65 cannot be settled by authority, but must be decided by closer appreciation than has yet been made of the probabilities of the different methods.

The Roman measures of length may thus be considered, we fully believe, to be as well known to us as they were to themselves. The same cannot be said of the measures of weight. All writers agree that the amphora, or cubic foot, weighs 80 pounds of wine; but it is also said that they considered wine to be of the same weight as water. We have no means of ascertaining the specific gravities of their wines; those of our own vary from ·99 to 1·04, water being taken as 1. But there is one very obvious consideration which, we believe, has escaped notice. No metrologist has given the Romans credit for seeing that water would do just as well to make comparisons and adjust standards by, as wine, believing, as they did, that both are of the same weight. If we suppose then that they preferred to spill water rather than wine, and assume 11·62 inches for the foot, we have 1568·984 cubic inches* English, in the amphora, or 5·6586 imperial gallons, or 56·586 pounds averdupois of water. If the Roman pound be the 80th part of this, it is ·7073 pounds averdupois, or ·8595 pounds troy. This is 4951 grains, or 6039¼ French grains. Now, according to Wurm, Budæus made it 7200 French grains, Capellus and Romé de L'Isle 6048, Auzout 6226, Eisenschmid 6216, Dupuis 6300, Leblanc and De la Nauze 6144, Paucton 6312, Arbuthnot 6395. Of these, those of Romé de L'Isle and La Nauze, which come the nearest to 6039¼, were determined from weighing coins: but the most modern valuations deduced from coins give 5040 grains. On coins however we do not much rely. The congius of Vespasian, already mentioned, gave to different experimenters 6094, 6386, and 6276 Paris grains; but it is most probable that the capacity of this vessel has been somewhat increased by rust. There are also some antient weights in stone or metal, preserved in different places, from which De L'Isle brings out 6071 and 6042 grains. But others make different results, whether from the coins or the weights; and the result of the whole seems to be, that the Roman pound cannot be more accurately stated than in the following words:—'something more than seven tenths of a pound averdupois.' The Attic TALENT is said by many writers to be 80 Roman pounds. Now this being taken, as in the article cited, at 56·953 pounds averdupois, gives ·7119 of a pound averdupois. Between ·707 and ·712, or very near to one of these extremes, we have little doubt the truth really lies. Accordingly, the Roman uncia is much nearer to our ounce averdupois than to our ounce troy; and many metrologists have supposed that the former was originally the uncia.

We have not now any means of knowing whether the fundamental points of connection between the Greek and Roman measures are exact or only approximate. These are, that the foot is longer than the Roman by one twenty-fourth, and the Philetærian foot by one-fifth; that the *μετρητης* is an amphora and a half, and that the amphora of water or wine weighs an attic talent. Taking these relations for granted, we have for the Greek foot 12·10 English inches or 1·008 feet, for the Philetærian foot 13·94 inches, for the metretes 8·4879 gallons, and for the attic talent 56·586 pounds averdupois. There is one stadium left at Athens [STADIUM] which is 630 English feet, giving for the Greek foot 1·05 feet English; but there is not much dependence to be placed on the measure. Such buildings as have been examined at Athens, in the manner already described, give as a mean 136·69 Paris lines, or 12·14 English inches. We may therefore say that the Greek foot was longer than the English one by the tenth part of an inch. The statements then as to the relations between the Greek and Roman measures appear to have been tolerably exact, and our knowledge of the relations between our measures and theirs, though not sufficient for scientific comparison, is abundantly exact for the purposes of the classical student, far more so than could have been expected to have been attainable by those who remember that for a long period all means of comparison were lost.*

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* To turn cubic inches into imperial gallons, multiply by 11 and by 2, divide by 6100, and, if worth while, from the result subtract its two hundred thousandth part.

WEIMAR, the capital of the grand-duchy of Saxe-Weimar-Eisenach, is situated in 51° N. lat. and 11° 20′ E. long., on the bank of the river Ilm. It stands in a pleasant valley, with a wooded mountain to the north and low hills to the south and east. The river, over which there are two bridges, winds along the south side of the town. Weimar is one of the most remarkable towns in Germany—illustrious in the annals of German literature by the names of Göthe, Herder, Schiller, Wieland, Kotzebue, and others. It is an open town with irregular streets; there are however many agreeable houses, but the general appearance is plain and rather antique. The palace is beautifully situated, and the interior is fitted up with great elegance and taste. The adjoining park would be an ornament to any great city. The chief public buildings are the workhouse, the hospital, the library, the new mews, and the two churches, but none of them is at all distinguished by architecture. The Court Theatre was built in 1825, and, under the management of Göthe and Schiller, had one of the best companies in Germany, and greatly contributed to improve the public taste. The grand-ducal library contains above 130,000 volumes, besides manuscripts, copper-plates, and drawings. The principal church deserves notice, as containing the sepulchres of the reigning family, and being adorned with several fine paintings by Lucas Kranach, particularly the altar-piece, representing the Crucifixion. The public institutions are useful and well managed. Weimar has a much-frequented gymnasium, a seminary for schoolmasters, an academy for drawing, painting, and sculpture, a house of correction, an orphan asylum, a benevolent ladies' institution, under the patronage of the grand-duchess, which is connected with 31 towns, and has 2300 girls instructed in female work, all over the country. Falk's establishment for destitute children was converted by the grand-duke, in 1829, into a public school for education by the name of Falk's Institution. A private establishment connected with the study of geography deserves notice as being perhaps the most extensive of the kind in Germany. It publishes maps, charts, globes, geographical works, and periodicals in great numbers. The inhabitants, now about 12,000, are of the Lutheran religion. The Roman Catholics and Jews, who are very few in number (twenty years ago only 100 Roman Catholics and no Jews), have a chapel and synagogue. There is also a chapel of the Russian Greek religion, erected for the grand-duchess Maria Pawlowna, sister of the emperors Alexander and Nicholas. There are some manufactures, but they are of small importance: the inhabitants derive their chief support from the residence of the court. About two miles and a half from the town is the country-seat Belvedere, situated on a hill and surrounded with a park. There is a fine avenue from the town to this seat. [Eisenach; Saxe-Weimar-Eisenach.]

(Brockhaus, *Conversations Lexicon*; Hassel, *Handbuch*; Stein, *Lexicon*.)

WEINBRENNER, FRIEDRICH, one of the most eminent German architects of his time, not only on account of the numerous edifices erected and professional works published by him, but for his extensive influence as the founder of a better school of the art, was born November 9th, 1766, at Carlsruhe, where his father was a carpenter and builder, and where he himself afterwards found scope for the display of his talents in the erection of a great number of both public and private edifices. Losing his father before his future destination was fixed, his studies were rather irregular, and in regard to them he was left chiefly to his own impulses, directed only by the advice of his brother, who was some years older than himself. Having obtained from him sufficient insight into matters of practical routine, Weinbrenner commenced his artistical *Wanderjahre* in the spring of 1788, and set out for Zürich, where he remained a considerable time, in consequence of being engaged to superintend some timber constructions. Agreeable as his stay there was rendered by the acquaintances he formed with several artists and literary men—among the latter Lavater—he hastened as soon as his engagements would permit to Vienna, and after examining the architectural monuments of that capital, he proceeded to Dresden and Berlin. This he had proposed to himself as the extent of his travels, but in Berlin he became acquainted with the brothers Genelli, architects of considerable repute and talent, who urged him to visit Italy. Their advice was so strongly seconded by Weinbrenner's own inclination, that though he had not ventured to form such a scheme for himself, he resolved to adopt it, and accordingly set out for Rome, in June, 1792, in company with Carstens [Carstens] and another young artist named Cabot.

When the first tumultuous transport excited by the view of Rome and its monuments of art had somewhat subsided, Weinbrenner felt, if not disheartened, most anxiously conscious that, in order to prove a profitable one, the study he had imposed upon himself required system and perseverance, and also more historical and antiquarian knowledge than he then possessed. The time that was not occupied in examining and drawing buildings was devoted to literary research and books; yet not entirely, for the state of his finances compelled him to earn something to provide for his immediate wants, which he did by giving instruction in architecture. Many strangers of distinction then at Rome took lessons of him, and among the rest Prince Augustus of England (the late duke of Sussex); but this was of no long duration, for the political changes and popular tumults at Rome in 1793 drove many strangers and artists from the city. Nevertheless Weinbrenner remained there till 1797, with the exception of a considerable interval spent by him at Naples. On returning to Carlsruhe, he found a very promising opening for his talents. Besides being almost immediately appointed 'Bau-inspector,' he had early opportunities of displaying his professional ability in the erection of the new synagogue and one or two private mansions. Notwithstanding this favourable commencement, he gave up his appointment two years afterwards, and went to settle at Strasburg, where his wife's relations (Margaretha Arnold, whom he had shortly before married) resided, and were many of them artists. The change however proved an imprudent one: Strasburg became menaced by hostilities, and he found himself without other occupation or resource than teaching a few pupils. At this juncture he was invited by the Hanoverian government, through the recommendation of Prince Augustus, to inspect and improve the prisons of that country. Very advantageous offers were made him to remain there, but instead of closing with them at once, he requested that he might be allowed to postpone his decision for a twelvemonth. In the interim he returned to Strasburg, and was dissuaded by his wife and her family from accepting the proposal. Fortunately he had an alternative, for he was again invited to accept his former appointment at Carlsruhe, and though the immediate emoluments were inconsiderable—not above a quarter of what he would have had at Hanover—some favourable conditions were annexed to it, and there seemed to be upon the whole a fairer prospect of his signalizing himself in his profession. Nor had he reason afterwards to repent of the choice he made, for from that period he was continually employed on various improvements and embellishments in the capital of Baden and other parts of its territory. At Carlsruhe alone he erected many buildings, among others the Catholic church, the Lutheran church, theatre, Ettlinger gate, Standeshaus, museum, mint, Hochberg palace; and at Baden the Conversations-haus or assembly-rooms, baths, and 'Antiquitäten-halle,' or museum, &c., besides the Leopold summer palace, and various private houses and smaller buildings. Of churches, mansions, villas, &c. erected or designed by him in other places within the territory of Baden, the number is very considerable; nor are there a few by him in various other parts of Germany—Leipzig, Strasburg, Göttingen, and Düsseldorf. Being so numerous, his works display various degrees of merit according to the respective opportunities afforded him; but taken collectively they manifest a great improvement in style, with individuality of character, and fresh and masterly combinations, instead of the mere routine of design. He applied himself to his art with higher views of it than were then entertained among his countrymen, and diffused a similar feeling for it through the next generation of the profession, having reared up to it a great number of those who now rank high among the living architects of Germany. Nor was his instruction confined to them exclusively, for he published a variety of treatises on different branches of architectural study, viz. two on the orders of architecture, 'Zeichnungslehre,' 1810; 'Optik,' 1811; 'Perspectivlehre,' 1817-24; 'Ueber Form und Schönheit,' 1819; 'Ueber Architektonische Verzierungen,' 1820, &c. &c., besides a work on theatres, and a variety of papers on architectural and artistical topics in the 'Morgenblatt' and other literary journals. Though varied, his application to his professional pursuits and studies continued uninterrupted almost to the very last; for although his health had begun to be impaired some time before, he was taken off somewhat suddenly, March 1st, 1826, after enjoying the society of some friends on the preceding evening.

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* For further information on antient weights, coins, and measures, the reader is referred to the following work, 'Metrologische Untersuchungen über Gewichte, Münzfüsse, und Masse des Alterthums in ihrem Zusammenhange, von August Boeckh.' Berlin, 1838; and to a review of this work in the 'Classical Museum,' No. 1, by Mr. Grote.

(Friedrich Weinbrenner, von Aloys Schreiber.)

WEINMA'NNIA, a genus of plants belonging to the natural order Cunoniaceæ, and named in honour of John William Weinmann, an apothecary at Ratisbon, and author of the 'Phytanthoza Iconographica,' in four volumes. The species are trees, and natives of South America and the Mauritius. The leaves are compound or simple, with reticulated petioles, and undivided caducous petioles. The calyx is permanent and 4-parted; the petals 4; stamens 8; an hypogynous, urceolated disk; the fruit a many-seeded capsule, opening at the dissepiments from the apex; the seeds are roundish and reniform. There are about 40 species of this genus described. The *W. tinctoria* is a native of the Isle of Bourbon; it has leaves with many pairs of leaflets, which are oblong, serrated, and smoothish; the joints of the rachis spatulate, and the fascicles of racemes many-flowered. This tree is called by the natives of Bourbon *Tan rouge*, and is used for dyeing a red colour. Most of the species of Weinmannia possess astringent properties, and may be used for dyeing. On this account they are also often employed in Peru to adulterate the various species of Cinchona barks which are collected for medicinal purposes. The species of Weinmannia may be easily cultivated by growing them in any rich light soil, but they are not ornamental shrubs, and are only seen in this country in botanical collections.

WEIR, or **WEAR**, is a dam erected across a river, either for the purpose of taking fish, of conveying a stream to a mill, or of maintaining the water at the level required for the navigation of it.

The erection of weirs across public rivers was a practice reprobated from the earliest periods of the English law, and was considered as a public nuisance. Magna Charta (c. 23) directs that all weirs for the taking of fish should be put down except on the sea-coast. By the 12 Edw. IV., c. 7, and other subsequent acts, weirs were treated as public nuisances, and it was forbidden to erect new weirs, or to enhance, straighten, or enlarge those which had aforetime existed. Hence in a case where a brushwood weir across a river had been converted into a stone one, whereby the fish were prevented from passing except in flood-time, and the plaintiff's fishery was injured, this was considered to be a public nuisance, although two-thirds of the weir had been so converted without interruption for upwards of forty years. And it was laid down in that and other cases, that though a twenty years' acquiescence might bind parties whose private rights only were affected, yet that no length of time can extinguish public rights or legitimate a public nuisance. (7 East, 198; 2 B & Ald., 662.) On the same grounds it will probably be held that the Prescription Act (2 and 3 Wm. IV., c. 71) does not apply to weirs. It appears therefore that no weirs can be maintained on any rivers in derogation of the rights of the public, or even, as it seems, of individuals, except such as have existed time out of mind, or such as have been erected under local acts of parliament for the navigation of particular rivers.

WEISSE, CHRISTIAN FELIX, was born on the 8th of February (28th of January, Old Style), 1726, at Annaberg, in the present kingdom of Saxony. His father, Christian Heinrich Weisse, head master of the public grammar-school at Annaberg, and from 1727 director of the gymnasium at Altenburg, was a distinguished scholar, whose works, 'De Stylo Romano,' and 'Latium in Compendio,' were much esteemed in their time. Young Weisse lost his father at an early age. After having finished his preparatory studies in the gymnasium at Altenburg, he went to the university of Leipzig in 1745, where he studied the classical languages and antiquities under Ernesti. At Leipzig he became acquainted with Lessing, who directed his attention to the modern languages, especially to English, and encouraged him to cultivate his poetical talents. Weisse however did not respond to the expectations of Lessing. His favourite passion was the drama, which in Germany at that time was little better than a stiff imitation of the French school, and the French taste was so prevalent that Weisse was unable to contend against its influence, as we see from the many tedious tragedies which he wrote during the period from 1751, in which year he published his first dramatical essay, 'Die Matrone von Ephesus,' till 1767. In this year he published 'Die Befreiung von Theben' ('The Delivery of Thebes'), which was his first drama written in blank verse. He felt that the Alexandrines, in which the German dramas were generally written, were, among the imitations of the French school, the worst of all, and the principal cause of the tedious monotony of the dialogue. When he abandoned this verse at the suggestion of Lessing, and adopted the blank verse of the English drama, or even prose, he fell into great extravagancies, and showed that he was anything but a tragic writer. Of this his 'Romeo und Julie,' in which he fancied he could improve on Shakspere by strictly following the novel of Bandello, is a sufficient sample. In his 'Richard III.' he showed that he was thoroughly unable to conceive any great passion: for each passion he had one mould, such as the character of Nero, of Alexander, of Medea: he was unable to depict the same passion with any variety, and the only difference between his men consists in words. 'Richard III.' however has two great merits: it was the last tragedy in the French taste which appeared on the German stage, and it occasioned Lessing to write his excellent observations on Aristotle's theory of the drama and on Shakspere.

The severe criticism of Lessing and the consciousness of his own weakness led Weisse to abandon tragedy, and to write comedies, vaudevilles, and operas, in which he had much more success. His best comedy, according to Lessing, is 'Amalia,' in five acts. His vaudevilles and operas were set to music by Wolff, Hiller, and other eminent composers, and his little arias became national songs. He supplied many of the theatres, and the splendour of the court of the kings of Poland and electors of Saxony at Dresden gave him opportunities for the exercise of his talents. The remunerations for his productions, and the high appointments which he received, as chief receiver of the taxes at Leipzig, an office which he held till his death, put him not only above want, but procured for him all the means of leading a comfortable life.

In 1760 he became editor of the 'Bibliothek der Schönen Wissenschaften und freien Künste,' a periodical which was then much esteemed in Germany.

The appearance of Wieland, Göthe, Schiller, and so many other eminent men during the latter part of the eighteenth century, induced Weisse, who was unable to become their rival, to change his subject. He now wrote for children. Weisse and Basedow became the founders of a new system of education in Germany; and while Basedow's views principally concerned the intellectual education in schools, Weisse directed his literary activity towards domestic education. His 'A, B, C, und Lesebuch für kleine Kinder,' Leipzig, 1772, 8vo., ran through six editions, and was the best spelling-book hitherto published in Germany. He also published 'Kleine Lieder für Kinder,' and translated several little English works for children, as well as various articles of the 'Spectator' on the same subject. He also published 'Wochenblatt für Kinder,' which, in 1775, he changed into a quarterly journal called 'Der Kinder-Freund' ('The Children's Friend'). This celebrated work treats on the domestic education of children in a history of a family, from their birth to the time when they leave the paternal roof, the daughters to be married and the sons to follow some occupation. The life of this family, the earlier amusements of the children, their education, the various branches of their instruction, and their amusements, are described: a great number of tales are introduced, which they are supposed to tell to one another; and several little comedies, which the members of the family perform for the entertainment of their friends. From 1775 to 1782 the 'Kinder-Freund' went through five editions, among which two are in twenty-four volumes, and three in twelve. The 'Kinder-Freund' was continued in the 'Briefwechsel der Familie des Kinderfreundes,' 12 vols. 8vo., Leipzig, 1783-93, which gives the history of the family during the first years after the children had left their home. Berquin's celebrated 'L'Ami des Enfans' is an imitation of the 'Kinder-freund,' and in many parts a translation. There is scarcely a European language into which some of Weisse's works for children have not been translated either entirely or in extracts or abridgments. Weisse's literary activity was immense, and lasted till his death, although by a fall from a ladder in his library, in 1792, he almost lost the use of his hand, and was obliged to dictate. He published many translations from the English, especially works for the use of children and young persons of both sexes, such as the works or part of the works of Richardson, Law, Moore (the Fables), James Fordyce, Brooke, Sterne, Franklin, some of the poems of Ossian, several odes of Dryden, Pope, Congreve, and many other works. The reputation of Weisse from the time that he began to write for children was very great. However in all his works on education there are indications that the author's system was rather artificial, and more adapted to the drilling of children than the formation of character. His real merit is nevertheless great. Though unable to throw off the false rules of a taste in which he had been brought up, he was an enlightened man, of extensive knowledge, of sterling probity, and great humanity. Of late he has often been severely criticised, but his contemporaries held him in high esteem. Wieland dedicated to him his 'Musarion;' Thümmel, his 'Inoculation der Liebe;' Gerstenberg, his 'Die Braut;' Ramler, his translation of Boileau's 'Essay on Belles Lettres;' Garve, his 'Essay on the Character of Zollikofer;' and the second volume of his 'Versuche über Gegenstände der Moral und Literatur;' Teller, his 'Darstellung der Sprache in Luther's Bibel-Uebersetzung;' and Eichstädt, his edition of Lucretius. Other eminent writers addressed themselves to Weisse for the revision of their works: as Winckelmann for his 'Geschichte der Kunst des Alterthums,' and 'Ueber die Baukunst der Alten;' Hagedorn, for his 'Betrachtungen über die Malerei;' Lippert, for his 'Daktyliothek,' and many others. Abrahamson, in Berlin, struck a medal in memory of Weisse, for which Frisch made the design and Ramler wrote the inscription.

Weisse died on the 16th of December, 1804. The principal editions of his works are—'Beiträge zum Deutschen Theater,' 5 vols. 8vo., Leipzig; 1st vol., 3rd edit., 1771; 2nd vol., 2nd edit., 1767; 3rd vol., 2nd edit., 1768; 4th vol., 2nd edit., 1769; 5th vol., 2nd edit., 1769; 2, 'Trauerspiele,' 5 vols. 8vo., Leipzig, 1776-80. Several of his tragedies were published separately: 3, 'Lustspiele,' 3 vols., 2nd edit., Leipzig, 1783; 4, 'Komische Opern,' 3 vols., Leipzig, 1777. These operettes and vaudevilles, with the music of Hiller, are published separately, as the 'Dorfbarbier,' Leipzig, 1771, fol., which is still performed on the stage of Germany; 'Die verwandelten Weiber, oder Der Teufel ist los,' 1st part, 1770, fol.; 2nd part, under the title 'Der lustige Schuster, oder Der Teufel ist los,' 1771, fol., &c.; 5, 'Kleine Lyrische Gedichte,' Leipzig, 1772, sm. 8vo.: the songs for children are contained in the third volume; 6, 'Lieder für Kinder, mit Melodien in Musik gesetzt von J. A. Hiller,' 2nd edit., Leipzig, 1775; 7, 'Schauspiele für Kinder,' 3 vols. 8vo., Leipzig, 1792, is a collection of the dramas for children contained in the 'Kinderfreund;' 8, 'Lieder und Fabeln für Kinder und junge Leute,' edited by Frisch, Leipzig, 1807; 9, 'Bibliothek der Schönen Wissenschaften und freien Künste,' 12 vols. 8vo., each containing 2 parts, Leipzig, 1760-65. This work is very important for the literary history and the biography of the scholars and writers of Germany and other parts of Europe who lived in the eighteenth century. A catalogue of the biographies and articles contained therein was published at Leipzig in 1767. Weisse, as already observed, was the editor of this work from 1760: his editorship began with the fifth volume. The number of his own contributions is very great; his criticism of Wieland's translation of Shakspere is remarkable. The work was continued under the title, 'Neue Bibliothek der Schönen Wissenschaften und freien Künste,' 72 vols., Leipzig, 1765-1806; the latter part of which was edited by Weisse and Dyk, the learned publisher of the work, who, after the death of Weisse, was the sole editor. The 'Bibliothek der redenden und bildenden Künste' is a continuation of the 'Neue Bibliothek,' &c.

A complete catalogue of Weisse's works and other literary productions is given by Jördens. In 1826 a school for poor children was founded by subscription at Annaberg, the birthplace of Weisse, which received the name of Weissens-Stiftung' (Weisse's Institute). Weisse was married to a sister of the celebrated philosopher Platner.

A son of Weisse, CHRISTIAN ERNST, born 1766, became professor of feudal law, and afterwards of criminal law, at Leipzig. He died in 1832. He was a distinguished jurisconsult of the old historical school, but he was unable to keep pace with the ideas of the nineteenth century. His principal works are:—1, 'Geschichte der Kur-Sächsischen Staaten,' 4 vols. 8vo., Leipzig, 1802-6, the continuation of which is, 2, 'Neueste Geschichte des Königreichs Sachsen seit dem Prager Frieden bis auf unsere Zeiten,' 3 vols. 8vo., Leipzig, 1808-12. This is a good work, but written in a very dry style, and often overcharged with details, which however make it very useful for those who are investigating some parts of the history of Saxony. 3, 'Museum für Sächsische Geschichte, Literatur, und Staats-Kunde,' 3 vols. 8vo., Leipzig, 1794-96: the continuation of this work is, 4, 'Neues Museum für Sächsische Geschichte,' &c., 4 vols. 8vo., Freiberg, 1800-4, an excellent collection of documents and other materials for the history of Saxony. 5, 'Lehrbuch des Sächsischen Staatsrechts,' 2 vols. 8vo., Leipzig, 1824-27: this compendium is still considered the best work on the constitution and the public law of Saxony, and it has continued to be a standard work even since the constitutional changes of 1831.

A son of Christian Ernst Weisse, *Christian Hermann*, born in 1801, and professor of philosophy at Leipzig, has now obtained a distinguished rank among German philosophers since the publication of his work 'System der Aesthetik als Wissenschaft von der Idee der Schönheit,' 2 vols. 8vo., Leipzig, 1830.

(Jördens, *Lexicon Deutscher Dichter und Prosaisten*; Gervinus, *Neuere Geschichte der Poetischen National-Literatur der Deutschen*, vol. iv.; *Conversations-Lexicon*.)

WEISSEMBURG. [RHIN BAS.]

WEISSENFELS is the chief town of a circle of the government of Merseburg, in the Prussian province of Saxony. It is situated at the foot of a mountain, on the right bank of the Saale, which here becomes navigable, and over which there is a wooden bridge, 320 feet long. It has a celebrated seminary for schoolmasters, and a gymnasium; a school for deaf and dumb; 2 churches, a Roman Catholic chapel, 2 hospitals, and a poorhouse. The inhabitants, above 6000 in number, have manufactories of gold and silver, porcelain, merinos, tanneries, and potteries. They likewise derive considerable profit from their vineyards, and fisheries in the river, and the trade in timber and corn. Weissenfels is a garrison town, has 4 gates and 4 suburbs, and on a rock outside of the walls stands a large castle, now converted into barracks. In the convent church, which is no longer used, are deposited the remains of several princes, and also those of the great Gustavus Adolphus, king of Sweden, who fell in the battle of Lützen, Nov. 6, 1632.

(Müller, *Wörterbuch des Preussischen Staates*; Hassel, *Die Preussiche Monarchie* (in his *Handbuch*).

WELDON, JOHN, one of our most eminent composers of cathedral music, was born at Chichester, and studied his art under the famous Henry Purcell. At an early age he became organist of New College, Oxford; in 1701 was appointed gentleman-extraordinary of the chapel-royal; in 1708 succeeded Dr. Blow as organist thereof; and seven years after, when a second composer was added to the court establishment, he was chosen to fill that situation which then was an active and responsible one. He was a remarkable pluralist, for, while holding all these offices, he was also organist of St. Bride's; and George I., having presented the parish of St. Martin-in-the-Fields with an organ, Mr. Weldon, perhaps in compliment to the king, says Sir John Hawkins, was elected organist. 'The reason that moved the king to this act of munificence was the same historian conjectures) a singular one. The parish had chosen his majesty their churchwarden, and he executed the office for two months; but at the end thereof he grew tired of it, as well he might, and presented the parish with that noble instrument which is now in the church.' (*Hist.*, v. 60.)

Weldon's compositions were chiefly for the church; but he assisted in setting Congreve's masque, *The Judgment of Paris*, to music, in which is the air 'Let ambition fire thy mind,' a lovely melody, and still fresh. This was introduced by Arne in *Love in a Village*, and is yet known to all as 'Hope, thou nurse of young desire.' Some of his songs are to be found in the *Mercurius Musicus*, and in other collections now become rare. Among the number is 'From grave lessons and restraint,' a very popular air, and as such remembered in Hawkins's time, who has given it in his fifth volume; and it would even now be occasionally sung by lovers of natural melody, but that the words partake of that pruriency which characterised so much of our lyric poetry a century and a half ago.

The fame of this composer is mainly built on his anthems 'In Thee, O Lord,' and 'Hear my crying,' of which Hawkins justly observes, 'it is difficult to say whether the melody or the harmony of each be its greatest excellence.' Dr. Burney speaks slightingly of Weldon's powers; and it is probable that on this subject he was either prejudiced, or imperfectly acquainted with the works he criticised.

Weldon died in 1736, and was succeeded in the chapel-royal by Dr. Boyce. (*Harmonicon*, xi. 117.)

WELLAND. [LINCOLNSHIRE.]

WELLESLEY, RICHARD COLLEY, MARQUESS WELLESLEY, was the eldest child of Garrett, first earl of Mornington, and of Anne, countess of Mornington, who was daughter of Arthur, first Viscount Dungannon. He was born in Grafton-street, Dublin, on the 20th of June, 1760. The earl of Mornington died in 1781, before his son came of age; the countess survived till 1831.

The earl of Mornington, a man of considerable general abilities, and who is well remembered as a musical composer, paid great attention to the education of his family. The future Marquess Wellesley was sent at an early age to Eton College, whither he was in due time followed by his brothers—the future Lord Maryborough, Arthur Wellesley, afterwards Duke of Wellington, Lord Cowley, and the Rev. Gerard Wellesley. All the brothers occupied a respectable place among their schoolmates, but the eldest surpassed them, and even stood high for classical attainments among the great body of his contemporaries, both at Eton and the University.

The first act of the young Lord Mornington, on attaining his majority, was to assume the numerous pecuniary obligations of his father, and place his estates under the management of his mother. Encouraged by the reputation he had acquired with his teachers and schoolfellows, he selected political pursuits as the means of starting him in a career that might re-establish the shattered fortunes of the family. With this view he took his seat in the Irish House of Lords as soon as he had come of age, and continued a member of that body till the Union. This proved however too narrow a theatre for his abilities or his ambition. He kept up the English connections which he had formed during the time of his education, and having been returned a member of the British House of Commons by the borough of Beeralston, became a frequent visitor in London.

The first opportunity he had of attracting substantial notice occurred during the regency debates of 1789. The British Houses of Parliament, on the illness of George III., proposed that the Prince of Wales should assume the office of regent subject to certain conditions or restrictions. The Irish Legislature proposed that his powers should be unrestricted. The earl of Mornington strenuously supported restrictions in the Irish House of Lords, maintaining that the full powers of the crown should not be assumed by any one during what might prove but a temporary indisposition of the king. These views, which coincided exactly with those of George III., induced the king, whose attention, after his recovery, had been called to the minorities in the Irish Houses of Parliament, to take an interest in the young statesman who found the toils of one legislative body too little for his activity. At the next general election the earl of Mornington was returned for the borough of Windsor, sworn in a member of the Irish privy council, and elected one of the knights of St. Patrick.

He was soon after appointed one of the lords of the treasury, and in 1793 he was sworn in a member of the British privy council. He continued to make such steady progress in the favour of the king and the confidence of the minister, that he was nominated to succeed Lord Cornwallis in the government of British India. He was raised at this time to the British peerage by the title of Baron Mornington. The marquisate which he subsequently received was merely an Irish title. As a British peer he was never raised to a higher rank than that of baron.

Lord Mornington was appointed Governor-general of India on the 4th of October, 1797; he reached the Ganges in May, 1798, after touching at the Cape of Good Hope and the Isle of France by the way, having some time before been preceded by his brother, Colonel Arthur Wellesley, who was to commence his brilliant career under his auspices. He retained the supreme command in India till August, 1805, when he embarked to return to Europe.

The governor-generalship of the earl of Mornington, or, to use the title by which he is best known, and which was conferred upon him in December, 1799, of the Marquess Wellesley, was an eventful one. The moment of his assuming the command appeared to be a critical time. Bonaparte had accomplished the conquest of Egypt, and was supposed to contemplate a blow at our Indian dominions. Tippoo Saib retained a resentful recollection of his losses, and was encouraged by French emissaries to attempt the recovery of the district of Coimbatore and the hill forts, which he had been obliged to surrender.

The first step of the governor-general under these circumstances was to force the Nizam to disband his French troops; the next was to open negotiations with Tippoo, in order to detach him from the French alliance. Failing in this, and having detected Tippoo's negotiations with France, he prepared for war. Great exertions were made by the Indian government to organize the Native and improve the British troops. With his characteristic promptitude of decision, the governor-general resolved to strike home at once. Warlike operations commenced with the victory of Mallavelly, which displayed the high condition of the Anglo-Indian army. Following up this impression, General (afterwards Lord) Harris was ordered to invest Seringapatam, which, after a siege of a month, was taken by assault, and the Sultan slain. His territories were partitioned. The capital with the districts on the coast, including the fort of Mangalore, was retained for the East India Company; compensation was made to some native allies; and the remainder of Tippoo's territories, with the nominal sovereignty over the whole, was restored to the representative of the antient Hindu sovereigns, then a child of five years of age. So complete was the effect of these victories and the subsequent arrangements in impressing the minds of the natives with a sense of the strength and resolute character of the Anglo-Indian government, that General Wellesley (in one of the despatches published by Colonel Gurwood) writes to his brother, that he 'only waits to know what countries they are which the governor-general wishes to take possession of.'

The next efforts of Lord Wellesley were directed to the extension of the commercial intercourse of India, and to the commencement of those important financial reforms which eventually raised the revenue of the Company from seven millions to upwards of fifteen millions annually, with advantage to commerce and without injustice to the inhabitants. His projected extension of the commerce of India was in part thwarted by the monopolist spirit which at that time prevailed among the directors of the East India Company. Nowise cooled in his zeal by this disappointment, he set himself to complete the internal organization of the British empire in Asia, and to establish it on a broader basis. With this view he undertook a vice-regal progress through the northern provinces, visiting the native princes with a pomp equal to their own, redressing grievances, checking enemies, and conciliating friends.

In 1801 he was again involved in warlike operations. He in that year despatched a considerable force up the Red Sea to assist in wresting Egypt from the power of France. He next turned the British arms against the Mahrattas, and, after a severe struggle, conquered the whole country between the Jumna and the Ganges, and compelled Scindiah and the Rajah of Berar to make peace. Sir Arthur Wellesley's victory of Assaye and the crowning battle of Lassawaree terminated a war directed with an energy and fertility of resources that gave good and true augury of the future career of the commanding officer on a more important and conspicuous field. Without undervaluing the political wisdom of the Marquess Wellesley, it may safely be said that had he not possessed so able a general as his brother, the result of the war might have been less favourable; and that, had it been less favourable, his policy would have been judged of very differently from what it has been.

After six or seven years of service in India, the Marquess Wellesley became desirous of returning to England. Such however was the estimation in which his services were held at home, that some years elapsed before he procured his recal. Even a change of ministry failed to obtain the release he solicited. At last he was allowed, in 1805, to resign the government of India, and he embarked for Europe in the month of August. He was received with every demonstration of respect and approbation by the government and the East India Company. Complaints were indeed heard that his administration had been unwarrantably expensive, and that he had been guilty of oppression towards the native powers, especially the Nabob of Oude. Articles of impeachment were presented against him (without effect) in the House of Commons by Mr. Paull. But the judgment of the public then (and the time which has since elapsed, with all its gradual disclosures, has only confirmed that judgment) was, that without adopting all the exaggerated eulogies of the panegyrists of the Marquess Wellesley, his policy was, in the circumstances of our Eastern empire, the wisest and most just that could have been adopted. His government marks the commencement of a better æra of English rule in India.

The Marquess Wellesley on his return from India again took part in the proceedings of parliament. He had no great sympathy with the opposition; that could scarcely be expected from one who might almost be regarded as the personal friend of the king. But he was far from being a strenuous supporter of Mr. Perceval's government, or even, at a subsequent period, of Lord Liverpool's. The Pitt party had been disorganized by his death at the time that Lord Wellesley returned from India, and it was not again consolidated until Lord Liverpool was placed at the head of affairs. Besides, the Marquess's position as governor of a distinct empire, and his protracted absence from England, had impressed him with a feeling of personal consequence which ill qualified him to perform a subordinate part under any of the sectional leaders of the predominant party, and had to a great extent emancipated his mind from the mere party conventionalities of this country. He in so far concurred with the general policy of administration that he was a zealous advocate of the war against Bonaparte, but his mind was much too liberal to sympathize with narrow-minded and oppressive views in home politics; although, bred under Mr. Pitt and matured in India, he cared little for the constitutional views which were then popular.

In 1807 Lord Wellesley evaded the urgency of the king, who wished him to become a secretary of state in the duke of Portland's cabinet. In 1808 he rendered ministers efficient service by his vindication of the expedition to Copenhagen. He was soon afterwards appointed ambassador to Spain. A short residence in Spain convinced him that, if Bonaparte were to be driven out of the Peninsula, it must be by Britain ceasing to play the part of a mere auxiliary, and taking the lead in the war. On the death of the duke of Portland he was recalled, and was with difficulty persuaded by the king to accept the appointment of secretary of state for foreign affairs with Mr. Perceval. He held his office from December, 1809, till January, 1812, when he resigned on account of the difference of opinion existing between him and his colleagues on different points, especially respecting the Roman Catholic claims and the inefficient conduct of the war.

After the assassination of Mr. Perceval, in May, 1812, Lord Wellesley undertook, at the request of the Prince Regent, to form a coalition government. Such a task is alike difficult and unprofitable: when party distinctions are becoming obsolete, parties may be fused with advantage; but coalitions, which are alliances of parties, each retaining its distinctive character, when effected necessarily draw loss of respect and influence along with them. The distinction between the parties of that day was still too strongly marked to admit of their being fused together, and their leaders were too wise or too honest for a coalition. In three days Lord Wellesley saw that the undertaking was hopeless, and resigned his charge.

On the 8th of June, Lord Liverpool announced in parliament that he was at the head of the government. On the 1st of July Lord Wellesley brought forward a motion favourable to Roman Catholic claims in the House of Peers, similar to that which Mr. Canning had carried a few days earlier in the House of Commons. It was lost by only one vote, and that vote a proxy. He continued for ten years from this time to offer a modified opposition to government. During the Peninsular war he had repeated occasions to attack ministers for their inadequate support of his brother. In 1815 he condemned in unqualified terms the disregard to commercial interests that marked the treaties by which the peace of Europe was consolidated.

In December, 1821, he accepted the appointment of lord-lieutenant of Ireland, an office which he continued to hold till March, 1828. The nomination of the Marquess Wellesley, a well-known advocate of the Roman Catholic claims, to this high office, raised on the one hand the expectations of the professors of that religion, and excited on the other great discontent among the Protestant ascendency party. His arrival was the signal for an outburst of the fiercest party spirit. The Orangemen of Dublin insulted the lord-lieutenant in the theatre, and the southern counties became the scene of insurrectionary movements. The viceroy commenced his administration with an attempt to adopt a conciliatory policy, but the times did not admit of its being followed up. It was deemed necessary to have recourse to an Insurrection Act and other coercive measures. Yet the personal character of the Marquess Wellesley continued to command respect; his impartiality and kindly disposition escaped imputation. The Earl of Liverpool's retirement from public life had no effect upon the position of Lord Wellesley, for both Mr. Canning and Lord Goderich were favourable to the Roman Catholic claims. But when the Duke of Wellington came to assume the reins of government, the first declaration which he made upon the subject left the lord-lieutenant of Ireland no alternative but to resign.

On the formation of the Grey ministry the Marquess Wellesley accepted office under it. In 1831 he was appointed lord-steward. In September, 1833, he resigned that office, and was once more appointed lord-lieutenant of Ireland. On Sir Robert Peel's brief accession to office (1834-5), the Marquess Wellesley resigned, though urged by his brother to remain. He accepted the office of lord-chamberlain on the formation of the second Melbourne ministry, in April, 1835, but resigned it in the course of the same year, and never afterwards filled any public employment. He died at his residence, Kingston-house, Brompton, on the morning of Monday, the 26th of September, 1842, in the 83rd year of his age.

The Marquess Wellesley was twice married. His first wife, Hyacinthe Gabrielle Roland, he married on the 1st of November, 1794. They had had several children who died young, but none after marriage. They separated soon, and were not again reconciled. The first Lady Wellesley died in 1816. On the 29th of October, 1825, at the advanced age of 65, the Marquess Wellesley again married. His second wife was an American lady, daughter of Mr. Richard Caton (granddaughter of the eminent revolutionary patriot Carroll of Carrollston), and widow of Mr. Robert Patterson. By this lady, who has survived him, he had no children.

Lord Wellesley was a man of superior powers and of enlarged views. His administration in India was brilliant and productive of lasting good; though part of the credit must be attributed to the high cast of official talent developed in the East India Company's service under the judicious arrangements of that body, and part to the efficient assistance he derived from his brother and the other generals in the field. The marquess was an elegant scholar, of a disposition too delicate to stand the ruder shocks of party warfare. His prosperous career of civil service was more flattering to his ambition than productive of emolument. His father's debts were paid by him voluntarily, but he was unable to preserve the family estates. In 1837 the directors of the East India Company passed a resolution to the effect that they had reason to believe the

Marquess Wellesley was involved in pecuniary difficulties, and that therefore they deemed it their duty to offer him some further acknowledgment of his distinguished services. The resolution proceeded to state that, on the fall of Seringapatam, the sum of 100,000*l.* was set apart for the Marquess Wellesley—a grant which on his suggestion was abandoned to the army. It was afterwards determined to vote him an annuity of 5000*l.*, which had ever since been paid; but the Court of Proprietors believed that the Marquess derived very little advantage from the grant, and under these circumstances it was resolved that the sum of 20,000*l.* be placed in the hands of trustees for his use and benefit. This grant his lordship accepted.

Some Latin poems by the Marquess were published early in life. In 1805 a thin quarto was published in London, purporting to be a history, by the Marquess, 'of all the events and transactions which have taken place in India during his administration.' It is a mere translation from a French version of some of his intercepted despatches, published at Paris. In 1836 Mr. Montgomery Martin published, in five volumes, 8vo., at the expense of the East India Company, 'Despatches, Minutes, and Correspondence of the Marquess Wellesley, during his Administration in India;' and in 1838, the same gentleman republished, in a thin 8vo. volume, from Parliamentary papers, 'Despatches and Correspondence of the Marquess Wellesley, during his Mission to Spain.' His lordship also published a number of occasional pamphlets:—'Substance of a Speech in the House of Commons on the Address in 1794;' 'Notes relative to the Peace concluded with the Mahrattas;' 'Letters to the Government of Fort George, relative to the new form of government established there;' 'Letters to the Directors of the East India Company on the India Trade;' &c.

This sketch has been compiled from the publications mentioned above; the 'Annual Register,' and the 'Parliamentary Debates;' and from a memoir of the Marquess Wellesley which appeared in the 'Times' newspaper soon after his death.

WELLESLEY, PROVINCE OF. [PENANG.]

WELLINGBOROUGH. [NORTHAMPTONSHIRE.]

WELLINGTON. [SHROPSHIRE.]

WELLINGTON. [SOMERSETSHIRE.]

WELLINGTON. [ZEALAND, NEW.]

WELLS. [ARTESIAN WELLS; SPRINGS.]

WELLS, MINERAL. [WATER, p. 111.]

WELLS, an antient city and bishop's see, and parliamentary and municipal borough, 120 miles from London, in the hundred of Wells-Forum, in the county of Somerset. It is situated in a valley at the foot of the Mendip Hills, near the source of the river Ax, and also near that of another spring, called St. Andrew's Well, from which the place is supposed to derive its name. Hills rise at a little distance nearly all round the city. The founder of the first church at Wells is said to have been Ina, king of Wessex, in 704. In the reign of Edward the Elder, in the beginning of the tenth century, the town became the seat of a bishopric. About 1091 John de Villula, who, by the practice of physic at Bath, and by other means, is said to have earned the means of purchasing the see from William Rufus, obtained the bishopric, and removed the episcopal seat to Bath, and called himself bishop of Bath only. This led to bitter disputes, which were settled by Bishop Roberts, the successor of Villula, who, about 1139, determined that the diocesan should be styled bishop of Bath and Wells, and be enthroned on his admission in both churches. He repaired the cathedral, which his predecessor had allowed to go to decay. In 1202 King John granted a charter erecting the town of Wells into a free borough, constituting the men free burgesses, and granting a Sunday market and five annual fairs. The governing charter, up to the time of the passing of the Municipal Corporation Act in 1835, was the 31st of Elizabeth, under which the corporation, a self-elected body, consisted of a mayor and recorder, seven masters or aldermen, sixteen capital burgesses, and an indefinite number of burgesses. In 1835 the number of freemen was 460, and the mayor, recorder, and senior master acted as justices for the borough. The remodelled corporation consists of four aldermen and twelve councillors, and the number of burgesses on the roll at the first open election was 325. The borough magistrates are now the mayor, ex-mayor, and another. The income of the corporation in 1840 was 1088*l.*, of which 517*l.* arose from borough and gaol rates; 149*l.* from tolls and dues; and 170*l.* from rents and fines on renewal of leases. The borough expenditure for the same year was 1309*l.*, of which 171*l.* was for police and constables; and 660*l.* for public works, repairs, &c. The amount of borough rate levied was 442*l.*; and in the same year there were 343*l.* levied under local acts. The corporation was 1700*l.* in debt.

The limits of the borough have been extended, so as to comprise the actual city and suburbs, and they now coincide with the limits of the parliamentary borough, which were enlarged when the Reform Act was passed in 1832, but only include that part of the out-parish of St. Cuthbert adjoining the city which is built on. The number of parliamentary voters on the register in 1839-40 was 414: in 1837 there were 103 freemen, who were not burgesses, though they were entitled to vote for the members of the city. Wells has returned two members to Parliament since the reign of Edward I., and the Reform Act made no alteration of the number.

The city is situated in a large parish called St. Cuthbert, which contains many hamlets, and extends in every direction beyond the city: the parish of St. Andrew, which comprises the precincts of the cathedral, is extra-parochial. The population, according to the census of 1831, was as follows:—

	St. Andrew, extra-parochial	381
Parish of	St. Cuthbert, in	3,430
	St. Cuthbert, out	2,838
		6,649

The Corporation Commissioners in 1835 remarked that Wells was not then so flourishing as it used to be, and that there were fewer persons of property living in it than there were 25 years before. The silk trade had been wholly given up, but there was still one large stocking manufactory, which within the two preceding years had employed as many as 1500 persons. The corn market had decayed; but the market for cheese was still the largest in the west of England. Wells is cleansed, lighted with gas, watched, and supplied with water, under local acts. The January quarter-sessions for the county are held at Wells, and the summer assizes are alternately held there and at Bridgewater. There is a gaol to which felons and others are temporarily committed, and in which the prisoners are lodged who are brought for trial at the assizes. The town-hall was built in 1780, and stands on one side of an extensive area which communicates by an antient gateway with the cathedral close. The cathedral, which is one of the finest structures of the kind in England, forms a striking object as seen from all the great roads leading to the city. It is in the usual form of a cross, the principal limb or bar, which extends from east to west, being 371 feet in length, and the transept measuring 135 feet from north to south. The tower, which is over the junction of the nave and transept, rises to the height of 160 feet from the floor; and two other massive towers, each 126 feet in height, crown the extremities of the west front. This façade is remarkable for its tracery and sculptured figures: there are about 150 statues of the size of life, and above 300 others of smaller size; and although many of them are a good deal mutilated, the effect is very striking. The present cathedral was begun in the early part of the reign of Henry III. (1216-1272) by Bishop Joceline de Welles, who also made Wells his place of residence, and in other respects restored it to the precedence which, in everything except the name of the see, it has since enjoyed. The entire body of the church, from the west end to the middle of the present choir, is supposed to have been the work of this bishop. The two western towers were added about the end of the 14th century, that at the south end by Bishop John de Harewell, and that on the north by Bishop Bubwith, twenty years later. The church had been previously completed to its eastern extremity, and the great central tower erected, soon after the commencement of the 14th century. The Ladye chapel is the glory of Wells cathedral, and by many it is said to be the most beautiful specimen of ecclesiastical architecture in England. There are several antient and other remarkable monuments deserving of notice. The cloisters form a quadrangle attached to the south side of the cathedral, the sides severally measuring from 150 to 160 feet. The chapter-house is a handsome octangular building, 52 feet diameter in the interior, the roof being supported by a single central pillar. The episcopal palace stands at a short distance south from the cathedral, and with its lofty and embattled wall, enclosing an area of about seven acres, and surrounded by a broad moat filled with water, resembles an old baronial castle. The deanery-house is north-west from the cathedral, and beyond are twenty houses called the Vicar's College or Close, an establishment consisting of two principals and twelve vicars. The net revenue of the see of Bath and Wells for the three years ending 1831, was 5946*l*. For the number and value of the benefices in the diocese see Benefice. The parish church of St. Cuthbert is a large and handsome edifice in the later pointed style. The living is a vicarage, in the gift of the dean and chapter, of the gross annual value of 688*l*., net annual value 564*l*. The Independents, Methodists, and Baptists have places of worship: the number of Sunday-school children belonging to the different denominations in 1833 was as follows:—Church, 122; Independents, 90; Methodists, 43; and Baptists, 40. The endowed charities are numerous, and in 1840 they amounted to 1853*l*., administered by nine trustees. The principal are an almshouse for thirty men and women, with a chaplain; several other almshouses on a smaller scale; two schools, called the Blue Schools, for 34 boys and 20 girls, twenty of each being clothed, the boys apprenticed, and an outfit being provided for the girls on going to service or otherwise entering upon some occupation. The collegiate grammar-school is partly supported by the dean and chapter, who allow the master a salary of 30*l*. a-year, with apartments, and a school-room in the cathedral cloisters. In 1829 an infant-school was established, which in 1833 was attended by 52 males and 53 females.

The market-days are Wednesday and Saturday; and there are fairs in May, July, October, and November.

(Collinson's *History of Somersetshire*, vol. iii.; Britton's *Cathedrals*; *Municipal Reports*, &c.)

WELLS, CHARLES WILLIAM, physician, was born at Charlestown in South Carolina, in May, 1757. His father and mother were natives of Scotland, and emigrated in 1753. He was sent by his father to Dumfries and afterwards to Edinburgh, for the purpose of being educated, and returned to Carolina in 1771. The revolutionary movements shortly after commenced in America, and his father, who espoused the royalist party, was obliged to flee to Great Britain, where he was followed by his son in 1775. He then went to Edinburgh, and commenced the study of medicine, and here formed an intimacy with David Hume, and William Miller, afterwards lord Glenlee. After acting as surgeon in a Scotch regiment in Holland, he graduated at Edinburgh, in 1780. He returned to America the same year, and with the remains of his father's and brother's property went to St. Augustine, in East Florida, where he conducted a newspaper in his brother's name. On the preliminaries of peace being signed in 1783, he again went to Charlestown, where he was seized and thrown into prison, and continued there for three months, having escaped further confinement by paying a ransom. On returning to St. Augustine he was shipwrecked, and only saved his life by swimming on shore. He returned to London and commenced practice as a physician in 1785. In 1790 he was appointed physician to the Finsbury Dispensary, and in 1795 was elected assistant-physician to St. Thomas's Hospital, and full physician in 1800.

Dr. Wells was a fellow of the Royal Society, and published the following papers in their 'Transactions:'—1, In 1795, 'On the Influence which incites the Muscles of Animals to contract, in M. Galvani's Experiments.' 2, In 1797, 'Experiments on the Colour of the Blood.' 3, In 1811, 'Experiments and Observations on Vision.' In the 2nd and 3rd volumes of the 'Transactions of a Society for the Promotion of Medical and Surgical Knowledge,' he published several papers on various departments of medicine. His contributions to newspapers and magazines were very numerous, embracing politics, general literature, and biography. His last work, and the one on which his reputation as a philosopher must rest, is his 'Essay upon Dew,' which was published in 1814. The demonstration of the nature of dew in this work is an extremely fine application of the principles of induction in philosophical inquiry, and has deservedly given the author a wide-spread reputation. The experiments involved in this inquiry were such as to lead him to expose himself frequently for long intervals together to the night-air. The consequence was, that it brought on attacks of disease from which he never ultimately recovered, and he died on the 18th of September, 1817. Dr. Wells was an accurate observer and an acute reasoner, and all his productions bear marks of a superior mind. In an edition of his works published in 1821 is an autobiography written a short time previous to his decease, from which this notice has been chiefly drawn.

WELSH LANGUAGE AND LITERATURE.—*Literature.*—The Welsh language is that which is now spoken, and has been so far back as historical records extend, in the principality of Wales. The name of 'Welsh' was first given to the people who speak it by the Anglo-Saxons, and the same term or a similar one seems to have been used in many of the Germanic and even of the Slavonic languages to denote the Italians, or other nations whose languages resembled the Latin. 'Welschland' was the name for Italy in German of the middle ages, and is not yet entirely superseded in the language of the common people; the name of that country in Polish is 'Wlochy,' and the appellations of the Walloons and the Wallachians appear to be derived from the same root. The Welsh are probably indebted for the name to their being looked upon by the Saxons as subjects of a Roman province.

The name which the Welsh give to themselves is 'Cymry,' and to their language 'Cymreig,' the obvious resemblance of the sound of which to 'Cimbri' has led many to identify them with the Cimbri of Roman history. The prevalent opinion however with regard to their origin is that they are a Celtic tribe, and of the same blood and language as the native Irish and the Scottish Highlanders. They also claim the appellation of antient Britons, and for their language the honour of having been the first spoken in this island, which they support, among other grounds, by the signification of the word 'Cymry,' which is said to denote 'primitive.' It is probable that most of these opinions are well-founded, as some have been ascertained to be, but nearly all are subject to some degree of doubt, and all have been warmly contested of late years, during which more attention has been directed to the subject. The meaning now affixed to the word 'Cymry' does not seem to have occurred to any Welsh scholar before the Rev. John Walters, who first published it about the middle of the eighteenth century. Even the claim of the Welsh to the appellation of Celts has been disputed. Their having been the primitive inhabitants of Britain is denied by Sir William Betham, who contends that the earliest known appellations of places in England can only be satisfactorily derived from the Gaelic or Irish, and that the Welsh are a foreign tribe, the Belgæ of Cæsar, who had only made their first appearance in the island not very long before the date of Cæsar's own invasion. In the 'Gentleman's Magazine' for June, 1843, a work is announced by the Rev. R. Williams of Llangadwaladr, a 'Dictionary of the Antient Cornish Dialect of the Celtic, with the Synonyms in all the Celtic Dialects,' in which an attempt will be made to prove that the antient names of places, not only in England, but in Scotland and Ireland, are clearly derivable from the Welsh, and that therefore the Welsh were the original inhabitants of all these countries. The most singular dispute however that has arisen connected with the Welsh language is that on the affinity subsisting between it and the Gaelic and Erse. The general and almost undisputed opinion for a long time had been that they were dialects bearing a close resemblance: Schlözer and Adelung hinted suspicions of the correctness of this view; and Sir William Betham, in his 'Gael and Cymri,' asserts that they are wholly dissimilar and unconnected. Professor Forbes, of King's College, London, whose native tongue is Gaelic, maintained the same views as Sir William in an animated correspondence on the subject, which was carried on in the 'Gentleman's Magazine' for 1836 and 1838. The main fact which he announced, that the most intimate knowledge of the Gaelic language would not enable a person to master a single verse of the Bible in Welsh, was certainly new to people in general, and would never have been suspected from the tone in which most Celtic scholars were accustomed to speak of the affinity of the languages; but the inference which he drew from it, of a total want of connection between the two, was satisfactorily refuted by other facts. The Rev. Richard Garnett, of the British Museum, who was induced to search into the question by the statements of Professor Forbes, reports in the

Gentleman's Magazine' for May, 1839, that on examining the monosyllabic words in the introductory portion of Neilson's Irish Grammar, about 270 in all, he found of

Words perfectly identical with corresponding Welsh terms in sense and origin	140
Clearly cognate	40
Derived from the Latin, Saxon, &c., repetitions and compound terms	40
Peculiar to the Gaelic	50

He adds that, 'in the Grammar prefixed to Armstrong's Gaelic Dictionary there is a list of about two hundred verbs in common use. Seventy, or more than one-third of the whole, are unequivocally cognate with Welsh and Armoric, and twenty more probably so.' 'In Stewart's Gaelic Grammar we have a list of twenty-four simple prepositions (omitting mere varieties of form), and about forty improper, or compound. Of the former, fourteen are Welsh, and three Cornish; and of the latter, eighteen, or nearly one-half, radically Welsh.' Mr. Garnett adds with justice, that 'the amount of resemblance is hardly so great between Icelandic and German,' and these are unquestionably cognate languages.

On the whole therefore, it may be stated that the Celtic family of languages consists of two distinct branches, the first comprising the Irish, the Gaelic, and the Manks, which are in fact merely dialects—all three intelligible to any person who is master of one; and the second comprising the Welsh, the Armoric or Bas-Breton, and the Cornish. The affinity between the members of the latter branch is not so close as that between the members of the former, or so close as it has often been asserted to be. The best evidence on this point is that of the Rev. Thomas Price, a distinguished Welsh scholar, who made a tour through Brittany in the summer of 1829, and published a very entertaining and instructive narrative of it in the 'Cambrian Quarterly Magazine.' 'I may,' he says ('Cambrian Quarterly Magazine,' vol. ii., p. 197), 'be asked a question which I should myself have proposed to another upon a similar occasion, had I never visited Brittany, and that is, if the Welsh and Breton languages bear so near a resemblance to each other as is generally understood, where was the necessity of having recourse to the French as a medium of communication? Why not converse with the Bretons in the Welsh at once? To this I answer that, notwithstanding the many assertions which have been made respecting the natives of Wales and Brittany being mutually intelligible through the medium of their respective languages, I do not hesitate to say that the thing is utterly impossible; single words in either language will frequently be found to have corresponding terms of a similar sound in the other, and occasionally a short sentence deliberately pronounced may be partially intelligible, but as to holding a conversation, that is totally out of the question.'

There have been numerous unfounded statements with regard to the affinity of Welsh to other languages than those which have been enumerated as composing the Celtic stock. Dr. Owen Pughe and others appear to have adopted an opinion that Welsh was closely connected with the Slavonic family of languages, on the ground of a casual resemblance between some words of Welsh and of the Wendish dialect spoken in Lusatia. It is scarcely necessary to add that the slightest further investigation of the subject would have convinced them that it has less affinity to Wendish than to English. Its connection with Hebrew has also been strongly asserted by many, but the true state of the case was pointed out long ago by Llewellyn, in his 'Historical and Critical Remarks on the British Tongue.' 'It is commonly said,' he observes, 'that the British and the Hebrew are similar languages, but by this must be understood not that they seem to be derived the one from the other, or that there are a great many radical words the same in each, but only that there is a similarity of sound in certain letters of both alphabets, and that they are alike in many peculiarities of construction, especially in the change incident to several letters in the beginning of words.' The Welsh is now generally referred to the great Indo-European family, or rather nation, of languages, which embraces English, Greek, Latin, and Sanscrit. Its affinities with the Sanscrit, which had been denied by Kennedy, Bopp, and Schlegel, have been made the subject of research by Prichard, in his 'Eastern Origin of the Celtic Nations,' and by Pictet, in his treatise 'De l'Affinité des Langues Celtiques avec le Sanscrit.'

The Welsh language in its present state is one of the oldest in Europe: it is in fact among spoken languages the most antient of which any written monuments are preserved, unless we regard the Romaic as to a certain degree identical with the antient Greek. The Welsh has poems now in existence, the origin of which is referred with probability to the sixth century. It is true that the language of these is so antiquated that the best scholars differ about the interpretation of many passages, and we observe that, in Price's 'Hanes Cymru,' it is deemed proper to subjoin a modern version even of a poem by Gwalchmai, in the twelfth century, for the information of the common reader; but, generally speaking, the body of poetry which the Welsh possess from the year 1000 downwards, is intelligible to those who are acquainted with the modern language after a very slight study. The same observation is perhaps applicable to no other living European language except the Icelandic.

The Welsh has long been an object of study to those who speak it. 'There are,' says Owen Pughe ('Archæologia, xiv., 220), 'about thirty different old treatises on Welsh grammar and prosody preserved. Of these one is particularly deserving of notice as a curious relic; it was composed by Geraint about 880, revised by Einion about 1200, and again by Edeyrn about the year 1270, and regularly privileged by the different sovereigns who then exercised authority in Wales.' The first printed grammar is generally said to be that of Griffith Roberts, published at Milan in 1567, but this statement is hardly correct: the work of Roberts, 'Dosparth byrr ar y rhan gyntaf i Ramadeg,' is a treatise on orthography only, and the book itself contains no indication of its having been printed or published in Italy, which indeed the character of the type would seem to contradict. Of the grammars which have since been published, Davies's 'Antiquæ Linguæ Britannicæ nunc communiter dictæ Cambro-Britannicæ Rudimenta' is the most esteemed. It was first published at London in 1621, has since been frequently reprinted, and has appeared in an English translation. The best dictionary is that of Owen, afterwards Owen Pughe, 'Geiriadur Cynmraeg a Saesoneg—A Welsh and English Dictionary,' 2 vols. 8vo., London, 1793, a new edition of which appeared in 1829, and is much more convenient for use than the former, from having been divested of the writer's peculiar orthography, which, whether preferable or not to the common system, was a serious obstacle to the learner. It is still indeed burdened with useless compounds, by which the number of words is swelled to above 100,000, but the twelve thousand quotations which it contains, accompanied by translations, form an invaluable feature. This dictionary comprises Welsh and English only, not English and Welsh. The want of the latter is supplied by the excellent English-Welsh dictionary of the Rev. John Walters, of which also a new and improved edition was published about 1825. An account of all the dictionaries previous to Owen's is given in the preface to that work. One of the most valuable books in the language is Lhuyd's 'Archæologia Britannica,' published at Oxford, in one volume, folio, in 1707. It contains, among other matter, a comparative vocabulary of the original languages of Britain and Ireland, an Armoric grammar and vocabulary, a Cornish grammar, and a catalogue of Welsh manuscripts.

The Welsh language is distinguished for the beauty of the compounds, which it possesses the capacity of forming to an almost unlimited extent. It has often been praised for energetic brevity; but, on the contrary, its general character, as it is now written, is that of tameness and diffuseness. Many of the phrases most constantly occurring require a greater number of words to express them in Welsh than in English. The most remarkable peculiarity of the Welsh among European languages (for it has a parallel in the Sanscrit) is what is called its system of permutation, which has often been praised as a beauty, but can only appear so in the eyes of those who consider complexity as an absolute advantage. The principle of permutation is this—that the initial letters of certain words are changed when they follow certain other words. Thus 'ci' in Welsh signifies 'a dog.' To signify 'my dog,' it is necessary to say 'vy nghi,' not only prefixing the word 'vy,' or 'my,' but altering the initial *c* into *ngh*; for 'thy dog,' the expression is 'dy gi;' for 'her dog,' 'ei chi,' &c. A word beginning with a different letter undergoes a different mutation. 'Pen,' a head, is changed into 'vy mhen,' 'dy ben,' 'ei phen,' &c., and there are a number of complex rules for these singular changes, the main, or rather the sole object of which is to promote the harmony of a language, which after all has never been considered harmonious by those of whom it was not the mother tongue.

The use of a language so different from English by a portion of the inhabitants of the country has often been considered an evil, but no active measures appear to have been taken against the peculiar speech of Wales. The fate of its neighbour, the Cornish, which gradually perished of mere neglect, has led to the supposition that the Welsh would also disappear from the same cause; and indeed Mr. Wynn, the president of the Asiatic Society, himself a Welshman, referred to the progressive extinction of Welsh as a proof of the efficacy of the non-interference system in such cases, in a discussion on the subject of endeavouring to introduce the English in the place of some of the native languages of India. The same idea was prevalent a century ago, when Goronwy Owen, the Welsh poet, relates in one of his letters (printed in the 'Cambrian Register,'), that in a discussion on the Welsh language with another Welshman, Owen, the translator of Juvenal into English, 'the wicked imp, with an air of complacency and satisfaction, said there was nothing in it worth reading, and that to his certain knowledge the English daily got ground of it, and he doubted not but in a hundred years it would be quite lost.' The hundred years that have since elapsed have not confirmed this opinion. 'For upwards of ten centuries,' says the Rev. W. J. Rees, in an address delivered in 1821 on the formation of the Cambrian Society in Gwent, 'since the reign of Offa, who made his celebrated dyke to prevent incursions of the Welsh into his territories, the Welsh language has receded comparatively but little within the boundary, especially in some parts of North Wales; and in other districts, where the long lapse of time since the conquest by Edward I. and the intimate incorporation by Henry VIII., and the great encouragement given for the attainment of the English language are considered, it has gained less ground than could be expected. An Englishman travelling the public roads of the principality often meets with persons who speak English, and those whom he has occasion to address at the inns are able to accommodate themselves to his language: the gentry he may visit speak English, and those who call upon them probably use the same language in his hearing; and from these slight facts which come to his knowledge, he erroneously concludes that the English is the prevailing language of the country. It is only one who has resided a long time in the interior, having intercourse with the common people, that can form a true estimate of the extent of the Welsh language; and most persons will readily assent to the truth of the assertion, that the Welsh is the sole living speech not only of thousands, but of tens of thousands, and even of some hundreds of thousands of the inhabitants of the principality.' (*Cambro-Briton*, vol. iii., p. 229.) The Welsh language has not only become more firmly rooted in the Old World in recent times, but, like the Gaelic, has acquired a prospect of flourishing in the New. While Dr. Macleod, in the preface to his 'Leabhar nan Cnoc,' exults in the hope that if Gaelic is destined to perish in the Highlands, it will survive beyond the Atlantic in the living speech of numbers greater than ever spoke it in Europe, the Rev. T. Price, in his 'Hanes Cymru,' relates with similar exultation that he has received from America some numbers of a Welsh periodical, the 'Cyfaill yr Hen Wlad,' or 'Friend of the Old Country,' now publishing at New York. The only bad sign of late years for the prosperity of the Welsh language is that an 'Essay on the means of Promoting the Literature of Wales,' by the Rev. J. Bray, has received the prize of the Cymreigyddion Society, and been published by them, in which the adoption of the language of England is recommended as the best method of promoting literary cultivation. It is evident to those who peruse the essay, that it can only be the matter, not the treatment of the subject, which secured the prize; and the Cymreigyddion Society, which thus bestows its approbation upon it, was expressly instituted, in 1795, for the 'delivery of lectures in the Welsh language on scientific and useful subjects,' and the 'translation of scientific treatises into Welsh.'

Literature.—The quotation which was prefixed to a magazine entitled 'The Cambro-Briton,' devoted to the cultivation of Welsh literature, is peculiarly happy: 'Nulli quidem mihi satis eruditi videntur quibus nostra ignota sunt.' The history of the literature of Wales is strikingly different from that of every other in Europe, and the apathy which has allowed the subject to remain in obscurity and neglect can hardly be explained.

The effect of this apathy has been that the most interesting points of the history of Welsh literature still remain to be subjected to investigation and criticism. The Welsh claim to be in possession of a body of poetical compositions extending from the sixth century to our own times, a period of thirteen hundred years. Till within the last half-century the proofs on which this assertion rests—the compositions for which this antiquity is claimed—remained buried in the libraries of colleges and of individuals, some so difficult of access, that Lhuyd, the celebrated Welsh antiquary of the eighteenth century, who spent his life in researches into Celtic literature, had never been able to obtain a sight of some of the most interesting. This reproach was removed, after ineffectual appeals to the patriotism of the gentry of Wales, by the liberality of Owen Jones, a furrier in Thames Street, who, at the expense, it is said, of more than a thousand pounds, collected and published, in 1801 and subsequent years, in three volumes, under the title of 'The Myvyrian Archaiology of Wales,' the chief productions of Welsh literature for nearly nine hundred years, from about 500 to 1400. In this task Owen Jones was assisted by Edward Williams, better known by the name of Iolo Morganwg, or Edward of Glamorgan, and by Dr. Owen, afterwards Dr. Owen Pughe. This enterprise was by no means undertaken too soon. 'A number of manuscripts equal to what now remains,' says Owen, in the fourteenth volume of the 'Archæologia' of the Antiquarian Society, 'hath perished through neglect within the last two hundred years, that is to say, since the higher ranks of Welshmen have withdrawn their patronage from the cultivation of the literature of their native country. We have still upwards of two thousand manuscript books of various ages from the beginning of the ninth to the close of the sixteenth century.' By the publication of the 'Myvyrian Archaiology' a vast mass of materials was preserved, but it did not comprise the whole of what Jones intended to publish—in the library of the Welsh school at London, no less than eighty volumes of transcripts were deposited which were intended for a continuation of the work. After the cessation of Jones's exertions, the old apathy returned, and continued till within the last two or three years. Dr. Owen exerted himself for several years to obtain support for the publication of the 'Mabinogion,' or prose tales of the Welsh, but died without accomplishing his purpose, which is now being carried into execution by Lady Charlotte Guest. At present the prospects of Welsh literature are more favourable than on any previous occasion. The Cymmrodorion Society has issued the works of the antient poet Lewis Glyn Cothi, and has other publications in the press. Another association has recently been instituted, on the model of the Camden and similar societies, for the purpose of publishing manuscripts, whether in Welsh or other languages, connected with Wales; and these are to be accompanied with translations. It also announces a translation, by the Rev. J. Williams, of the 'Myvyrian Archaiology,' which had nothing English about it but its prefaces.

In the latter portion of the plan of this society the second step is taken of the three which are requisite to bring the literature of Wales fairly before the world. The first is, the publication of its monuments, as indispensable materials for all that is to follow; the second, the rendering of them accessible, by translations, to those who have not the opportunity of acquiring, in addition to the knowledge of the Welsh language as it now is, that of all its variations during a period of thirteen hundred years. The third will be, that of applying a judicious criticism to these materials; of comparing, elucidating, and investigating; separating the genuine from the spurious; and deciding its value. When all this has been done, and not before, it will be possible to take a satisfactory survey of the history of Welsh literature, in which is involved the history of two of the most interesting points of modern literature in general, that of the introduction of rhyme and the origin of romantic fiction. At present the want of published materials in some cases and of adequate criticism upon them in others renders speculation on these subjects peculiarly vague and unsatisfactory.

The Welsh, it has been already stated, claim to be in possession of several poetic compositions of the date of the sixth century, and these compositions are in rhyme, which would be, as far as is at present known, the earliest instances of that kind of composition. The whole of them were printed in the 'Myvyrian Archaiology,' in which they occupy one hundred and eighty-eight pages of double columns, nothing of which, beyond a few specimens, had appeared in print before. The authors to whom they are attributed are:—Aneurin, who is supposed to have lived from 510 to 560; Taliesin, from 520 to 570; Llywarch Hen, or Llywarch the Old, from 550 to 640; and Myrddin, or Merlin, from 530 to 600; besides Gwyddno, Gwilym ab Don, Golyddan, and others of minor importance.

The authenticity of these poems having been impugned by Pinkerton, in his preface to Barbour, and by Laing, in a note to his 'Dissertation on Ossian,' it was maintained by Sharon Turner, in his 'Vindication of the Genuineness of the Antient British Poems of Aneurin, Taliesin, Llywarch Hen, and Merddin,' first published separately in 1803, and since appended to the successive editions of his 'History of the Anglo-Saxons.' This dissertation has been spoken of in terms of warm approbation by a Welsh writer fully competent to form an opinion on the subject, Edward Williams, better known by his bardic name of Iolo Morganwg, one of the editors of the 'Myvyrian Archaiology.' In a letter printed in the 'Cambrian Register' (vol. iii., p. 382) he observes that 'It is a shame to us all Cambrian scribblers that a mere English gentleman, who with a most wonderful rapidity acquired the knowledge of our language, Mr. Sharon Turner, is the best writer that has ever appeared on our literary antiquities.'

In this treatise Mr. Turner asserts the genuineness of the antient poems on both internal and external evidence. The oldest copy extant is, he says, in an antient manuscript called 'The Black-Book of Carmarthen,' preserved in the library at Hengwrt in Merionethshire, which is presumed by competent judges to be of the twelfth century; so that if forged at all, the poems must have been forged as far back as that period, while in fact they are alluded to as antient by writers of the centuries immediately following. If fabricated at that time, it is probable that they would have contained allusions to the popular legends respecting King Arthur, whose name had then become known throughout Europe as that of the hero of romantic tradition; while those compositions, professing to be written by contemporaries of Arthur, and frequently referring to his life and actions, always mention him in a sober, unexaggerated strain, perfectly consistent with the light in which he is presented by authentic history. Finally the language is of an extremely antiquated cast, often obscure, and sometimes unintelligible, and altogether different from that of compositions known to be of the twelfth century.

The most elaborate reply which has appeared to Mr. Turner's 'Vindication' is given in a criticism on it in the 'Edinburgh Review' for April, 1804; but the main objections of the critic appear to us to be scarcely deserving of notice. There is one however which he touches on lightly that seems of very great weight. Mr. Turner and others, who maintain the authenticity of most of the antient Welsh poems, do not maintain the authenticity of all; and if it be once admitted that some of the compositions which pass under the names of Aneurin and Taliesin are forged, the whole fabric which has been reared in their defence seems to rest on an insecure foundation.

The poem of Aneurin entitled 'The Gododin' bears very strong marks of authenticity. Aneurin was one of the northern Britons of Strath Clyde, who have left to that part of the district they inhabited the name of Cumberland, in token that it was once in possession of a section of the Cymry. In this poem he laments the defeat of his countrymen by the Saxons at the battle of Cattraeth, in consequence of having partaken too freely of the mead before joining in combat. He commemorates many obscure chieftains who fell on the occasion in language which seems dictated by the freshness of grief. A portion of this poem has been translated by Gray; a version of the whole was inserted by the Rev. Edward Davies in his 'Mythology of the Druids;' and a translation of the whole works of Aneurin, 'The Gododin' and the 'Odes of the Months,' was published in 1820 by Mr. Probert.

The works of Taliesin, the contemporary and friend of Aneurin, are of a much more questionable description. There is a story of the adventures of Taliesin current among the Welsh Mabinogion, or children's stories, which has a strong similarity in many of its incidents to the productions of Eastern fiction. It is printed in Welsh in the 'Myvyrian Archaiology,' and in Welsh, with an English translation, in the fifth volume of the 'Cambrian Quarterly Magazine.' According to this story, Gwion the Little, a boy who was employed by Keridwen, a witch of Meirion, or Merionethshire, to watch a magic cauldron in which she was preparing a concoction that was to bestow knowledge and genius on her son, incurred the vengeance of his mistress by involuntarily drinking the three blessed drops which were to produce these wonderful effects. Of course he became endowed with wisdom, and fled from the wrath of Keridwen, who pursued him. He fled in the form of a hare, she pursued in that of a hound; when nearly overtaken, he turned to a fish, and she to an otter; then he to a sparrow, and she to a hawk; and he was finally swallowed in the form of a grain of wheat by Keridwen, in the form of a hen. After nine months she was delivered of him again; and, unwilling directly to take his life, tied him up in a leathern bag and threw him into the sea; after which he was found by Prince Elphin, the son of Gwyddno, at a weir on the sand between Dyvi and Aberystwyth. This strange story appears at first sight to be of the same character with those which were told of Virgil in the middle ages, a wildly fictitious narrative, fathered on a distinguished name from the wish to give it an air of authenticity in the eyes of ignorance. But this explanation is not sufficient. In the poems attributed to Taliesin continual allusions are found to this preposterous narrative; he distinctly asserts his having passed through metamorphosis and metempsychosis; and he attributes to the effects of the caldron of Keridwen the gift of prophecy which he claims.

Mr. Peacock, in the novel of the 'Misfortunes of Elphin,' says, 'Where Taliesin picked up the story which he told of himself, why he told it, and what he meant by it, are questions not easily answered. Certain it is that he told this story to his contemporaries, and that none of them contradicted it. It may therefore be presumed that they believed it, as any one who pleases is most heartily welcome to do now.' It must be acknowledged however that the incidents of the narrative seem of a character likely to be invented in a century later than the sixth, and indeed some of the poems of Taliesin are those which Mr. Turner seems to show the least inclination to defend. These poems exhibit also an introduction of the Greek and Latin metres into Welsh poetry, and even of scraps of Latin, as in the name of Wales in the celebrated lines prophetic of the fate of his countrymen, which have been quoted oftener than any others of Taliesin:—

'Eu Ner á volant
Eu hiaith á gadwant
Eu tir á gollant
    Ond gwyllt Walia.'

'Their Lord they shall adore,
Their language they shall keep,
Their land they shall lose
    Except wild Wales.'

A belief in the authenticity of the other poems of Welsh antiquity would certainly be strengthened if it could be shown that the genuineness of those of Taliesin was not involved in theirs. There is still so much to be elucidated by the critical examination of these antient remains, that it cannot at present be ascertained whether this is the case.

'The Heroic Elegies and other Pieces of Llywarch Hen, Prince of the Cumbrian Britons, with a literal translation by William Owen,' were published in 1792. Llywarch Hen, like Aneurin, was one of the warriors of Strath Clyde, and, like him, was driven to Wales by the successes of the Saxons. His poems have the same character of genuineness as those of Aneurin, and are superior in interest. Southey, who remarks that 'their authenticity has been proved by Mr. Turner; and they are exceedingly curious, as some of the oldest remains of Celtic poetry,' observes, in the notes to his 'Sir Thomas More,' that their 'general strain is as melancholy as it is rude.' The 'Elegy on Old Age and the loss of his Sons,' and the lines 'To the Cuckoo in the Vale of Cuawg,' are particularly striking; but the latter poem is ascribed by some to a certain Mabclaf ap Llywarch, who lived towards the end of the fourteenth century; the former is shown to be Llywarch's by many circumstances mentioned in it.

Some of the remaining poems in the 'Myvyrian Archaiology' are ascribed to the two Merddyns, who have been amalgamated and made into Merlin in romance. The same work contains a considerable number of anonymous pieces ascribed to the earliest bards.

The privileges of the bards form the most peculiar and interesting portion of those curious collections of Welsh laws, which are still extant from a very early period. The laws of Howell Dda, or Howell the Good, a king of South Wales, are of the date of the commencement of the tenth century; but in a poem by Cynddelw, of the date 1160, reference is made to still older enactments, to a concession of privileges to the men of Arvon by Run in the sixth century, and a similar one to the men of Powys by Cadwallon in the seventh. The laws of Howell have been frequently reprinted since their first appearance in Wotton's 'Leges Wallicæ;' the last edition, in Welsh and English, is to be found in the 'Antient Laws and Institutes of Wales,' published in 1841, by Aneurin Owen, under the superintendence of the Record Commission. According to the general laws of Wales then collected, the bards were entitled to dues from marriages, to exemption from bearing arms, and to innumerable other privileges; and a bard was particularly favoured who 'knew the prophetic song of Taliesin.'

It is stated by Owen Pughe, in the 'Archæologia' (vol. xiv., p. 216), that the principal heads under which antient Welsh literature may be classed are—poetry, bardic institutes, laws, history, theology, ethics, proverbs, dramatic tales, and grammars; and that 'the first of these classes, poetry, is by far the most extensive, for it may be computed to fill about eight parts out of the ten of our old writings, omitting to take into account the heraldic collections altogether; but with respect to the quantity that is printed, such a proportion may be reversed.' 'On this subject,' he adds, 'I have made a calculation so as to enable me to infer that I have perused upwards of 13,000 poetical pieces of various denominations for the purpose of collecting words, in the course of about eighteen years that I have been compiling the dictionary of the Welsh language.'

The 'Triads' may be said to belong to most of the remaining classes, for they are by turns historical, ethical, legal, and theological. They are enumerations of a triad of persons, or events, or observations, strung together in one short sentence. This form of composition, originally invented in all likelihood to assist the memory merely, has been raised by the Welsh to a degree of elegance of which it hardly at first sight appears susceptible. The 'Triads' are of all ages, and have unfortunately been preserved without much attention to the date of their composition; some of the oldest are probably as old as anything in the language. Short as they are individually, the collection in the 'Myvyrian Archaiology' occupies more than 170 pages of double columns. 'The Wisdom of Cadog the Wise,' a collection of proverbs, said to be made by St. Cadog, who lived in the sixth century, from the then antient adages of the Britons, is much of the same style of composition as some of the Triads; and indeed some of the proverbs are thrown into that shape.

In history the Welsh literature is not rich. Their first authentic antient historian is Caradoc of Llancarvan, who lived in the twelfth century, and wrote a history of Wales, an English translation of which was made about 1557, by Humphrey Llwyd, published by Dr. Powell, in 1584, and has since been frequently reprinted, the last time at Shrewsbury in 1832. The original was printed in the second volume of the 'Myvyrian Archaiology.' It is a dull but useful chronicle.

The fictitious history translated by Geoffrey of Monmouth had a very different fate from the dry records of his contemporary. His work, a 'History of Britain,' in nine books, in Latin, which, according to his own account, he translated from British materials supplied to him by Walter Calenius, archdeacon of Oxford, who had collected them in Brittany, was written in the reign of Henry I., and appears to have spread at once the name of its hero, King Arthur, throughout Europe. It commences with the coming of Brutus from Troy to Britain, and contains all the strange and wonderful stories respecting Arthur and Merlin which have become familiar to the readers of romance. There is a Welsh translation of this book, which goes by the name of the 'Chronicle of Tysilio,' and has been re-translated into English and published by the Rev. Peter Roberts, at the end of the manuscript of which is the singular note in Welsh: 'I, Walter, archdeacon of Oxford, turned this book from Welsh into Latin, and in my old age I turned it the second time from Latin into Welsh.' It was long supposed that the stories in this book were the invention of Geoffrey of Monmouth, but it is now rather believed that his statement of being only the translator is correct, and that he really had a Welsh original before him. The arguments for this belief have been given by Mr. Ellis, in the introduction to his 'Specimens of early English Metrical Romances.' If there were Welsh originals, it becomes a question of considerable interest if they still exist; and the prevalent opinion now appears to be that they are to be found in the 'Mabinogion,' or Children's Tales, of which a manuscript, supposed to be of the date of 1370, exists in the 'Red Book of Hergest,' preserved at Jesus College, Oxford. The tales in this collection are in prose; they comprise not only those of the court of King Arthur, but the Life of Taliesin, which is as wild as any of its companions, a number of similar tales, and the history of Bevis of Hampton. Owen Pughe published several of the Mabinogion, in Welsh and English, in the 'Cambrian Register' and the 'Cambrian Quarterly Magazine;' and it has been already mentioned that he had formed the project of publishing the whole, but could never obtain sufficient support. They are now being issued in numbers, under the superintendence of Lady Charlotte Guest, who declined availing herself of the translation of the whole, already made by Owen Pughe, and prints a new English version with the original Welsh, together with notes, which, if entirely the production of her ladyship's pen, evince her knowledge not only of antient French and German, but of Danish and Icelandic. When the work is completed, it will probably afford ample materials for ascertaining if the Welsh versions of the stories of the Round Table which it contains are likely to be the originals of Geoffrey of Monmouth, or, like the Chronicle of Tysilio, taken from him; but in either case it now appears to be the prevalent opinion that that cycle of romance originated in Welsh invention or tradition. The reasons in favour of this view have been ably summed up in an 'Essay on the Influence of Welsh Tradition upon European Literature,' which obtained the prize proposed by the Abergavenny Cymreigyddion Society, in October, 1838, and which, though not published, may be seen at the British Museum, to which a privately printed copy was presented by the author, Mr. J. D. Harding. Mr. Harding, in this Essay, and the Rev. T. Price, in his 'Tour in Brittany,' refer for a confirmation of their views on this subject, which coincide, to the authority of Mr. Panizzi, in his 'Essay on the Narrative Poetry of the Italians,' prefixed to his edition of Boiardo and Ariosto. Mr. Panizzi states as the result of his researches, that 'All the chivalrous fictions since spread through Europe appear to have had their birth in Wales.'

The subjects of the antient Welsh compositions in prose are so much connected, that in treating of them it has been thought better to encroach a little on the chronological arrangement than to put them asunder. It will now be proper to return to the poetry, the history of which up to our own time is so entirely uninterrupted by any foreign influence, that it may be brought to an end before returning to the prose.

The second period of Welsh poetry has the merit of undoubted authenticity, and in antiquity it surpasses what can be produced in any other living language of the north of Europe, with the exception of the Icelandic. The bards of Wales were the contemporaries of the Scalds of Scandinavia, and they appear in their rules for the composition of poetry to have had much in common with each other. The 'Myvyrian Archaiology' contains the compositions of fifty-nine bards, from the time of Meilyr, who lived between 1120 and 1160, to that of Tudur Ddall, between 1340 and 1380. The most famous piece of Meilyr is the 'Death-bed of the Bard,' both the original and translation of which are given in the 'Cambrian Register,' vol. i., p. 405. His son, Gwalchmai ap Meilyr (1150-90) is reported to have accompanied Richard Cœur-de-Lion to the Crusades; fourteen compositions by him are still extant, of which the most famous is on the subject of the battle of Tal-y-Voel, in 1158, and has been translated, but by no means faithfully, by Gray—

'Owen's praise demands my song,
Owen swift, and Owen strong,' &c.

This poem is written in a phraseology so obscure to the modern reader, that the Rev. T. Price, who quotes it in his recently published 'Hanes Cymru,' thinks proper to add a version of it in modern Welsh. Cynddelw (1150-1200) was a poet contemporary with Gwalchmai, but of inferior talents. Forty of his pieces are printed in the 'Myvyrian Archaiology,' of which the most interesting are his poem entitled 'The Death-bed of Cynddelw,' and his verses to Madoc, prince of Powys, the same who is the hero of Southey's poem, and is supposed by some writers to have been the discoverer of America. Two of his rivals were illustrious for rank as well as genius:—Owain Cyveilioc (1150-97), the prince of Cyveilioc, a portion of Powys; and Hywel (1140-1169 or 1172), one of the sons of Owain Gwynedd, and therefore the brother of Madoc, who aspired to his father's throne, and fell in the contest, the issue of which led to Madoc's emigration from Wales. The most conspicuous production of Owain is the ode entitled 'The Hirlas Horn,' or 'The Long Blue Horn,' which has been frequently translated since its first appearance in Evans's 'Dissertation on the Bards.' The poems of Hywel are chiefly love-odes, of which the finest is one entitled 'The Choice.' One of their contemporaries, Llywarch ap Llewellyn (1160-1220), who was the laureate of several of the princes, is commonly known by the singular appellation of 'Prydydd y Moch,' or the 'Poet of the Pigs,' for what cause is not now ascertainable. One of his productions is an invocation, when undergoing the fiery ordeal to which he was subjected, to ascertain if he possessed any knowledge of the fate of Madoc.

The names of the bards now become still more numerous, and the period in which they lived may be considered as the middle of the classic age of Welsh poetry. The most distinguished are—Einion, the son of Gwalchmai, the son of Meilyr (1170-1220), of a family in which poetical genius seems to have been hereditary; Elidyr Sais (1160-1220), Phylip Brydydd (1200-1250), and Prydydd Bychan (1210-1260). Their poems are chiefly eulogies on the princes and great men with whom they were connected. The next generation of bards must have been that which witnessed the conquest of Wales by the English. According to a tradition which has been made universally known by 'The Bard' of Gray, they must have perished by the sword of the invader; but the current story of the massacre of the bards appears to rest on no adequate authority. There is no memorial or tradition of it in the country which is said to have been its scene, and no allusion to it in the productions of bards of the time immediately following. In the 'Myvyrian Archaiology' there appears no greater falling off in the number of poetical productions than might naturally be expected as the result of a foreign conquest, of however mild a character; and the next century was destined to produce a bard who in national popularity surpassed all who preceded him.

Dafydd ap Gwilym has sometimes been called the Welsh Ovid, and sometimes the Welsh Petrarch, but is said by his English translator to 'approach more nearly to Burns than to any other poet, whether of his own or other countries.' His poems are of a character almost entirely new in the literature of Wales; the subjects of them are chiefly themes of love and social festivity, instead of valour and heroism. The exact dates of Dafydd's birth and death are unknown, but he is supposed to have been born about 1340, and to have died about 1400; the incidents of his life are both interesting in themselves and curious from the light they throw on the manners of the time. He appears to have been of illegitimate birth, and his mother's relations, on finding her pregnant, turned her out of doors, when she put herself under the protection of her lover, who immediately married her, and the new-married pair visited a cousin of the husband, of the name of Ivor Hael. In after years, when Dafydd was a lad, he took refuge in the house of the same Ivor on being turned out of doors by his parents in consequence of impertinence to them. Here he became tutor and lover of Ivor's daughter, whom, when the father found what was going on, he placed in a nunnery at Anglesea, but without withdrawing his patronage from Dafydd, who composed many songs to the lady, and was about this time elected chief bard of Glamorgan, from which he is often called Dafydd Morganwg. His appointment to this office led to a contest of satire with Rhys Meigan, another bard, who reflected on the illegitimacy of Dafydd's birth, but was answered in a poem of such pungency, that on hearing it recited he fell down and expired on the spot. The handsome person of Dafydd and his poetical talents made him at this time such a favourite with the fair sex, that he had the opportunity of amusing himself by giving an assignation to twenty-four different mistresses, with all of whom he appointed an interview at the same spot, and, concealed behind the bushes, laughed at the meeting. They all, when they had discovered the trick, vowed to be the death of the deceiver, who had the temerity to make his appearance, and in a humorous verse desired her who had kissed him oftenest to strike him first. The confusion and the mutual sneers of the women produced a battle, in the heat of which Dafydd escaped. The heart of the bard was soon after affected by a serious passion for Morvudd, the daughter of Madog Lawgam, who was united to him in a grove by his friend Madog Benfras, an eminent bard. Dafydd argued the validity of this mode of marriage, but the bride's father and the Church thought otherwise, and Morvudd was soon after united, agreeably to the rites of the Church, with Cynfrig Cynin, whom Dafydd christened 'Bwa Bach,' or the 'Little Hunchback,' and assailed under that name with all the weapons of satire. He followed up this poetical warfare by running away with the lady, who was nothing loth, but the fugitives were overtaken and separated, and Dafydd was condemned to pay a heavy fine, which the men of Glamorgan, who looked more to his genius than his morality, released him by discharging. This obstinate attachment to Morvudd excited the contempt of another eminent bard, Gruffydd Gryg of Anglesea, who ridiculed Dafydd in a poem, which produced a contest of satire till it was brought to an end by an ingenious and good-natured stratagem of Bola Bauol, a friend of both. He contrived that a report of the death of each should reach the ears of the other, and, as he expected, on the receipt of the sad intelligence animosity was forgotten: Dafydd composed a panegyrical elegy on Gruffydd, and Gruffydd on Dafydd. When the trick was discovered, the consequence was a renewal of friendship. Dafydd lived to survive his Morvudd and all his dearest friends, and on his death-bed composed a poem expressive of his own resignation and hope.

The poems of Dafydd ap Gwilym were first published in Welsh only, but with an English memoir, from which the preceding account has been taken, by Owen Jones and Owen Pughe, in 1789. An English translation of several of the best was published under the assumed name of Maelog, in 1834. The poems of Dafydd are remarkable, among other things, for exhibiting the indications of an approach to a system of versification which was soon after carried to what may be called a point of perfection or point of absurdity, as the reader's taste may decide, and which it may therefore be proper to notice here as at the period of its full establishment.

'Originally,' we are told by a writer in the 'Cambrian Register,' vol. i., p. 400, 'the distribution of long and short syllables or feet formed the basis of Welsh verse and rhyme: of the combination of verses, there was also another principle called consonancy, or the accordant sound of the same consonants from certain accented parts of the verse which casually embellished it. But this consonancy, being peculiarly musical in the Welsh language, was established as a constituent part of verse at a congress held in the ninth century, at which presided Geraint, usually called Bardd Glâs, or the Blue Bard. The consonancy was afterwards modified and improved at different times, until about the year 1350, when a congress was held under the auspices of Ivor Hael, wherein it was established in the form in which it remains to this day.'

'Our system of versification,' says Edward Williams, or Iolo Morganwg ('Poems,' vol. ii., p. 220), 'is superior to anything of the kind perhaps in the world: it is reduced to twenty-four elementary classes, and there is not in any language, antient or modern, any kind of verse to be found that is not used in the Welsh language, and that does not rank under one or the other of our twenty-four primary classes.' That this system however is not easy to be understood, is evident from what is added to his notice by the writer in the 'Cambrian Register,' that 'some of the leading poets of North Wales committed the egregious blunder of adopting what were only twenty-four different stanzas of examples of the original canons for the canons themselves, which has created a schism between them and the bards of the

South, and which has been the means of leading modern writers into errors, *whenever* they have had occasion to speak of the twenty-four measures of poetry.'

The Welsh name for this species of consonancy is *Cynghanedd*, and though more complicated, it has much analogy to the alliteration employed in Anglo-Saxon, Icelandic, and earlier English poetry, from which the first idea of it may have been borrowed. The Welsh soon became proud of it: a specimen of English verse, composed in 1450, by a Welsh student at Oxford, to exhibit the advantages of the 'cross consonancy,' is printed in the second volume of the 'Cambrian Register.' A more recent example of it, given in Walters's 'Dissertation on the Welsh Language,' will perhaps convey a clearer notion of it than a lengthened description. The lines are on Envy:—

'A fiend in Phœbus' fane he found,
That yonder grew yet under ground,
  Sprung from the spawn of Spite;
The Elf his spleen durst not display,
Nor act the devil in the day,
  But at the noon of night.'

The introduction of *Cynghanedd* tended strongly to induce the poets of Wales to pay more attention to sound than sense, as may be conjectured from the specimen given, but it held its ground till in our own days, in 1819, Dr. Owen Pughe, by translating the 'Paradise Lost' into Welsh blank verse, without respect to the laws of Cynghanedd, was said to have led the way to a desirable reform.

The next distinguished poet after Dafydd ap Gwilym was Lewis Glyn Cothi, who lived during the wars of the Roses. His works are less remarkable for their poetical than their historical interest. They were first published in the original Welsh, with English notes, chiefly of explanatory historical matter, by the Cymmrodorion, or Royal Cambrian Institution, in the year 1837, and occupy an octavo volume, which was edited by the Rev. John Jones, of Christchurch, known by the name of Tegid.

The reigns which followed were by no means fertile in poetic merit. · The next bard who deserves attention in a general survey of Welsh literature, is Huw Morus, or Hugh Morris, who was born in 1622, and survived till 1709. 'He is to be ranked,' we are told in the 'Cambrian Register,' 'among the first of the Welsh poets. He eminently excelled in that talent which we call humour, and was equally master of the pathetic and the sublime.' The same writer states that his 'Elegy on the Death of Mrs. Middleton' is equal or superior to 'the two most beautiful compositions in the English language on the same subject, the 'Monody' on the death of his lady, by Lord Lyttelton, and that 'to the Memory of a Young Lady,' by Mr. Shaw.' The works of Huw Morus were published in two duodecimo volumes, at Wrexham, in 1823, under the title of 'Eos Ceiriog,' or 'The Nightingale of Ceiriog.'

The most distinguished bards of the eighteenth century were Goronwy Owen, Evan Evans, and Edward Williams. Goronwy Owen is styled by Owen Pughe 'one of the greatest poets that appeared among the Welsh.' He was the son of a peasant in Anglesey, and was indebted for his education to Mr. Lewis Morris, a distinguished antiquary, who had him brought up for the church. He married in Oswestry, where he was curate, and says in one of his letters, 'My wife speaks very little Welsh, yet she understands some; so that I fear that if I go not to Wales, my boys will be Saxons, for by the life of me I cannot teach the eldest one word of Welsh.' He was curate to Dr. Douglas, afterwards bishop of Salisbury, 'the person,' he says, in one of his letters, 'who defended the poet Milton against the insidious defamation of Lauder. Be it as it may, he is sufficiently severe and hard towards me. I hold some little land of him appertaining to the school, and though it was set too high before, yet he has sent down this year orders to raise the rent, lest a poor wretched curate should gain anything in his service, or obtain too good a bargain at his hand.' This and similar treatment at last induced Owen to petition the Cymmrodorion Society, in 1757, for assistance towards paying his passage for America, where he settled at Williamsburg in Virginia; and after the year 1767 nothing further was heard of him. 'About the year 1798,' says Owen Pughe, in the 'Cambrian Biography,' 'some persons who revered his memory tried to obtain information if he were alive or dead, and with that view sent a letter over to his son. Him they found perfectly Americanized: before any answer was sent, he must first know who would pay him for his trouble.' The principal poems of Goronwy Owen were printed in the first volume of a book called 'Diddanwch Teuluaidd,' printed at London in 1763. The book has a curious English preface by the printer, who states that it was 'put into his hands by the editor, Hugh Jones,' who 'owned himself incapable of writing an English preface to it, and therefore desired me to do that office for him.' 'The editor,' he adds, 'being an itinerary bard in the manner of the antients, hath given me leave to tell his readers that he pretends to neither learning nor languages; he despises them all except his own, as the chief Greek poets did, calling other languages barbarous. He can hardly be persuaded that the English or French nations have anything that may properly be called poetry; such is man's partiality towards his own country and people.'

The Rev. Evan Evans was born in Cardiganshire in 1731. He also was patronised by Mr. Lewis Morris, and educated for the church, but rose to no higher station than that of a curate, and at his death, in 1789, was reported and believed to have perished from want on a mountain. He was, on the contrary, allowed an annuity by Mr. Panton, a gentleman of Anglesey, on condition of receiving his library of manuscripts after his death. He published two octavo volumes of Welsh sermons, 'Dissertatro de Bardis,' 'Specimens of Antient Welsh Poetry,' and a poem entitled the 'Love of our Country.' His talents as a poet have become more known and appreciated since his death than before. Jones, the historian of Brecknock, says, in a letter, written in 1797, 'I did not think Evan Prydydd Hir' (the bardic name of Evans) 'the poet he was. I knew him well, but I suppose the *cwrw* had expelled the *awen* before I became acquainted with him.'

Edward Williams, known by the Bardic name of Iolo Morganwg, was a poet of merit both in Welsh and English. He was born in the parish of Llancarvan in Glamorganshire, about the year 1747. His English poems, lyric and pastoral, in two volumes, published in 1794, present perhaps the most curious list of subscribers that ever was attached to any publication. It begins with the name of the Prince of Wales; it contains those of Mrs. Barbauld, of William Bowles, generalissimo of the Creek nation, Sir William Jones, Miss Hannah More, Lord Orford, Thomas Paine, Samuel Rogers, Miss Anna Seward, John Horne Tooke, Wilberforce, and General Washington. He afterwards published two volumes of Welsh hymns, 'Salmau yr Eglwys yn yr Anialwch.' Williams worked through life at his trade as a stonemason. He lived for some time in London, and was anxious to emigrate to America, but returned to Wales, and lived and died there. He was intimately acquainted with the literature of his country; he was one of the editors of the 'Myvyrian Archaiology,' and he was, in 1820, about to publish a collection of documents illustrative of Welsh history, but seems to have been prevented from want of sufficient support. These documents are now announced for publication by the Welsh Manuscript Society, under the editorship of his son, Mr. Taliesin Williams, who published, in 1829, his father's 'Cyfrinach Beirdd Ynys Prydain,' or 'Secret of the Bards of the Isle of Britain.' Iolo died at Flemingstone in Glamorganshire, on the 17th of December, 1826; and Southey says, in his Life of Cowper, 'It grieves me to think what curious knowledge, and how much of it, has probably perished with poor old Edward Williams.' From some letters by him, which were printed during his lifetime in the third volume of the 'Cambrian Register,' it seems that he had written his autobiography, in which he had introduced an account of Welsh literature during his own time, as well as his opinions of Welsh literature in general. This work would probably be of value, as his opinions on these subjects appear to have been self-formed.

The epithet which has been given to a writer contemporary with Edward Williams, 'the Cambrian Shakspere,' would give a stranger an idea that at all events its possessor occupied an important station in Welsh literary annals; out even in this he would be mistaken. 'Twm or Nant, says Williams, in one of his letters, 'has been called the Shakspere of Wales. What blasphemy to name him with the Shakspere of England! You have most probably seen a foolish crambo, sometimes put into the hands of little children beginning to read, "This is the house that Jack built." It is much fairer to compare this to the writings of

Shakspere than anything that was ever written by Twm or Nant, whose interludes consist of nothing but the lowest and frequently the most indecent buffoonery that can be imagined.' 'Twm or Nant,' or Tom of the Valley, was the Bardic name of Thomas Edwards, who was born in the year 1738, in Denbighshire, and died, we believe, about 1820. Some of his admirers call him 'the Welsh Aristophanes.' His interludes, 'Enterlutes,' as he calls them in Welsh, resemble, if we may judge by their titles, which are given by a correspondent in the 'Gwladgarwr' (vol. vi., p. 144), the Mysteries which preceded the establishment of the regular theatre in most countries of Europe. One of them is a dialogue between a Protestant and a Dissenter; another between Pleasure and Misery. The dates of these are 1783 and 1787: he afterwards advanced nearer to the regular drama, for, in 1812, we have the 'Ystori Richard Whittington, yr hwn a fu dair gwaith yn Arglwydd Maer Llundain,' the story of Whittington, thrice Lord Mayor of London.

The Cambrian Shakspere deserved his title much less than Dr. Owen Pughe would that of the Cambrian Milton. Dr. Pughe was equally eminent as an antiquary, a lexicographer, and a poet. His principal work of the latter description is his 'Coll Gwynfa,' a translation of the 'Paradise Lost,' which has been already mentioned as distinguished for throwing off the yoke of 'Cynghanedd.' He also published, under the name of Idrison, a poem entitled 'Hu Gadarn,' or 'Hu the Mighty,' commemorative of the exploits of the patriarch of the Cymry, famous in tradition, who conducted their migration from 'Defrobani,' or 'Summerland,' to the west of Europe. Dr. Pughe was born in Merionethshire, in 1759, and died in 1835, in his native county, to which he had returned after a long residence in London.

Mr. Edward Jones, who was appointed bard to the Prince of Wales in 1783, was also a native of Merionethshire, and died in London in 1824. His 'Relics of the Welsh Bards' are valuable from the specimens they contain both of the poetry and the music of Wales, but the English translations which he gives of the Welsh passages are by far too paraphrastical. Mr. Parry's invaluable collection of 'Welsh Melodies,' with poetry by Mrs. Hemans, has superseded much of the utility of Jones's work for the musician; but we understand that a new edition of the 'Relics' has either appeared or is about to appear under the superintendence of Mr. Parry himself.

The Welsh Parnassus of the nineteenh century is crowded with candidates for fame, many of whom have received the highest praises from Cambrian critics. It may be observed of all, that they aim at producing little beyond short lyrical pieces, many of them on the casual occurrences of the day or on subjects dictated by societies. Our limits will not allow us to give more than very brief notices of the most conspicuous. As usual North Wales is the most abundant in bards, and Caernarvonshire appears to be the most prolific county. David Owen, of Eifion (by his bardic name Dewi Wyn), was born in Caernarvonshire in 1784, and died in 1841, after a life spent in rural pursuits. His poetical works were collected in one volume, and published at Chester in 1841, under the title of 'Blodau Arfon,' or 'Flowers of Arvon.' The Rev. William Williams (Gwilym Caledfryn), of Caernarvon, is the author of an interesting volume of poetry, entitled 'Grawn Awen, or the Treasures of the Muse;' and Mr. David Thomas (Dafydd Ddu Eryri), of Caernarvon, who was found drowned in 1822, had produced some poems, the merit of which has lately occasioned their republication, with a Life of the author prefixed. Mr. David Richards (Dafydd Ionawr), of Dolgelly, is the author of four or five volumes of poems, which enjoy the reputation of being some of the best in the language. The Rev. John Richards, of Llanerchymedd in Anglesey, and the founder of Sunday-schools in that island, who died in 1832, in his seventy-sixth year, was both an antiquarian and a poet. Mr. Thomas Lloyd Jones (Gwenffrwd), of Holywell in Flintshire, who went to America in 1832, and died in Alabama in 1834, in his twenty-fourth year, had translated Thomson's 'Seasons' and Goldsmith's 'Deserted Village,' and published, in 1831, a small but useful volume, entitled 'Ceinion Awen y Cymry,' or 'the Beauties of Welsh Poetry.' In South Wales the principal seat of the 'Awen' is Merthyr Tydvil. Taliesin Williams, the son of Iolo Morganwg, has followed the example, instead of the advice of his father, who, like Sir Walter Scott, was anxious that none of his sons should be poets. He is now a schoolmaster at Merthyr, which boasts of another poet in the person of another schoolmaster, John Thomas, who is said by his admirers to be the best minstrel in South Wales, and of a third, in the innkeeper Edward Williams (Iolo Mynwy). Two of the most distinguished of modern Welsh poets are resident at Oxford—the Rev. Daniel Evans, of Jesus College, who assumes the name of Daniel Ddu o Geredigion, and the Rev. John Jones, of Christ Church, who takes that of Tegid. A collection of poems by the former was published at Llandovery, in 1831, under the title of 'Gwinllan y Bardd—The Poet's Vineyard:' the productions of Tegid must be sought for in numerous periodicals; they are noted for grace and neatness of expression. There is one Welsh poet of note in London, the Rev. James Hughes, of Deptford, minister of Jewin Crescent Chapel; who is also the author of a popular exposition of the Old and New Testaments.

The prose literature of Wales in modern times may be said to commence with the translation of the Bible, the history of which is curious. In the year 1562 or 1563, it was enacted by Parliament that 'the Bible, Testament, and Common Prayer' should be translated into the British or Welsh tongue; should be viewed, perused, and allowed by the bishops of St. Asaph, Bangor, St. David, Llandaff, and Hereford; and should be printed and used in the churches by the 1st of March, in the year 1566, under a penalty, in case of failure, of forty pounds, to be levied on each of the above bishops. In 1567, one year after the time fixed by Parliament, the New Testament made its appearance, but more than twenty years elapsed before there was a version of the Old. The reasons are probably those conjectured by Llewelyn, that the time allowed was too short, the persons that could be employed upon it too few, the penalty allowed for failure too slight to induce the bishops, who seem to have had no funds assigned them to carry on the work, to go to the expense of procuring a translation, which must have cost each of them much more than forty pounds. In fact the whole affair seems to have dropped to the ground, and the translation, which finally was published at London in 1588, was executed by Dr. William Morgan, vicar of Llan Rhaiadr, in Denbighshire, not in consequence of the Act of Parliament, but because he felt the necessity of the work. Morgan was promoted, in 1595, to the see of Llandaff, 'translated,' says Llewellyn, 'to St. Asaph in 1601, and in 1604 to a better place.' His successor at St. Asaph, Dr. Parry, published, in 1620, a revised edition of this Bible, with such considerable alterations that it might almost be called a new translation, and this is the one which continues in use to the present day. Owen Pughe mentioned, in 1802, that nineteen editions of the Bible, consisting of upwards of a hundred and thirty thousand copies, had circulated in Wales. Llewelyn published, in 1768, 'An Historical Account of the British or Welsh versions and editions of the Bible,' which is very amusingly written.

The early editions of the Welsh Bible were printed in London, and the introduction of typography into the principality was exceedingly slow. Cotton, in the 'Typographical Gazetteer,' states that the earliest information he possesses on the subject is from one of the Martin Mar-Prelate tracts in Queen Elizabeth's reign, in which mention is made of 'knave Thackwell the printer, which printed popyshe and traiterous Welshe bookes in Wales,' but that nothing more has ever been discovered of this printer or his books. In the 'Gentleman's Magazine' for August, 1821, it was observed by a correspondent, that 'from the invention of printing downwards, so adverse were the circumstances attending the diffusion of Welsh literature, that there was not a printing-press in the principality until the year 1734, or thereabouts, when a temporary one was set up by Mr. Lewis Morris, of Bod-Edeyrn, in Anglesey. This identical press,' the correspondent adds, 'is still in being at Trevirw, near Llanrwst.'

Affairs seem to have continued in this apathetic state till towards the close of the eighteenth century, when two principal engines were set in motion which have since changed the whole face of literary affairs in the principality—the one the establishment of periodicals, and the other the establishment of societies. The first Welsh periodical appeared about the year 1770; its title was 'Eurgrawn Cymraeg,' or 'The Welsh Treasure;' it was edited by the

Rev. Peter Williams, of Caermarthen, and Evan Thomas, a Welsh poet from Montgomeryshire, then resident at that town. What has been the effect of this example appears from the list of eight periodicals then in existence given in the preface to the second volume of the ‘Transactions of the Cymmrodorion’ in 1828, and the statement in a number of the ‘Cambrian Quarterly Magazine’ for 1831, that at that time ‘no less than fourteen periodicals in the Welsh language issued monthly from the press.’

The principal now or lately in being are—1, the ‘Seren Gomer,’ or ‘Star of Gomer,’ which, first commenced as a newspaper, has since 1818 appeared at Caermarthen in the form of a monthly magazine, and affords, in the shape of biographies, reviews of books, &c., a tolerably complete view of the passing literature of Wales, but is perhaps on the whole rather a religious than a literary periodical. It was founded by the Rev. Joseph Harris of Swansea, a popular writer and author of several works both in English and Welsh, who died in 1825, and whose son, John Harris (Jeuan Glan Tawy), who died in 1824, in his twenty-first year, was a poet of merit. 2, ‘Y Gwladgarwr,’ or ‘The Patriot,’ published at Chester and Liverpool from 1833 to 1841, was of a more exclusively literary character than the ‘Seren Gomer.’ Its first editor, the Rev. Evan Evans (Jeuan Glan Geirionydd), a native of Trefriw, near Llanrwst, is a distinguished bard, author of the ‘Seraph,’ and officiates as a judge of poetical compositions at the ‘Eisteddvodau.’ 3, The ‘Cylchgrawn,’ or Welsh ‘Penny Magazine,’ the publication of which was commenced in January, 1834, and discontinued in June, 1835, consisted principally of translations from the works of the Useful Knowledge Society, in particular the ‘Penny Magazine’ and ‘Cyclopædia,’ and was published under the Society's superintendence. It was edited by the Rev. John Blackwell, of Mold in Flintshire, and late rector of Meinordeifi in Cardigan, a distinguished poet. Its discontinuance is attributable partly to the prevalent taste of the Welsh public for sectarian publications. 4, ‘Y Drysorfa,’ or ‘The Treasury,’ edited by John Parry, under the superintendence of a committee of the Calvinist body, published since 1831. This periodical is chiefly religious. The same may be said of, 5, ‘Yr Athraw,’ or ‘The Instructor,’ edited by H. Gwalchmai, and published at Llanidloes since 1836, and 6, ‘Y Diwygiwr,’ or ‘The Reformer,’ conducted by a committee of ministers of the Independents, commenced at Llanelly in the same year. Besides these there are ‘Yr Haul,’ or ‘The Sun,’ and ‘Y Gwyliedydd,’ or ‘The Sentinel,’ and others of inferior note. All of the existing periodicals give a summary of the occurrences of the day, and we believe that all are of the liberal or reforming side in politics, but one. There are also two or three local newspapers. These periodicals now comprise almost the whole of the current literature of Wales. As in poetry scarcely a single Welsh author has been found to venture beyond the limits of a short lyric piece, it seems as if the confined limits of an article in a magazine were amply sufficient for the ambition of their writers in prose.

This is perhaps the most appropriate place to mention that some of the most valuable information in print with regard to the literature of Wales is comprised in three periodicals in the English language, devoted exclusively to Welsh subjects. The earliest of these, ‘The Cambrian Register,’ extends to three volumes, the first of which was published in 1796, the second in 1799, and the third in 1818. It would be difficult to name three volumes of a periodical publication more rich in original information of interest. The letters of distinguished Welsh antiquaries, which form a portion of its contents, are particularly entertaining; and a history of Welsh poetry, which appears in the first volume, contains more information on the subject of its recent authors than will be found elsewhere. Dr. Owen Pughe was one of its principal contributors. ‘The Cambro-Briton and General Celtic Repository,’ also in three volumes, published in the years 1819-22, is an excellent periodical, replete with information of every kind, and remarkably free from frivolous or unimportant matter. Its editor was Mr. John Humffreys Parry, secretary to the Cymmrodorion Society, author of the ‘Cambrian Plutarch’ and other works of reputation. The ‘Cambro-Briton’ is also an indispensable work in the library of every one who wishes to become acquainted with the history, the antiquities, and the literature of Wales. The ‘Cambrian Quarterly Magazine,’ in five volumes, published from 1829 to 1833, is unfavourably distinguished from its predecessors by the admission of articles of mere light reading; but some of these are extremely well written, and the ‘Tour through Brittany,’ by the Rev. Thomas Price, inserted under the signature of Carnhuanawc, is a signal ornament to the work. The eleven volumes of these periodicals should find a place in every public library in England, or even in any private collection of moderate size, where the literature of antient Britain and the modern literature of a considerable portion of it, are not objects of absolute indifference. They comprise almost all the information on the subject at present accessible to the English reader—defective in many respects, it is true, and scattered over many volumes; but the English can scarcely complain of the deficiency of a general and satisfactory survey of the literature of Wales, while as yet they have nothing of a similar kind for their own.

The societies of Wales, though not very successful at first, have been in the long run most effectual in reviving the taste for its literature and the study of it. The earliest of them seems to have been the Cymmrodorion (Associates) or Metropolitan Cambrian Institution, which was originally established in London in 1751. Its immediate purpose was to cultivate the language and literature of Wales, and its members were also to ‘contribute their endeavours towards the instruction of the ignorant and the relief of the distressed part of their countrymen.’ It collected some scarce books and MSS. relating to Wales, which were afterwards deposited in the library of the Welsh school in Gray's-Inn-Lane, but did little else in a literary point of view, and after an existence of thirty years appears to have gradually expired of inaction. Its place was more vigorously occupied by the Gwyneddigion, or Society of the Inhabitants of Gwynedd, or North Wales, which was established in London in 1771, by that indefatigable patriot Owen Jones of Myvyr. This association has at different times patronised various literary works connected with the principality, but its chief aim is to keep alive the attachment to the national music and poetry. With this view it has revived the antient congresses of the bards, and distributed medals among the best performers on the national instrument, the harp, and the writers of the best Welsh poems on subjects selected annually for the occasion. The London Cymreigyddion Society, founded in 1795, was intended to place the natives of Wales on something of an equality with the natives of Great Britain, in respect of the opportunities of acquiring useful knowledge; and for this purpose its meetings once a month were to be devoted to the delivery of lectures in the Welsh language on scientific and useful subjects, many of which were printed and published. It has been already mentioned however that one of the last public acts of this society has been to reward the Rev. J. Bray for his ‘Essay on the Means of Promoting the Literature of Wales,’ in which he recommends as one of those means the systematic discouragement of the Welsh language. The second ‘Cymmrodorion’ Society was formed in 1820, at a meeting held at the Freemasons' Tavern, and has similar objects with the first. It commenced the publication of its ‘Transactions’ in 1822, and some parts have since been issued, but they have not as yet reached to the extent of two volumes octavo. The library of the Cymmrodorion contained the manuscripts collected by Owen Jones for the continuation of the ‘Myvyrian Archaiology, and the society proposed to follow up that valuable work, but the design as yet remains unaccomplished. It is probably reserved for the achievement of the ‘Society for the Publication of Antient Welsh Manuscripts,’ which was founded at Abergavenny in 1837, and is announced in its prospectus to be acting in conjunction with the ‘Cymmrodorion Society, founded at London in 1750,’ by which the second Cymmrodorion Society is probably meant, though the date which is given is anterior even to the formation of the first. The Manuscript Society has already issued the ‘Liber Landavensis,’ or the Antient Register of the Cathedral Church of Llandaff, in Latin and English, under the editorship of the Rev. W. J. Rees, and announces the ‘Heraldic Visitations of Wales,’ the ‘Lives of the Welsh Saints,’ and other valuable publications. An effort has recently been made in London, chiefly, we believe, by Mr. Hugh Williams, to found a Cambrian Library, or collection of books in Welsh or relating to Wales—a very desirable object, and one that might be effected at a comparatively small expense, if taken in hand, as it now appears to be, with judgment as well as zeal. It is probable however that in a short time a collection of Welsh literature much superior to any that has hitherto been seen will be formed at the British Museum. The Cymmrodorion Society and the Welsh School in Gray's-Inn-Lane recently (July, 1843) came to a resolution to present to that establishment their separate collections, with the view of rendering them more generally accessible to the public. The Welsh manuscripts at the Museum were already of considerable importance, and this augmentation will place the collection decidedly at the head of all of the kind: in the printed book department the accession will probably have a similar effect.

The example set by the Gwyneddigion of reviving the 'Eisteddvodau,' or Bardic Congress, has been followed up with vigour in the four districts of Wales. Four different societies were instituted between 1818 and 1822, for Dyved, for Powys, for Gwynedd, and for Gwent, who hold annual meetings alternately in their respective districts, somewhat in the same manner as has since been practised by the British Association. These meetings have been attended with increasing enthusiasm. Their proceedings are reported at length in the Welsh newspapers, and often bear a character of great interest. It was at one of these meetings that the present incumbent of St. David's, Bishop Thirlwall, delighted his auditors by addressing them in the language of Wales, which he had studied and acquired since his accession to the see.

It has been remarked that the periodicals contain almost the whole of the current prose literature which is worthy of attention. The great mass of it consists of sermons and other religious works addressed to the common people; there are also a few compilations of geographical and historical information, possessed of little other merit than that of rendering accessible to the Welsh reader what is already accessible in a hundred shapes to the English. One of the best of these is the Welsh Encyclopædia, by Mr. Owen Williams, of Waeunfawr, near Caernarvon. The only work which aspires to a character of its own, and merits translation, is one by the Rev. Thomas Price, the publication of which was commenced in 1836 and completed in 1842: 'Hanes Cymru, a Chenedl y Cymry, o'r cynoesoedd hyd at Farwolaeth Llewelyn ap Gruffydd, ynghyd a rhai cofiaint perthynol i'r amseroedd o'r pryd hynny i waered'—'A History of Wales and the Welsh Nation, from the earliest Ages to the Death of Llewellyn ap Gruffydd, with some notices relating to the times subsequent to that event.' The book is a thick octavo of about eight hundred pages, full of the information which its author has amassed during twenty years of attention to the history and literature of his country.

The bibliography of Wales was first cultivated by Moses Williams, an able and indefatigable antiquary, who assisted Wotton in the publication of the 'Leges Wallicæ,' and collected a valuable library, which is now in the possession of the Earl of Macclesfield. Owen says of him, in his 'Cambrian Biography,' that 'he published nothing of consequence besides an index to the Welsh poets,' but in this he is mistaken. In addition to the 'Repertorium Poeticum, sive Poematum Wallicorum, quotquot hactenus videre contigit Index Alphabeticus' (London, 1726, 8vo.), which contains an index of pieces of Welsh poetry, according to their first lines, and the fullest catalogue of poets we have seen, Williams issued a 'Cofrestr o'r holl Lyfrau Printiedig gan mwyaf a Gyfansoddwyd yn y Jaith Gymraeg, neu a Gyfjeithwyd iddi, hyd y Flwyddyn 1717' (London, 1717, 8vo.)—'A catalogue of all the Books that have been Printed, and several that have been Composed, in the Welsh Language, or Translated into it, up to the Year 1717.' This catalogue does not extend to more than a single sheet, but it is very closely printed. The original edition is now very scarce, but the whole of it was reprinted in the periodical entitled 'Y Gwyliedydd,' for 1832. In the 'Gwladgarwr' for 1840 a list of Welsh publications is given, from the earliest time to the year 1799; but, though valuable, it is probably very imperfect, as it omits even some of the works inserted in Williams's catalogue. The number of articles it enumerates is 620, but this includes a few works in other languages than the Welsh relating to Wales.

The first attempt at a collection of Welsh lives is Owen's 'Cambrian Biography, or Historical Notices of celebrated men among the Ancient Britons' (London, 1803, 12mo.), but the notices are so extremely brief, averaging four or five to a page, that the book can hardly be regarded in any other light than an index. The 'Cambrian Plutarch' of John Humffreys Parry (London, 1824, 8vo.) is much more satisfactory, but embraces only twenty-two lives. A 'Welsh Biographical Dictionary,' by the Rev. Robert Williams, is now publishing (1843) at Llandovery. Only the first number has yet appeared.

WELSHPOOL. [Montgomeryshire.]

WELSTED, LEONARD, a small poet, or versifier, of the last century, was sprung from a reputable Leicestershire family, and was the grandson, through his mother, of the lawyer and antiquary Thomas Staveley, known for his curious volume against popery, entitled 'The Romish Horseleech.' Welsted was born at Abington in Northamptonshire, in 1689, and was educated at Westminster School. The common statement that he afterwards studied at both universities rests upon no better authority than a satirical pamphlet, called 'The Characters of the Times,' published, in 8vo., in 1728, which has been sometimes ridiculously attributed to Welsted himself, who is one of the persons satirized in it. Early in life, by the interest of the earl of Clare (afterwards duke of Newcastle), he obtained a situation in the Ordnance-Office, which he held till his death, in 1747. Welsted's earliest production is supposed to have been a short poem of some humour, called 'The Apple-Pie, a Tale,' which may be read in Nichols's 'Select Collection of Poems,' with notes, iii. 78. But this was originally attributed to Dr. William King (of whom there is a notice in Johnson's 'Lives of the Poets'); nor was it claimed for Welsted till 1735, when he was asserted to be the author in a periodical publication called 'The Weekly Chronicle' (for 16th August), with the remark, that King had 'let it pass some years, without contradiction, as his own.' King died in 1712. Others of Welsted's poems appeared in 1709, 1710, &c. One of his literary performances is a translation of Longinus from the French; another is a comedy, entitled 'The Dissembled Wanton; or, My Son, get Money,' which was brought out with considerable success at Lincoln's Inn Fields in 1726, and printed the same year. But what has chiefly been the means of preserving Welsted's name is a piece called 'The Triumvirate, or a Letter in verse from Palaemon to Celia at Bath,' which he published in 1718. For this, which, according to one of the notes on the 'Dunciad,' 'was meant for a satire on Mr. Pope and some of his friends,' the luckless author was immortalized ten years after in the third book of that poem, in the following parody on Denham's well-known lines:—

> 'Flow, Welsted, flow! like thine inspirer, beer;
> Though stale, not ripe; though thin, yet never clear;
> So sweetly mawkish, and so smoothly dull;
> Heady, not strong; o'erflowing, though not full.'

He is also noticed in the second book, and in the treatise 'Of the Art of Sinking in Poetry,' published the year before the 'Dunciad.' A note on the passage quoted above affirms that Welsted was one of Sir Robert Walpole's anonymous writers, and that it appeared from the Report of the Secret Committee of 1742 that he had at one time received 500*l*. for his secret services in that capacity. Welsted was twice married: first, to a daughter of Henry Purcell, the eminent musical composer; secondly, to a sister of Bishop Walker, the defender of Londonderry, who survived him.

WEM. [Shropshire.]

WEN, the name of those tumors occurring on the human body which assume the form of a bag or cyst, and contain a variety of contents. These cysts have been named according to the character of their contents. When the contained matter resembles fat or suet, the tumor is called *Steatoma;* when it resembles honey in consistence, *Meliceris;* and when it is like a poultice or pap, it is called *Atheroma*. These however are mere artificial distinctions, and can seldom be satisfactorily applied. These tumors consist essentially of a serous or mucous bag varying in size, and the contents are of an exceedingly varying and sometimes anomalous character. Those which are commonly called wens, and which are mostly situated immediately under the skin, are mostly enlargements of the sebaceous follicles which naturally exist in the skin. Sir Astley Cooper says that in wens a dark-coloured spot may be often seen on the skin in the centre of the tumor, and such spot, he says, is caused by the obstruction of the orifice of one of the sebaceous glands of the skin. Such also is the origin of many of the cysts of the mammæ, which consist of dilated lactiferous ducts. But this is not the origin of many of the larger forms of encysted tumors, as those of the ovary, &c. There are many forms of encysted tumor occurring in the internal viscera, in which the lining membrane is composed of serous tissue, as those of the liver, lungs, &c. Those tumors also called ganglions, which occur within the sheaths of tendons, have a serous lining, but ought not to be referred to under the character of wens.

The cysts of wens, especially those of the atheromatous kind, vary much in thickness. When situated on the head, back, and trunk, they are very dense; but when on the face, often very thin. Sometimes the cysts become hardened by the deposition of cartilaginous and even ossific matter. It is from this process that many of these cysts have a tendency to assume the hardness and even the form of horns. These horny formations are however the result of the ulceration of the cyst, and the horny matter is produced by the secretion from the walls of the cyst. These horns mostly grow on the forehead or some part of the scalp. They are generally small, but instances are on record of their being eight or nine inches long and two or three in circumference.

In ordinary cases the cyst has only one cavity, but it not unfrequently happens that there are partitions in it, dividing its interior into cells of different sizes. The contents of the cysts are, as before stated, frequently very anomalous. Some are filled with a thin, fetid, brown fluid, mixed with flakes of the fibrinous parts of the blood; some contain serum; some a matter of gelatinous consistence; some a calcareous matter; some a black fluid; and others hair, teeth, and other organic substances. Those containing hair are mostly found in the neighbourhood of the eyebrows or eyelids.

On dissecting these tumors, some part of their surface is found firmly adhering to the skin, while other parts are connected with it by cellular membrane. The cyst is always more or less embedded in cellular membrane. In some cases these cysts are congenital, and persons who have them are frequently troubled with a great number in various parts of their body.

In the treatment of wens two modes may be had recourse to; the one by puncture, the other by removal. When the cyst is small and presents a small black point on its centre, it may be opened and the contents pressed out, when it will sometimes get well. But it frequently happens when these tumors are punctured, that severe inflammatory action is the result, so that painful suppuration occurs, and life is put in danger, and sometimes a bleeding fungus has protruded itself through the aperture. The safest mode of treatment on the whole is to remove them with the knife, where their situation will permit of it. When this is done, the cyst may either be dissected out entire, or it may be cut into two halves, and each half may be dissected out separately. In both cases great care should be taken to remove the whole of the cyst.

WENCESLA'US, or **WENZEL**, emperor, or more correctly king, of Germany, the eldest son of the emperor Charles IV., of the house of Luxemburg, was born in 1361. Charles intended to intrust the education of Wenceslaus to his personal friend Petrarch, but the poet declined the honour, and the young prince was instructed by other teachers. The system of education, which was planned by the emperor himself, was bad; and the consequences were that Wenceslaus became unfit for the high post for which he was destined by his birth. At the age of two, he was crowned king of Bohemia; at twelve, he was invested with the margraviate of Brandenburg; and at sixteen, he was chosen and crowned king of the Romans. From the accession of Rudolph I., in 1273, no Roman king had been chosen, the electors thinking that the election of a successor to the reigning emperor was incompatible with the freedom of election. They objected to the youth of Wenceslaus, but Charles answered them that the sons of kings had received from God souls much more enlightened than those of other men, and as their education was likewise more carefully conducted, they of course, at the age of sixteen, knew quite as much as, and were in every other respect superior to, common men of double that age. The electors were less persuaded by these arguments than by the wealth of Charles, who is said to have given one hundred thousand gold guldens to each of them, besides estates and other advantages, and thus Wenceslaus was chosen king at Frankfort in 1376.

Wenceslaus succeeded his father in 1378. On his deathbed Charles said to him, 'Love thy friends and thy lands, for thy lands have made thee the king of kings. Be peaceful, and never try to obtain by war what thou canst obtain by peace. Do honour to everybody who deserves it; be a friend of the pope, the priests, and the Germans: thus thou wilt reign in peace.' These were the maxims of Charles, but Wenceslaus did not follow them. The dominions of Wenceslaus were, the kingdom of Bohemia, with the fiefs of Silesia, the Upper Palatinate, and a great number of small fiefs over all Germany. His brother Siegmund was margrave and elector of Brandenburg, which Charles had ceded to him, and became afterwards king of Hungary; his brother John held Lusatia as a fief of Bohemia; his cousin, Jobst of Luxemburg, was margrave of Moravia, which was a fief of Bohemia; the duchies of Luxemburg, Limburg, and Brabant, which were possessed by an uncle of Wenceslaus, whose name was likewise Wenceslaus, were to return to him after the death of his uncle. The wife of Wenceslaus, Jane of Bavaria, was the sole heiress of her uncle, William of Bavaria, in his counties of Holland, Zeeland, and Hainault. The union of the provinces of the Netherlands under one head, and the foundation of a powerful state in the north-eastern part of Germany, two plans, the separate realization of which was afterwards the glory of the dukes of Burgundy and the kings of Prussia—these two plans, and still more the change of Germany into an hereditary monarchy of the house of Luxemburg, might have been carried into effect by Wenceslaus, if he had acted with prudence, forbearance, and energy.

The state of the empire was this:—After the death of Pope Gregory XI., at Avignon, in 1378, the Roman cardinals chose Urban VI., who was to reside in Rome. The French cardinals however chose Clement VII., who maintained himself a short time in Rome, but he was driven out by Urban VI., and took up his residence at Avignon. Wenceslaus recognised Urban VI. as pope, and in return received the papal recognition of his election to the imperial throne, which he had not yet obtained. This policy involved him in difficulties with the kings of France, Charles V., and, after him, Charles VI., from which however he disentangled himself by an alliance with King Richard II. of England, in 1381, who married the emperor's sister, Anne, and who likewise recognised Urban VI. As to the disturbances occasioned by the disputed government of two popes, the emperor was unable to quell them; and he only quieted Clement VII.'s adherents among the princes of the empire by granting to them several important privileges. To Leopold, duke of Austria, he pledged the imperial rights over the free cities of Suabia for a large sum of money; but these cities, fearing that they would lose their freedom under Leopold, concluded an alliance to which a great number of towns and free cities on the Rhine adhered, and they defended themselves against the duke. Some other princes of Southern Germany also tried to obtain imperial rights, and then gradually the sovereignty over other towns and free cities, and for that purpose they concluded a union, which was headed by Eberhard, count of Würtemberg, and Leopold, duke of Austria, who had very extensive possessions in Suabia. The consequence was a dreadful civil war between the princes and the citizens, whose party was strengthened by the towns and cities of Switzerland, which was then a province of Germany. In Switzerland the princes were defeated in the battle of Sempach (9th of July, 1386), where Duke Leopold of Austria was slain, with 656 counts and knights; but in Suabia the citizens were routed at the battle of Döfingen (24th of August, 1388) and in several other engagements. Wenceslaus tried to pacify the belligerent parties, but his measures were partial, and had no effect. In order to please the victorious princes, he cancelled the heavy debts which they had contracted by borrowing money from the Jews, a proceeding of which we find many other instances in Germany, England, and France: 3000 Jews were killed by the mob in Prague. For some time the emperor, who seldom left Prague, succeeded in maintaining peace in Bohemia and other parts of his own dominions but he abandoned himself to a dissolute life and committed many acts of cruelty. By his order John Pomuk, commonly called Nepomuk, a virtuous divine, and afterwards a saint, was drowned in the Moldau, after Wenceslaus had tortured him with his own hand (1393). He showed himself faithless to his own brothers, and Jobst of Moravia, who surprised the emperor and put him in a prison, in order to obtain justice from him. Jobst restored his captive to liberty at the summons of the other princes, who would not allow the head of the empire to be kept a prisoner, though this head was unworthy of his exalted rank. As Wenceslaus resided at Prague, and seldom appeared in any other part of Germany, the princes declared that they would depose him if he did not fulfil his duty of visiting the provinces of the empire, and contributing by his personal appearance to their tranquillity. Through sloth or timidity, Wenceslaus did not leave Bohemia, but appointed his brother Siegmund vicar-general of the Roman empire, and kept for himself nothing but the imperial name.

The state of the Church was still deplorable: Boniface IX., the successor of Urban VI., was pope at Rome, and Benedict XIII., the successor of Clement VII., was pope at Avignon. The doctrines of Wickliff had found their way into Bohemia, where they were propagated by Huss, and the confusion was so great, that a general council was considered the only means of restoring peace to the church. On this Wenceslaus suddenly left Bohemia and appeared at the diet at Frankfort (1398), but his propositions were so imprudent, and his conduct so destitute of good faith, that the princes resolved to depose him. He was summoned to appear at Lahnstein before the tribunal of the electors, and on his non-appearance he was declared to have forfeited his crown, and his deposition, founded on seven different charges, was pronounced by John, elector of Mainz, in the presence of a numerous crowd (20th August, 1400). Ruprecht, elector-palatine, was chosen emperor on the following day. Wenceslaus protested against his deposition, and continued to style himself emperor, and as such he was recognised by the council of Pisa in 1409. But he had not influence enough to form a powerful party in the empire, and even his authority in Bohemia was disregarded by his brother Siegmund, who kept him in prison for two years. After the death of Ruprecht, in 1410, Wenceslaus, without giving up his imperial title, effected the election of his cousin Jobst of Moravia, who died in the following year (1411). The choice of the electors fell upon Siegmund, elector of Brandenburg and king of Hungary, the brother of Wenceslaus, who now renounced the imperial title and lived quietly in Bohemia. He tried to protect Huss against the proceedings of the Council of Constanz, but did not succeed. After the burning of Huss, in 1415, his adherents in Bohemia formed a union, the ultimate consequence of which was the dreadful war of the Hussites against the empire. The beginning of this war was an outbreak at Prague in 1419. Wenceslaus resided then at his castle of Kunratiz, and when the news of the outbreak reached him, he fell into a fit of passion, and died of apoplexy on the 16th of August, 1419. He left no male issue, and his nominal successor in the kingdom of Bohemia was his brother, the emperor Siegmund.

(Pfister, *Geschichte der Teutschen*, vol. iii.; Pelzel, *Lebensgeschichte des Römischen und Böhmischen Königs Wenceslaus*, Prague, 1788-90.)

WENDOVER. [Buckinghamshire.]

WENDS. [Vends.]

WENERN, Lake. [Sweden.]

WENERSBORG. [Sweden.]

WENLOCK. [Shropshire.]

WENLOCK EDGE. [Shropshire.]

WENLOCK, MUCH. [Buckinghamshire.]

WENSUM. [Norfolk.]

WENTLETRAP, the collector's name for a species of *Scalaria*, much sought after by conchologists, and which seems to have presented considerable difficulties to systematists. Thus Denys de Montfort truly remarks that Linnæus made it a *Turbo*, Rumphius a *Buccinum;* Gualtieri, Davila, or Romé de L'Isle, Guettard, and de Favannes considered it to be a *Serpula;* D'Argenville a *Terebra;* and, in short, that it mocked all efforts for its classification till Lamarck formed a particular genus for its reception under the name of *Scalaria*, a denomination adopted by De Montfort and by all succeeding zoologists.

Lamarck arranges *Scalaria* between *Vermetus* and *Delphinula*.

Cuvier observes that the *Scalariæ*, which he places between *Turritella* and *Cyclostoma*, have, like the *Turritellæ*, the spire elongated into a point; and, like the *Delphinulæ*, the mouth completely formed by the last whorl; this mouth is moreover surrounded by a *bourrelet*, which the animal repeats at intervals, so as to form a succession of step-like elevations. He describes the animal as having the tentacles and the penis long and slender.

M. de Blainville gives *Scalaria* its position between *Proto* and *Vermetus*.

M. Rang makes it come between *Pleurotomaria* and *Melanopsis*.

Mr. Swainson has arranged it as the first genus of his subfamily *Turbinæ*, the fourth of his family *Turbidæ*. [Turbinidæ, vol. xxv., p. 379.]

Mr. J. E. Gray places it among his numerous family *Littorinidæ*, between *Aciona* and *Clathrus*.

Generic Character. — *Animal* very spiral, furnished with a proboscis, two tentacles provided with a filament, and carrying the eyes upon an external convexity. Foot short and oval. Exciting organ of the male very slender.

Shell subturriculate, with the spiral whorls more or less close, furnished with elevated longitudinal ribs, which are interrupted and nearly trenchant; aperture round, rather small, the borders united and forming a delicate and recurved bourrelet.

Operculum horny, delicate, rather large, and paucispiral. (Rang.)

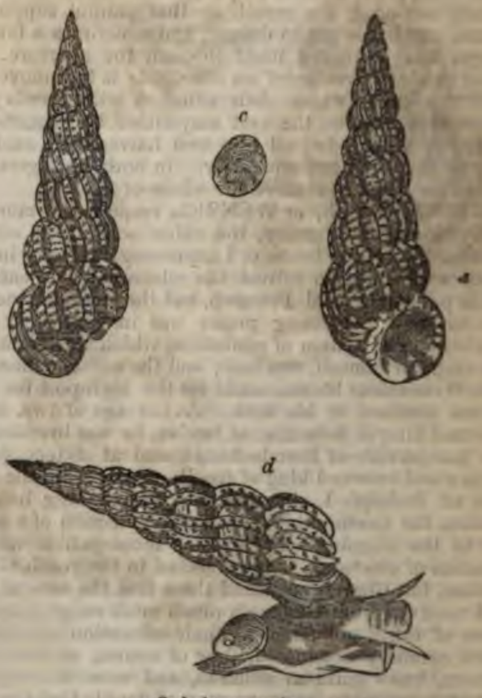
M. de Blainville divides the genus into the following sections:—

A. Species, the whorls of whose spire are contiguous. Example, *Scalaria communis*.

B. Species, the whorls of whose spire do not touch each other in any direction, or which are disjointed (Genus *Aciona*, Leach).

The first of these sections comprises the *False Wentletraps* of collectors, and the second those designated by them as *True Wentletraps*.

The number of recent species of *Scalaria* recorded by M. Deshayes in his Tables is fourteen; and of these the following species are recorded as living and fossil (tertiary): —*communis*, *pseudoscalaris*, *tenuicostata*, *lamellosa*, and *varicosa*. The *Scalaria diadema* described by Mr. G. B. Sowerby (1832) from specimens brought home by Mr. Hugh Cuming from the Gallapagos (James's Island), the animal of which secretes a bright purple humour, is probably to be added.



Scalaria communis.

a, Front; b, back; c, operculum; d, shell and animal.

Mr. G. B. Sowerby, jun., has made out at least eighty recent species, the numbers being, generally speaking, pretty nearly equally divided between the true and the false wentletraps; the whole of these will be figured in a forthcoming number of his new and accurate work, three parts of which have already appeared under the title of *Thesaurus Conchyliorum*.

Habits, Locality, &c.—Species of this genus, which is marine, have been found at depths ranging from seven to thirteen fathoms in sandy mud. The True Wentletraps are found in the seas of warm climates; some of the false (*Scalaria communis*, for example) occur in the European seas and upon our own coasts.

Examples, *Scalaria communis* (*Turbo clathrus*, Linn.).

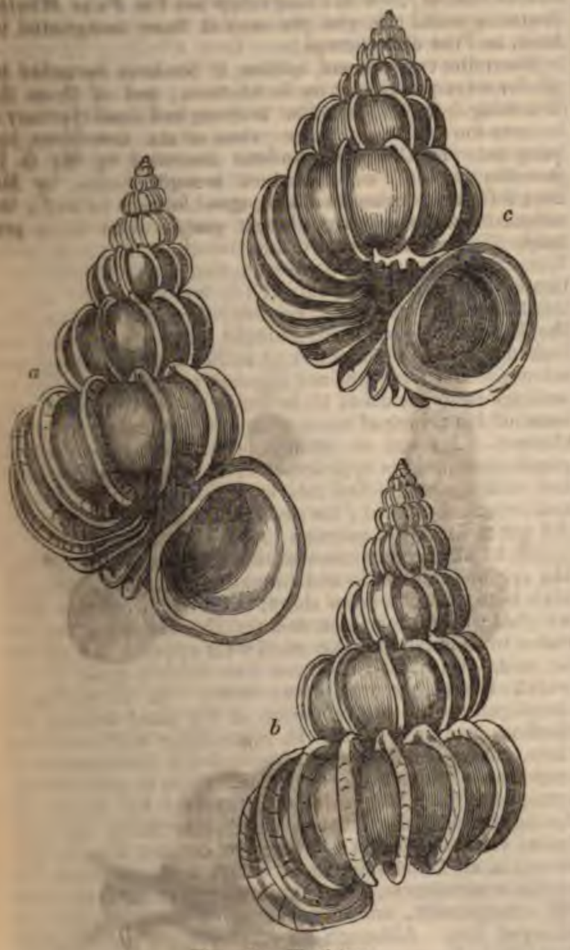
Description.—Shell turreted, imperforate, white or pale fulvous; the ribs rather thick, smooth, and suboblique. There is a variety of this species with the shell rather longer, rosy-violaceous, and with purple-spotted ribs. Length of the common variety about 16 lines, of the rosy-violaceous variety 17 lines and a half. (Lam.)

Scalaria pretiosa (*Turbo scalaris*, Linn.; *Aciona scalaris*, Leach).

Description.—Shell conic, umbilicated, contorted into a loose spire, pale yellow, with white ribs, the whorls disjointed and smooth, the last ventricose.

Locality.—East Indian seas; China.

This elegant shell, so much sought after by collectors, was known among the French as the *Scalata*, *La vraie Scalata*, and *Le véritable Escalier;* among the Germans as the *Rechte Wendeltreppe*, among the Dutch as the *Oprechte Wendeltrap;* among the Belgians as the *Wendeltrap*, and to the English as the *Wentletrap*, *Wendeltrap*, and *Royal Staircase*. The specific name given to it by Lamarck was at one time well deserved on account of its rarity and the great price which a fine specimen would bring in the market, especially when it exceeded two inches in height: such a specimen has been sold in former days for 2400 livres, or 100 louis! But those times are gone by; the shell is no longer rare, and good specimens only fetch shillings where they once brought pounds. A very fine example however still commands a considerable sum. That in Mr. Bullock's museum, supposed to be the largest known, brought 27*l.* at his sale, and was, in 1815, estimated at double that value.



The precious Wentletrap.

a, front showing the mouth; *b*, back; *c*, view shewing that the whorls are disconnected.

FOSSIL SCALARIÆ.

The number of fossil species (tertiary) recorded by M. Deshayes, in his Tables, is twenty-two; we have above noticed those recorded by him as recent and fossil (tertiary). Mr. Lea describes three species—*planulata*, *carinata*, and *quinquefasciata*, from the Claiborne Beds (tertiary of Alabama). Dr. Fitton figures one, *Scalaria pulchra*, from the strata below the chalk (Blackdown).

WENTWORTH, THOMAS. [STRAFFORD.]

WEOBLY. [HEREFORDSHIRE.]

WEREGELD. [WEHRGELD.]

WEREJA. [MOSCOW.]

WERL, OLAF. [VERELIUS, OLAUS.]

WERNER, ABRAHAM GOTTLOB, was born on the 25th of September, 1750, at Welslau on the Queiss, in Upper Lausitz. His father was superintendent of a foundry at that place. He gave his son minerals as playthings, and young Werner thus became acquainted, says Cuvier, with their names and characters as soon as he learned the letters of the alphabet. He received his early education at the school of the orphan asylum at Bunzlau in Silesia, but was afterwards placed at the celebrated school of mines at Freiberg in Saxony. He soon formed the resolution of entering into the mining establishment at that place; and as the regulations required a licentiate's degree in law before admission, he studied jurisprudence for three years at the university of Leipzig, but at the same time continued to cultivate a knowledge of mineralogy. At that university he published, in 1774, being then twenty-four years of age, a treatise on the external characters of minerals, in which he proposed a methodical and precise language to describe the sensible qualities of mineral substances. By this work, consisting of a few leaves, Werner, says Cuvier, rendered a service to mineralogy analogous to that which Linnæus had rendered to botanical science by the terminology made use of in his 'Philosophia Botanica,' and effected a revolution in the science of mineralogy. He here expressed his ideas on the deficiencies existing in mineralogical science, and on the means of removing them. He observed that the external characters of minerals had been neglected in their description; and at the same time he showed that these characters were not to be applied to the systematic distribution of minerals, but to determine the conception of their exterior, and to fix a method of describing them; that the external characters, previously employed by mineralogists, were very indefinite, and that the perfection and utility of the external description of minerals depended on the complete definition and arrangement of the external characters. This work of Werner soon became popular in Germany, but it was several years before it became more extensively known. A French translation, by Picardet, appeared in 1790, and one in English, by Mr. Weaver, was published in Dublin in 1805. In his native country it appears to have earned Werner a reputation, for in the year following its publication (1775), we find him appointed professor of mineralogy in the School of Mines at Freiberg, and inspector of the mineralogical cabinet at that place. He held these offices for seventeen years.

In 1780 Werner published a translation of Cronstedt's Mineralogy, with notes, and in the following year a catalogue of the private collection of minerals of Papst d'Ohain. In both these works he introduced his method of distribution and descriptions of minerals according to his terminology, giving the name 'Oryctognosy' to the study, while he termed the knowledge and science of the positions of minerals and fossils in the crust of the globe, and the classification of rocks and the inferences to be drawn as to the period and circumstances of their origin, 'Geognosy.' Although in the former department Werner has done great practical service, it is in connection with the latter division, and his theory of geology, that his name must be always associated.

In 1787 Werner published a little work on the classification of rocks, 'Kurze Klassifikation und Beschreibung der verschiedenen Gebirgsarten;' 'a brief but valuable arrangement and description of rocks,' says Dr. Fitton. The author there points out the mineralogical distinctions of rocks, but the work contains none of Werner's theoretical views respecting formations, and the classification he has given in it was materially altered by him at a subsequent period. Werner now proceeded to teach in his lectures the doctrine of the formation of the primitive and other rocks by chemical precipitation from water; and in the same year, 1787, from an examination of the Erzgebirge (or Ore-Mountains), in Saxony, and the basaltic rocks of the neighbourhood, he extended the application of this doctrine to the origin of trap rocks. Raspe, a German, had as far back as 1768 described the basalt of Hesse as of igneous origin. To Werner's limited sphere of observation, his erroneous opinions on this and on other subjects may in some measure be attributed. He found the basaltic rocks of Saxony and of Hesse forming the summits of the hills in tabular masses, and not occurring in dykes and veins, or extending downwards into the valleys, and hence some of the strongest proofs by which these rocks are now universally admitted to be of igneous origin were absent in the phenomena which came under his actual observation. But many even of the appearances in the neighbourhood of Freiberg, Werner appears to have overlooked or misconstrued. Thus within a day's journey of his school, the porphyry, called by him primitive, has been found not only to send forth veins or dikes through strata of the coal formation, but to overlie them in mass. The granite of the Harz mountains, on the other hand, which he supposed to be the nucleus of the chain, is now well known to traverse and breach the other beds, penetrating even into the plain (as near Goslar); and still nearer Freiberg, in the Erzgebirge, the mica slate does not mantle round the granite, as was supposed, but abuts abruptly against it. (Lyell.)

These views of Werner were soon followed by the promulgation in his lectures of his Theory of Formations, which, of all that he taught, we are inclined to select as his greatest achievement in the science. His ideas respecting the division of rocks into great classes we have seen was not original, but he was the first to observe that 'the masses or strata that constitute the surface of the globe present themselves in groups or assemblages, the members of which are generally associated wherever they occur, and are so connected as to exhibit a certain unity of character. These he termed 'formations,' and taught that 'the exterior of the earth consists of a series of these formations laid over each other in a certain determinate order.' This was a most startling announcement when we consider what a small portion of the globe had undergone a geological examination, and that even with that which had been examined, the author of this bold theory had little practical acquaintance. But if this reflection increases our surprise, it must also increase our admiration for the sagacity which announced from such small data a truth which, combated and resisted at the time, now receives the assent of all geologists, and which extended observations in all parts of the globe confirm. Ideas of this magnitude are, says Cuvier, the true characteristics of genius.

Unfortunately, however, but as the natural consequence of his notions respecting basaltic and other rocks, now deemed of igneous origin, he included the latter among his series of constant universal formations, and it is almost needless to say that this part of the theory has been as effectually disproved as the rest has been confirmed. Werner taught that these formations, including his primitive rocks, as well as his flötz or secondary rocks, were produced by a series of precipitations and depositions formed in succession from water, which he supposed to have covered the globe, and, existing always more or less generally, contained the different substances which have been produced from them. In almost necessary connection with this hypothesis, he supposed a number of successive and universal changes in the level of the sea, of very great extent.

In November, 1791, Werner published his 'Theory of the Formation of Veins,' which he had also taught for some years previously in his lectures. In this work he contended that veins were originally open fissures. He accounted for the existence of the fissures by supposing mountains to have been formed in the manner above stated, namely, by deposition from the sea of beds one above another, and that the mass of these beds being at first wet, and possessed of little tenacity, the mountain yielded to its weight, cracked, and sunk down on the side where support was wanting; and that as the waters also, which assisted in giving them support, began to lower their level, the mass would more readily yield to its weight, and would fall to the side where least resistance was opposed. The shrinking of the mass in drying, and the operation of earthquakes, might, he supposed, have further assisted in the production of such rents. Having thus accounted for the origin of the fissures, he believed, and endeavoured to prove, that the materials filling the veins were introduced into them from above, and that the mass of veins have been formed by a series of precipitations from water, which have filled, in whole or in part, the spaces or fissures; that these precipitations entered by the superior parts of the rents which were open, and were furnished by a solution in water, generally chemical, which covered the country in which these rents existed. To account for the high degree of crystallization which prevails in the veins, he supposed that the precipitations and depositions which formed them were made with more tranquillity than those which produced beds and formations; that mechanical solutions and depositions had disturbed the formation of veins much less than of beds, and that the spaces in which veins are found preserved for a longer time the faculty of receiving and retaining different solutions. (Playfair, 'Edin. Review,' vol. xviii.)

A French translation of the work, by D'Aubuisson, appeared at Paris in 1802, and an English translation by Dr. Anderson, at Edinburgh in 1809. This was the last work Werner wrote. It is said he had a most singular aversion to the mechanical act of writing, which he carried to such an extreme as never to reply to letters, and which even deterred him from reading them, lest he should be tempted to reply.

In 1792 he was appointed Counsellor (Bergrath) of the mines of Saxony. Von Charpentier held the situation of Captain-general (Berghauptmann) in the same establishment, and there appears to have been a feeling of rivalry between the two officers, although the labours of Charpentier were principally confined to the practical details of mining. In 1795 or 1796 Werner introduced into his lectures the doctrine of a new class of rocks, to which, as lying between the primitive and secondary or flötz, he gave the name of 'transition.' The total number of distinct formations or rocks of all these classes to which he assigned precise relative places, was between thirty and forty. The establishment of the transition class completed Werner's labours, and the promulgation and further illustration of his views now occupied his lectures. He had at this time acquired a great celebrity throughout Europe as the first geologist and mineralogist of the day, and was looked upon as the founder and author of mineralogy as a science. His fame was not so much acquired through his writings as by means of his lectures, for we have seen that some of his principal views were only promulgated in this channel. He was an admirable lecturer. One of his pupils describes his appearance in 1799 as very remarkable and striking at the first interview. He was middle-sized, and broad-shouldered; his round and friendly countenance did not at first sight promise much, but when he began to speak, he at once commanded the most marked attention. His eye was full of fire and animation, his voice from its high tone was sometimes sharp, but every word was well-weighed; a cautious clearness and the most marked decision in the views he expressed were apparent in all that he said. With all this there was united a good feeling which irresistibly won every heart. In mineralogical investigations his discrimination of the most delicate distinctions was remarkable. In recognising and exhibiting these, his whole demeanour presented a combination of earnestness and assured conviction. Every single obscurity annoyed him, and he almost compelled his hearers to distinguish with the greatest possible certainty the most trivial variations in the mixtures of colours occurring in minerals, all the characters of which were classified with extreme minuteness, and every instance of deviation from his arrangement, and every case of doubt, vexed and annoyed him. Although he employed no mathematical formulæ in the arrangement of his crystals, afterwards so successfully adopted by Haüy, yet the crystalline structure, the number of cleavages, and their relative position were materials in Werner's classification. Whoever, under his instruction, undertook a mountain expedition, received an extremely minute plan according to which he was to make his observations. Every deviation, even the slightest, from the rules thus laid down, and every neglect of any portion of them, was severely blamed. It was necessary that he who wished to derive advantage from Werner's instruction, should give himself up to his master, for the whole system was so intimately linked together, and the various elements of discrimination in mineralogy were so closely united with the mode of observation in geology, that the disturbance of any of them rendered all the others uncertain and doubtful. (Professor Steffens, *Was ich Erlebte*.)

He considered minerals under their chemical, economical, and even geographical aspects, and he arranged his collections under these different modes of treating the subject. He showed or attempted to show the influence of the mineral composition of rocks upon the habits, history, and even moral qualities of nations, and it may therefore be easily seen that his lectures had some points of interest even for the coldest minds. (Cuvier, *Biographie Universelle*.) He associated everything with his favorite science, and in his excursive lectures he pointed out all the economical uses of minerals, and their application to medicine; the influence of the mineral composition of rocks upon the soil; and of the soil upon the resources, wealth, and civilization of man. The vast sandy plains of Tartary and Africa, he would say, retained their inhabitants in the shape of wandering shepherds; the granitic mountains and the low calcareous and alluvial plains gave rise to different manners, degrees of wealth, and intelligence. The history even of languages, and the migration of tribes, had been determined by the direction of particular strata. The qualities of certain stones used in building would lead him to descant on the architecture of different ages and nations; and the physical geography of a country frequently invited him to treat of military tactics. The charm of his manners and his eloquence kindled enthusiasm in the minds of his pupils; and many who had intended at first only to acquire a slight knowledge of mineralogy, when they had once heard him, devoted themselves to it as the business of their lives. (Cuvier, *Eloge de Werner*; Lyell, vol. i.)

This extended and popular treatment of the science, attracted some, while others to whom the love of science for science sake was not a sufficient inducement, became his pupils from the connection that his lectures, from the situation he filled, necessarily had with mining. Among his pupils or attendants on his lectures may be enumerated Alexander Humboldt, Von Buch, D'Aubuisson, Jameson, Brocchi, Napione, Freisleben, Raumer, Englehart, Karsten, Mohs, Herder, Wiedemann, Emmerling, Reuss, Steffens, Breithaupt, Esmark, Wad (Denmark), D'Andrada (Brazil), and Elhyar (Spanish Mexico). In consequence of Werner writing so little, and his lectures not being preserved, it is to the works of many of these pupils that recourse must be had to acquire a perfect acquaintance with the details of their preceptor's views, and the gradual extension of his theories and discoveries. That Werner's powers of external discrimination were extremely acute, we have seen in speaking of him as a mineralogist, and his talent and tendency for classifying were in his mineralogical studies fully fed by an abundant store of observation; but when he came to apply this methodizing power to geology, the love of system, so fostered, appears to have been too strong for the collection of facts he had to deal with. As we have seen, he promulgated, as representing the world, a scheme collected from a province, and even too hastily gathered from that narrow field. Yet his intense spirit of method in some measure compensated for other deficiencies, and enabled him to give the character of a science to what had been before a collection of miscellaneous phenomena. The ardour of system-making produced a sort of fusion, which, however superficial, served to bind together the mass of incoherent and mixed materials, and thus to form, though by strange and anomalous means, a structure of no small strength and durability. (Whewell, *History of the Inductive Sciences*, vol. iii.)

To return to the biography of Werner. In 1802 he visited Paris, and was received with great honour by the scientific and learned bodies. The Academy of Sciences elected him one of their eight foreign associates, and the leaders of the French republic sent him a diploma as 'Citoyen.' The latter honour perplexed Werner, as he was a loyal Saxon and firmly attached to his prince. He communicated the circumstance to his court, but it does not appear whether he obtained permission to accept the honour. He was so devoted to his country that he never would enter into any other service, although the most tempting offers were repeatedly made to him.

Werner suffered for many years uninterruptedly from a stomach complaint. He was anxiously careful about his health, was always warmly clothed, and the stove in his room was lighted throughout the year. The distresses of his country, consequent upon its being made the theatre of the campaign of 1813, seem to have preyed upon his mind, increased his malady, and produced a complication of diseases from which he never rallied. In 1817 he went to Dresden, in the hope of obtaining some relief from his sufferings. He became worse, and died there on the 30th of June, in the arms of his sister, in the sixty-seventh year of his age. Böttiger pronounced his funeral oration: Ritter delivered his 'Eloge' at the Academy of Munich, and Baron Cuvier at the Academy of Sciences in Paris. Werner was never married. He had surrendered in his lifetime the whole of his valuable collection of minerals, comprising upwards of 100,000 specimens, and also a large collection of Greek and Roman medals, to the School of Mines at Freiberg, for 40,000 crowns, a price considerably below the value; and in consequence of the distressed state of Saxony at that period, he accepted only a small part of the reduced sum, reserving a moderate interest upon the remainder under the form of an annuity, and bequeathing the capital after his death to the academy in which he had been more than forty years the most distinguished professor. It is said he left some MSS. nearly ready for printing.

WERNIGERODE, or STOLLBERG-WERNIGERODE, is a district or domain, with the title of a county, in Prussian Saxony, the property of Count Stollberg-Wernigerode. It is between 90 and 100 square miles in extent, including a part of the Harz and the Brocken Mountain, and is situated between the principality of Halberstadt, the duchy of Brunswick, and the kingdom of Hanover. The country is covered with wooded mountains, round the Brocken, which is in the centre.

WERNIGERODE, the capital of the county, in 51° 50′ N. lat. and 10° 47′ E. long., is situated at the northern part of the Harz, and is traversed by a stream called the Zillerbach. It is a walled town, with 4 gates, and has a suburb called Neschenrode. The mansion of the count is an antient castle, built on a rock 827 feet above the level of the sea, and 400 feet above the town. It commands a very fine prospect, and contains a library of 30,000 volumes, including a remarkable collection of 2000 bibles, and the archives of the county. An extensive park adjoins the count's residence. The town is very far from handsome, but is enlivened by being the seat of all the public offices of the county, by the influx of travellers visiting the Harz, and by its woollen and linen manufactories, its tanneries and brandy distilleries, a paper-mill, several oil-mills, saw-mills, &c. The town contains 4 churches, an orphan asylum, a poorhouse, and a gymnasium, and has a considerable trade in corn. Population 5400.

(Müller, *Wörterbuch des Preussischen Staates*; Hassel, *Handbuch*; Brockhaus, *Conversations Lexicon*; Stein, *Handbuch*.)

WERST, or VERST, the Russian itinerary measure, being 3500 English feet, or nearly two-thirds of a mile. From the number of wersts subtract its third, and also one for every 250 wersts, and the result will be near enough to the answer in English miles.

WESEL, or LOWER WESEL, a town in the duchy of Cleves, in the government of Dusseldorf, in the Prussian province of the Rhine, is situated in 51° 40′ N. lat. and 6° 37′ E. long., at the junction of the Lippe with the Rhine, which here forms an island, very strongly fortified, and with a citadel built by the Great Elector. It is a fortress of the first rank, and has sustained several sieges. Wesel is an antient town, and was formerly a member of the Hanseatic League. Wars and other calamities greatly reduced it: and in 1770 it had only 4500 inhabitants. Since then it has gradually recovered, and the population is above 11,000, besides the garrison. The town has a gymnasium, a seminary, a commercial institution, a botanic garden, and several schools. There are three German Protestant and two Roman Catholic churches, one French Calvinist and one English church, a synagogue, and numerous public buildings, the most remarkable of which are the large and handsome senate-house, the government-house, the arsenal, the house of correction, and the corn-magazine. The manufactures are of many kinds: calicoes, linen, woollen cloths, hats, gloves, stockings, leather, tobacco, soap, and spirituous liquors. Hassel says there are 100 distilleries. The inhabitants carry on a considerable trade in corn, timber, coals, potashes, salt, cattle, wine, brandy, and colonial productions. The harbour is safe and convenient; and there is a bridge of boats over the Rhine, and a standing bridge over the Lippe. A monument in memory of the officers of the corps of the gallant Major Schill, who were shot by order of Napoleon, which is erected in a meadow near the town, was dedicated with great ceremony on the 31st of March, 1835.

WESEL, UPPER, is a walled town in the government of Coblenz, on the Rhine, the bed of which is deep and narrower than at any other point. There are two churches and three chapels, of which St. Werner's chapel is worthy of notice. The inhabitants, 2600 in number, are engaged in the manufacture of woollen cloth and the salmon fishery on the Rhine. Wine of superior quality is produced in the adjacent country. On a steep mountain without the town are the ruins of the great and very strong castle of Schönberg, and below the town the perpendicular Lurley rock, celebrated for the remarkable echo.

(Hassel, *Handbuch*; Müller, *Wörterbuch des Preussischen Staates*; Stein, *Lexicon*.)

WESER, one of the largest rivers of Germany, is formed by the junction of the Werra and the Fulda: the Werra rises in Saxe-Hildburghausen, and the Fulda in the Rhöngebirge in Bavaria. The course of the Werra is 175 miles, and that of the Fulda 125, to their junction at Hanöverisch-Münden, where their united streams take the name of the Weser, which is supposed to be only a corruption of the original name of the Werra (Wisaraha, Wesara, Wirraha). The Roman form of the name is Visurgis. The Weser then passes through the principality of Göttingen (Hanover), the duchy of Brunswick, the principality of Calenberg (Hanover), the county of Schaumburg (Hesse-Cassel), the Prussian province of Westphalia, the Hanoverian provinces of Hoya, Verden, and Bremen, and the territory of the city of Bremen, from which, to its very broad mouth beyond Bremerlehe, it forms the boundary between Hanover and Oldenburg, which, for a small space, possesses both banks of the river, and falls into the North Sea 45 miles below the city of Bremen: its entire course from Münden is 225 miles. Its principal affluents are, on the right hand, 1, the Aller, with the Ocker and the Leine; 2, the Wumme; 3, the Lune; and, on the left, 4, the Au; 5, the Delme; 6, the Hunte. The principal towns and ports on its banks are:—Münden, Carlshafen, Holzmünden, Hameln, Rinteln, Prussian-Minden, Nienburg, Bremen, Elsfleth, Brake, and Bremerhafen. The general direction of its course is from south to north, at first through a mountainous country, to the celebrated Porta Westphalica (between four and five miles above Minden), which is a gap in the Süntel-Gebirge, probably formed by the action of the river, through which it now flows, having Jacobsberg (528 feet high) on the right, and Wittekindsberg (807 feet high) on the left bank. After passing the Porta Westphalica it flows through a wide valley with low banks. The facilities afforded by the navigation of the Weser, as well as of the Werra, the Fulda, and some of the other tributary streams, as the Aller and the Hunte, are of the highest importance to the commerce of the countries on their banks. The upper and middle portions of the Weser are indeed often rendered impassable for months together in the summer time by the sand-banks, and its bed becomes more and more choked by sand, so that large ships are exposed to danger. Five miles below Bremerlehe a harbour was constructed, in 1818, at the mouth of the river.

In former times the commerce of the Weser was impeded by the numerous tolls levied by the governments of the different states on the banks (there were twenty-two places between Münden and Elsfleth, at all which toll was levied), by the right of staple claimed by different towns, and by a multitude of vexatious charges established by privileges and imperial grants. The princes interested in the navigation of the river attempted by means of conferences, in 1696, 1700, and 1710, to remove some of those impediments; but nothing was effected either then, or when the subject was resumed in 1803. The Hanoverian government was the first to set the example, in 1814, of effecting some important improvements. At length the Congress of Vienna, having decreed the regulation of the navigation on the German rivers, a commission, consisting of plenipotentiaries from Prussia, Hanover, Brunswick, Hesse-Darmstadt, Oldenburg, Lippe-Detmold, and Bremen, met at Minden in 1821; and on the 10th of September, 1823, the act for the navigation of the Weser was signed. By this act the navigation of the Weser from Münden to the sea and *vice versâ* is declared to be free. The numerous tolls, staple rights, privileges, &c. were abolished, and a uniform Weser toll was established, the amount of which was fixed for the whole course of the river. With respect to the commerce of the Weser in general, it embraces chiefly linen-yarn, wool, rape-seed oil, the productions of the Harz, Hanoverian linen, tobacco, leather, English manufactures, train-oil, window-glass, looking-glasses, and all kinds of colonial produce. The city of Bremen has had for three centuries the first and most important share of the commerce of the countries on the Weser.

(Hassel, *Handbuch*, vol. iv., 'Hanover,' &c.; W. V. Schlieben, *Gemälde der Preussischen Monarchie*; Brockhaus, *Conversations Lexicon*; J. Hüber, *Zeitungs-Lexicon*, edited by F. A. Rüder; Stein, *Handbuch*, edited by Hörschelmann, vol. ii.)

WESLEY, JOHN, was the most distinguished member of a family, several of the other members of which however also claim to be shortly noticed, either on their own account or in consequence of their connexion with him. It will be most convenient to comprise all the Wesleys under one head, and to take them in chronological order.

The Wesleys, or Westleys, as they formerly spelled their name, are said by Dr. Adam Clarke, in his 'Memoirs of the Wesley Family,' to have believed their progenitors to have come to England from Saxony; and it has been suggested that they might possibly have been of the same stock with the once famous reformer, John Wesselus, otherwise de Wesalia, or Basilius, of Groningen, who died in 1489. (See 'Biographical Notices of the Rev. Bartholomew Westley,' &c., by William Beal, 8vo., Lond., 1839; and WESSEL.) Supposing the name to be English, or Anglo-Saxon, a doubt has been entertained as to whether it is properly Westleigh or Wellesleigh. There is reason to believe that the family name of Wellesleigh (probably taken from the village so called near the city of Wells) has generally passed into Wesley; Wood, in the 'Athenæ Oxonienses,' has a notice of a bishop of Kildare, of the early part of the sixteenth century, whom he describes as 'Walter Wellesley, commonly called Wesley;' and it is known that, when John Wesley's younger brother Charles was at Westminster School, an Irish gentleman, Garret Wellesley, Esq., of Dungannon, M.P. for the county of Meath, considering the boy to be of his own family, offered to make him his heir if he would have relinquished the intention of proceeding to Oxford and gone over and settled in Ireland. This was before 1727, in which year Mr. Wellesley died, leaving his estates and also his name to his cousin, Richard Colley, Esq., who was created Baron Mornington (in the Irish peerage) in 1746, and was the father of the first earl of Mornington, and the grandfather of the late Marquess Wellesley and the present duke of Wellington.

The Reverend BARTHOLOMEW WESTLEY is the first of John Wesley's ancestors of whom there is any distinct record. He was born about 1600; was educated at one of the universities, where he studied both divinity and medicine; became, in the time of the Commonwealth, minister of Charmouth and Catherston (two adjoining villages near Lyme, in Dorsetshire); and was ejected from the first of these livings immediately after the Restoration, and from the second on the passing of the Act of Uniformity in 1662. He continued to reside at Charmouth, practising physic, till the passing of the Five-Mile Act in 1665 drove him, with other nonconformists, to a secluded spot at Pinney, now known by the name of Whitechapel Rocks; and there he is believed to have spent the remainder of his days, which appear not to have been many, though we do not find the date of his decease stated. 'He lived several years,' Dr. Calamy tells us, 'after he was legally silenced; but the death of his son made a very sensible alteration in the father, so that he afterwards declined apace, and did not long survive him.'

The Reverend JOHN WESTLEY, M.A., son of this Bartholomew, was born about 1636, and studied at New Inn Hall, Oxford, where he applied himself particularly to the Oriental languages, and adopted the opinions as to church government and other subjects of the vice-chancellor of the university, the celebrated Dr. Owen, who is said to have shown great kindness for him. After preaching for some time to what was called 'the gathered church,' at Weymouth, and at the neighbouring village of Radipole, he was appointed in May, 1658, to the vicarage of Winterborne-Whitchurch, in the same county of Dorset. He married a daughter of Mr. John White, one of the lay assessors of the Westminster Assembly of Divines, and commonly called 'the Patriarch of Dorchester,' in which town he was rector of Trinity Church for about forty years. Mrs. Westley is also stated to have been a niece of Dr. Thomas Fuller, the celebrated historian: it is probable that she was his wife's niece. Westley appears to have been thrown into prison for something he had uttered in the pulpit very soon after the Restoration: he lay in confinement till he was discharged by an order of the privy council, dated 24th July, 1661, on his taking the oaths of supremacy and allegiance. He was seized a second time in the beginning of 1662 as he was leaving the church, and carried to prison at Blandford, where he lay for some time; and soon after he got out, the Act of Uniformity deprived him of his living, and left him for several months a wanderer and an outcast. At length, in May, 1663, a pious and charitable person gave him a house rent-free at the village of Preston, a few miles from Weymouth. At one time he thought of emigrating to Surinam or Maryland; but he finally resolved that it was his duty to remain at home. He continued to preach when he could find a safe opportunity, both at Preston and Weymouth; and he eventually united himself as pastor to a small congregation at Poole, though without going to reside among them. He was often apprehended while thus engaged, and, besides being several times fined, was subjected to four imprisonments at Poole and Dorchester. Yet this elder John Westley does not appear to have been a person of extreme opinions, or one who habitually allowed his zeal to hurry him into disregard of danger or other indiscretions. His principle and his practice was to join on ordinary occasions in public worship with the members of the established church; and we are told that, while some of his nonconformist brethren in Dorset preached and administered the ordinances of religion to the small congregations who acknowledged them as their pastors openly and at all hazards, he 'thought it his duty to beware of men—that prudently he should preserve his liberty and his opportunity to minister in holy things as long as he could, and not by the openness of one meeting to hazard the liberty of all meetings.' (Beal, p. 27.) The Five-Mile Act however, which drove his father from Charmouth, drove him also from Preston, and forced him to retire to some place of concealment which does not appear to be known. Venturing forth again some time after to visit his family and to preach to his congregation, he was apprehended and suffered another imprisonment. Many more hardships incident to his situation he also underwent, and it seems to be intimated that his spirits at last sunk under the public and personal afflictions with which he was tried. If he was only three or four and thirty, as Southey states (*Life of Wesley*, i. 5), when he died, that event must have been before or in the year 1670. His death, as already mentioned, was speedily followed by that of his father, at about double the age.

The Reverend SAMUEL WESTLEY, or WESLEY, was a younger son of this John Westley, and was born at Preston, according to one account in 1668, by another in 1666, by a third 'about the year 1662, or perhaps a little earlier' (Compare Beal, p. 31, and Southey, i. 7, where it is remarked that the earliest date is established by certain extracts from the Registers of Exeter College, which are given, but which do not appear to us to prove any thing on the subject). He is said to have been designed by his father for the ministry among the Dissenters, and to have been sent with that view, after leaving the free grammar-school of Dorchester, first to the Academy at Stepney, kept by Edward Veal, B.D., and next to that kept by Charles Morton, M.A., at Newington Green. This course was no doubt taken under the direction of his mother, who long survived her husband, although the expense was probably borne by his other relations. Wesley however soon left the Dissenters; it is said that his determination to quit them was fixed by the disgust with which he witnessed a Calf's Head Club celebration of the execution of Charles I. When he joined the established church, he was abandoned by his relations; but, making his way to Oxford, with only two pounds sixteen shillings in his pocket, he entered himself at Exeter College as a poor scholar; and, although all he ever after received from any of his friends was a matter of five shillings, he managed to take his bachelor's degree, and by acting as a private tutor had accumulated the sum of ten pounds fifteen shillings, when he proceeded to London and got ordained. In all the accounts that we have examined it is asserted that the year in which he went to college was 1684; and one of the extracts which Southey prints certainly seems to imply that he made a deposit of caution-money as a poor scholar on the 26th of September in that year; but it will be found that this date will not agree with the rest of his history as commonly related. If his entering himself at Exeter College could be supposed to have taken place some three or four years earlier, the various statements or calculations of the year in which he was born would be more nearly reconciled. At all events it is clearly impossible that if he only became a member of the University in 1684, he could, as we are told, have taken his degree of B.A., been ordained, served a curacy in London for a year, been for another year on board a man-of-war as chaplain, and then served another London curacy for two years, during which he married, had a son, became known as a writer for the press, and got a small living in the country (supposed to be that of South Ormsby, in Lincolnshire), all before James II. published the order in council commanding his Declaration for Liberty of Conscience to be read in the churches, in May, 1688. At this time Wesley is represented as having been a person of such importance that urgent solicitations and promises of preferment were addressed to him to induce him to support the measures of the court, which however he resolutely refused to do; not only omitting to read the king's declaration, but preaching a pointed discourse against it before an audience composed in great part of courtiers, soldiers, and informers.

Other facts equally go to strengthen the improbability of his having gone to college only in 1684. It is stated to have been after he returned from sea that he married Susannah, youngest daughter of the Rev. Dr. Samuel Annesley, one of the most eminent of the London nonconformist clergy, and a near relation (Coke and Moore say, in their 'Life of Wesley,' p. 16, a first cousin) of the Irish earl of Anglesey. This lady, as appears from one of her own letters, which has been printed, had, like her husband, of her own accord left the Dissenters, and that at the early age of not full thirteen, after having, as she intimates, thoroughly examined the controversy between them and the established church. Another daughter of Annesley (who had originally held a living in the church, and was ejected by the Act of Uniformity) was the first wife of the eccentric John Dunton, bookseller, publisher, and author, in whose curious autobiographical performance entitled his 'Life and Errors' there are several notices of his brother-in-law; and Dunton published for Wesley the first work that had his name, an octavo volume of verse, entitled 'Maggots, or Poems on several subjects,' which appeared in 1685. Wesley, besides being already married to Miss Annesley, appears to have been at this time an established writer, though only anonymously, for the booksellers.

When the Revolution took place, we are told that Wesley wrote a book in defence of it; but as neither the date nor even the title is given, we may be permitted to suspend our belief as to the existence of this alleged work. As it is said to have been dedicated to the queen, who in consequence, we are told, gave the author the living of Epworth, in Lincolnshire, about 1693, it may possibly have been not anything concerning the Revolution, but an heroic poem, in folio, entitled 'The Life of Christ,' which he published that year and dedicated to her majesty, and which was reprinted, with large additions and alterations, in 1697.

Another folio volume of verse, under the title of 'Elegies on Queen Mary and Archbishop Tillotson,' followed in 1695; 'The History of the New Testament attempted in verse, and adorned with 152 sculptures, done by J. Sturt,' 12mo., in 1701; and 'The History of the Old Testament in Verse, with 180 sculptures, by Sturt,' 12mo., in 1704. In 1705 Wesley published a poem on the battle of Blenheim, for which the duke of Marlborough made him chaplain to one of the regiments then stationed in England, and would, it is said, have procured him a prebend, had it not been for the influence of the Dissenters at court and in Parliament, which was powerful enough not only to prevent this promotion, but soon after to procure the removal of Wesley from his chaplaincy. In the next reign however he received and held with Epworth the small living of Wroote in the same county. He died 30th April, 1735; and the same year appeared, under the care of his eldest son, his most elaborate work, entitled 'Dissertationes in Librum Jobi,' a Latin commentary on the Book of Job, for the publication of which proposals had been first circulated in 1729. 'A Treatise on the Sacrament' is mentioned, without date, in a list of Samuel Wesley's publications in Nichols's 'Select Collection of Poems,' ii. 99; and he is stated by his son John, in his 'History of England,' to have been the author of the defence delivered by Dr. Sacheverell before the House of Lords. His poetry is occasionally harsh in expression, but is not without feeling and animation; some passages are elegant and even elevated. By his wife, who was in many respects a very remarkable woman, he had a family of nineteen children, of whom one daughter, Mehetabel, who made an unfortunate marriage with a person of the name of Wright, evinced much literary talent, and was the mother of Mrs. or Miss Mehetabel Wright, who distinguished herself as a modeller in wax; and three sons, Samuel, John, and Charles, all attained more or less celebrity.

The Reverend **Samuel Wesley**, the Younger, was the eldest, or at least the eldest surviving, son of the Reverend Samuel Wesley of Epworth. He is stated to have been born there, Whitehead, in his 'Life of Wesley,' says about 1692; Coke and Moore, in 1690. Yet the latest of these dates, it will be observed, is earlier than that assigned for his father's induction to the living of Epworth. It is related that he was four years old before he spoke a word; but from that time he spoke not only without any difficulty, but with an understanding above his years. He was sent to Westminster School in 1704, was admitted a king's scholar in 1707, and in 1711 was elected to Christ's Church, Oxford, where he remained at least till he had taken his degree of M.A. He had acquired much reputation for his proficiency in classical learning both at school and at the University, and he was now appointed one of the ushers of Westminster School, in which situation he remained for nearly twenty years. He had taken holy orders soon after leaving college; but he never obtained any preferment in the church, though his religious convictions appear to have been strong, and his epitaph, besides giving him a high character both for benevolence and piety, says that he was an excellent preacher—adding that his 'best sermon was the constant example of an edifying life.' It is understood that his intimacy with bishop Atterbury and the other Tory wits of the day, and his warm advocacy or avowal of the principles of that party, stood in the way of his advancement. Both he and his younger brothers, John and Charles, as it has been observed, seem to have imbibed their political opinions from their mother, who, although she concealed her sentiments during all the reign of King William, differed from her husband in his approval of the Revolution—a fact which the latter only discovered by perceiving that in the king's last illness she did not say 'Amen' to the prayers for his recovery. But Samuel carried both his political toryism and his high-church notions much further than his brothers, whose 'new faith,' as he termed it, and canonical irregularities, he viewed with great concern and disapprobation. But he scarcely lived to see more than the beginning of Methodism. In 1732 he was appointed head master of Tiverton School, in Devonshire; and there he resided till his death, 6th November, 1739. He is the author of a collection of poems, first published in 4to., in 1736, and a second time in 8vo., in 1743. Some of them, especially those of a humorous cast, have much merit. The collection of 'Original Letters by the Reverend John Wesley and his Friends,' published by Dr. Priestley in an 8vo. volume, at Birmingham, in 1791, consists for the most part of the correspondence between Samuel Wesley and his brothers, obtained from Samuel's daughter and grand-daughter.

The Reverend **John Wesley**, the most eminent person of his name and family, was the second, or the second who grew up to manhood, of the sons of the Reverend Samuel Wesley, of Epworth, and was born there, 17th June (O.S.), 1703. He was still very young when he was sent to the Charter House, whence, at the age of seventeen, he proceeded to Christ Church, Oxford. The account of his official biographers, Coke and Moore, is, that, having taken his degree of B.A., he was elected fellow of Lincoln College in 1724, was ordained by Potter, then bishop of Oxford, afterwards archbishop of Canterbury, in 1725, and graduated as M.A. in 1726 (pp. 42 and 47). Southey's account, which is probably correct, is that he was not elected to his fellowship till March, 1726. In the end of the same year he was appointed Greek lecturer and moderator of the classes.

From his earliest years Wesley had been of a serious temper, and more especially from the commencement of his residence at college religious impressions had taken a strong hold on him. It is related that two books in particular, which he read in the course of his preparations for ordination, produced a powerful effect on him;—the treatise 'De Imitatione Christi,' attributed to Thomas-à-Kempis, and Jeremy Taylor's 'Rules of Holy Living and Dying.' From about the time when he was ordained he began to keep a diary, a practice which he continued to the end of his life. A large portion of this record, under the title of his 'Journal,' was published by himself, in 21 parts, and has been several times reprinted.

Soon after he was ordained, he went to officiate as curate to his father at Wroote, and here he resided for about two years; during which time, in 1728, he received priest's orders from the same prelate by whom he had been ordained deacon. It appears to have been in the end of this year that he was summoned back to college, in consequence of a regulation that such of the junior fellows as might be chosen moderators should perform the duties of their office in person. Here he found his younger brother Charles, then an undergraduate of Christ Church, one of a small association of students already distinguished in the University by the derisive appellations of the Holy Club, the Godly Club, the Bible Moths, the Bible Bigots, the Sacramentarians, and the Methodists. At first, we are told, their religious enthusiasm only carried them the length of devoting Sunday evenings to the reading of divinity, the other nights being given to secular studies; but very soon religion became the sole business of their meetings; they communicated once and fasted twice a week, employed much of their time in visiting the prisons and the sick, gave away whatever they could spare in charity, observed among themselves a regular system of prayer, meditation, and self-examination; in short, exhibited in all things a zeal and abstraction from the world such as has scarcely been surpassed by the most rigid order of monkish devotees. John Wesley appears to have immediately joined this society, which now consisted of about fifteen individuals, of whom the most remarkable, besides the two brothers, were Mr. Morgan, whose mortifications are supposed to have shortened his life, James Harvey, the well-known author of the 'Meditations,' and George Whitefield, who shares with Wesley the fame of having been one of the two chief founders of Methodism.

It was very soon after this that Wesley became acquainted with William Law, the author of the 'Serious Call' and other similar works; the two brothers used to travel from Oxford on foot two or three times a year to visit Law at his house in the neighbourhood of London, and his conversation and writings, harmonizing in the main with their own previous notions and feelings, exerted a powerful influence over them. Meanwhile however the less ardent or resolute of their Oxford associates dropped off one by one; and the number, which had at one time been seven and twenty, declined at last to five. Most of this had happended during the absence of the two Wesleys on a short visit to their parents, in 1732. In these circumstances, when, the next year, it was proposed that he should apply for the next presentation to his father's living of Epworth, John Wesley came to the conclusion that it was his duty rather to remain at the University, as the field where his exertions were most needed, and where also they were likely to find the greatest stimulus. Nevertheless a few months after his father's death he was induced to go out with General Oglethorpe to Georgia, in North America, to preach to the settlers and Indians in the colony which the general was founding there. He and his brother Charles, who now took holy orders, sailed from Gravesend 14th October, 1735, in the same vessel with a party of six and twenty Moravians. They anchored in the Savannah River on the 6th of February, 1736. Charles returned to England, sent home by Oglethorpe with dispatches, early in the next year; John remained in America till its close. The most remarkable incident of this part of his history is the affair in which he became involved with Miss Sophia Causton, niece of the chief magistrate at Savannah, whose partiality he for some time encouraged, but whom he eventually, on the advice of his Moravian friends, declined to marry. On this disappointment Miss Causton married Mr. Williamson; and soon after Wesley refused to admit her to the communion, upon which her husband indicted him for defamation, laying his damages at a thousand pounds. The affair was never brought to an issue; but it was the occasion of driving Wesley from the colony, which he left on the evening of Saturday, the 3rd of December, 1737, shaking the dust off his feet, to use his own expression, after a residence of one year and nearly nine months. The singular account which his followers give of this matter may be read in Coke and Moore (pp. 114-130). If we are to believe them, the whole originated in a scheme of General Oglethorpe to try if Wesley's heart was 'made of penetrable stuff'—in other words, if he could resist female seductions, as well as animal food and wine, from which he had for some time been accustomed to abstain. Shortly after he had broken off his intimacy with Miss Causton, it seems, the plot was revealed to him, under a promise of secrecy, by another young gentlewoman, then also recently married to the surgeon of the colony. 'Sir,' she is made to say to him, 'I had no rest till I resolved to tell you the whole affair. I have myself been urged to that behaviour towards you which I am now ashamed to mention. Both Miss Sophia and myself were ordered, if we could but succeed, even to *deny you nothing*.' The official biographers, we presume, must have got all this out of Wesley's journals or other private papers. As for himself, we are told, he 'kept his word, and cautiously avoided and concealed everything which could bring any inconvenience on this gentlewoman'—his informant.

He reached England 1st February, 1738. While he had been abroad, the religious excitement which now began to be generally known by the name of Methodism had made great progress in London, Bristol, and other parts of the south of England, under the impulse of the enthusiastic preaching of Whitefield, who had sailed from the Downs for Georgia only a few hours before the vessel which brought Wesley back from thence cast anchor there, the two ships in fact passing in sight of each other. As soon as he arrived in London, Wesley hastened to renew his connexion with the Moravians. It was not however till some months after this, that, according to his own account, he for the first time attained to true views of Christianity. His conversion, we are assured, took place about a quarter before nine o'clock on the evening of Wednesday, the 24th of May, at a meeting, to which he had gone very unwillingly, of 'a society in Aldersgate Street, where one was reading Luther's "Preface to the Epistle to the Romans."'

About three weeks after his 'new birth,' on the 15th of June, he set out for Germany, to visit the Moravian brethren at their original seat of Herrnhut. He met Count Zinzendorf, the head of the Moravians, at Marienborn, was brought before the prince royal of Prussia (afterwards Frederick the Great) at Weimar, and having reached Herrnhut, in Upper Lusatia, on the 1st of August, remained there for about a fortnight, and then set out on his return to England, where he arrived about the middle of September. From this date the history of Wesley merges in the history of Methodism; and all we can attempt here is to note briefly the succession of the principal events and circumstances with which he was personally most concerned.

Whitefield returned from Georgia in the latter end of 1738; and he and Wesley immediately again became intimately associated. The example of preaching in the open air, first set by Whitefield, 17th February, 1739, was shortly after followed by Wesley at the same place, the neighbourhood of Bristol. The first separate meeting-house for the Methodists was begun to be built in the Horse Fair, near St. James's church, Bristol, on the 12th of May in that same year. Lay preaching, of which the first example had been set by an individual named Bowers, in Islington churchyard, after a sermon by Whitefield, was, not without some hesitation, sanctioned by Wesley soon after his return to London in the autumn. This last movement in particular gave to Methodism in most people's eyes the distinct appearance of a schism in the church. Accordingly, when, before the end of the year, Wesley's mother professed her accordance in his views, her son Samuel wrote to her expressing the exceeding concern and grief with which he had heard that she had countenanced the spreading delusion so far as to become 'one of Jack's congregation.' The old lady had, like her son John, been converted in a moment—and from that time continued to live with him, and to attend his ministry, till her death in 1742.

In July, 1740, Wesley solemnly separated himself from the Moravians, with whom he had now come to differ, or had discovered that they differed from him, on some fundamental points of doctrine; and soon after he broke with Count Zinzendorf, the two parting, say his official biographers, 'without the least prospect of a reconciliation.' Their last interview took place in Gray's Inn Walks. His separation from Zinzendorf and the Moravians, which made the two parties immediately bitter enemies, was followed before the close of the same year by a breach with Whitefield, which however, although it divided the new religionists into two permanently distinct bodies, only suspended for a time the friendship and mutual regard of the two fathers of Methodism.

From this time Wesley's life was spent in preaching, travelling, writing books, and labouring in all other possible ways for the consolidation and extension of the new church, the management of which was now wholly in his own hands. No man ever gave himself up more entirely to any object, or prosecuted it either with more zeal and determination, or more method and skilful management. Not an hour, scarce even a minute, was abstracted from the service of the cause on which he had set his heart; and rarely has any ambition been so well seconded by the other qualities and habits of mind, and, it may be added, of body too, necessary to sustain it and give it full effect. He rested nowhere, seldom riding less than forty, fifty, or sixty miles a day; even on his journeys from place to place he read and wrote; and he generally preached three or four times, sometimes five times, a day. For a long time he usually travelled on horseback; latterly he used a chaise; 'nor do we believe,' say his official biographers, 'there could be an instance found, during the space of fifty years, wherein the severest weather hindered him even for one day.'

About the year 1750, soon after his brother Charles had become a husband, Wesley married Mrs. Vizelle, a widow with four children. This step was made a little awkward at first by his having a few years before published a tract entitled 'Thoughts on a Single Life,' in strong recommendation of celibacy for all who were able to subject themselves to that restraint. The marriage turned out a very unhappy one: Wesley, who had stipulated that he should not preach one sermon nor travel one mile the less on account of his change of condition, was little at home: the lady became jealous; robbed him of his substance, as he states in one of his letters, to prevent his giving it to bad women; and committed sundry other extravagances and outrages. Wesley had high notions of the authority of a husband, and the superiority of his own sex: 'Know me,' he wrote to her, 'and know yourself. Suspect me no more, asperse me no more, provoke me no more; do not any longer contend for mastery, for power, money, or praise; be content to be a private, insignificant person, known and loved by God and me. Attempt no more to abridge me of my liberty, which I claim by the laws of God and man; &c., &c. . . . Of what importance is your character to mankind? If you was buried just now, or if you had never lived, what loss would it be to the cause of God?' The end was, that after she had several times run away from him and been induced to return, she repeated the experiment once more, and was not asked to come back. 'Non eam reliqui,' says Wesley in his journal, 'non dimisi, non revocabo—I did not forsake her, I did not dismiss her, I will not recall her.' This was in 1771. She lived for ten years longer, and died at Camberwell, where a stone is placed at the head of her grave in the churchyard, setting forth that she was 'a woman of exemplary piety, a tender parent, and a sincere friend.' She bore no children to her second husband.

Wesley died after a short illness at his house in London, on the 2nd of March, 1791, in the eighty-eighth year of his age. His publications are far too numerous for us to attempt any account or even an enumeration of them: among the most remarkable, besides his Journal, are—a corrected translation of Thomas-à-Kempis, said to have been published by him in 1735, a short time before his departure for America; various collections of hymns, most of which however were written by his brother Charles; a History of England; a short Roman History; 'Primitive Physic;' and many short tracts on theological subjects. There are at least two collected editions of his works: one in 32 vols. 8vo., printed immediately after his death; another in 16 vols. 8vo., printed in 1809. The 'Arminian Magazine,' now called the 'Methodist Magazine,' was established by Wesley in 1780, and was conducted under his superintendence so long as he lived.

Of several lives that have been written of Wesley, the two principal are that compiled immediately after his death by Dr. Thomas Coke and Mr. Henry Moore, to whom all his manuscripts were left, and published in one volume, 8vo., in 1792; and that by the late Dr. Southey, in 2 vols. 8vo., Lon., 1820. Prefixed to the latter is a list of the chief printed materials for the biography of this extraordinary man.

The Reverend **Charles Wesley**, the younger brother of John Wesley, was born at Epworth in 1708, and was educated at Westminster School under his brother Samuel, his school-bills there for several years being discharged by the relation or namesake who, as related above, offered to make him his heir if he would accompany him to Ireland. He was elected to Christchurch in 1726, and from this time his history makes part of that of his brother, with whose labours in the diffusion of his religious views and in the establishment of Methodism he was associated from their commencement. It was contrary to the scheme of life he had laid out for himself, which was to spend his days at Oxford as a tutor, that he was prevailed upon, in 1735, to take orders, and to accompany his brother to Georgia. After their return from America, they had occasional differences upon points both of doctrine and practice, but none that ever produced any serious disunion. In 1749 Charles was married by his brother, at Garth in Brecknockshire, to Miss Sarah Gwynne, a lady of a good family in that county. After his marriage he confined his ministrations almost entirely to London and Bristol. Charles Wesley was an able preacher, and 'possessed,' say Coke and Moore, in their Life of his brother, 'a remarkable talent of uttering the most striking truths with simplicity, truth, and brevity.' He early showed a turn and talent for writing in verse; and most of the new hymns published by John Wesley in his various collections were of Charles's composition. 'In these hymns,' observes his brother, in one of his prefaces, 'there is no doggerel, no botches, nothing put in to patch up the rhyme; no feeble expletives. Here is nothing turgid or bombast on the one hand, or low and creeping on the other. Here are no cant expressions, no words without meaning. Here are (allow me to say) both the purity, the strength, and the elegance of the English language, and at the same time the utmost simplicity and plainness, suited to every capacity.' This is a just character of Charles Wesley's poetry, both in his hymns and other compositions. Harmoniously as the two brothers co-operated throughout their lives, they were very unlike in character. Charles appears to have been naturally of a quiet and domestic disposition, with little ambition or love of management and power; and, with all his sincere and fervent piety, so far from any inclination towards asceticism, as to be rather a lover of laughter and other joyous emotions, which his brother counted it almost a sin to indulge in. Charles died in London on the 29th of March, 1788. Two of his sons, whom (contrary to his brother's wish) he had educated as musicians, became very distinguished in their profession.

WESLEY, CHARLES and SAMUEL, sons of the Rev. Charles Wesley (see the preceding article), are both entitled to our notice as remarkable instances of a distinct and unquestionable manifestation of musical genius, during almost the earliest period of infancy.

The Honourable Daines Barrington, who has devoted several pages of his 'Miscellanies' to the youthful Wesleys, tells us, on the authority of their father, that the eldest, **Charles** (born in 1757), could 'play a tune on the harpsichord readily, and in good time, when he was only two years and three-quarters old;' and that when he played, his mother 'used to tie him up by his backstring to the chair, for fear of his falling......Whatever tune it was, he always put a true base to it.' He became a fine performer on the organ and harpsichord; at a time however when the art of playing on keyed instruments, and indeed on all other musical instruments, was far behind what it is in the present day, and only advancing to that state of perfection which it has since reached. He early in life was brought under the notice of George III., who was much pleased with him, and he had the honour to entertain the king, in hours of royal leisure, by his performance of Handel's music. He was also much patronised by the upper classes, for the sake of his practical skill, and highly esteemed by all for his moral worth, for the simplicity of his manners, and his amiable qualities; but, as too often happens in instances of premature development of genius, the flattering promises of his youth were not fulfilled in future years. After attaining a certain degree of excellence as a mere performer, he remained stationary; and, as regards composition, left not, we believe, any proof that he had ever passed the boundaries of mediocrity. He held during many years the appointment of organist to St. George's, Hanover Square. He died unmarried in 1815.

Samuel Wesley was born in 1766. 'The seeds of harmony,' says Mr. Barrington, 'did not spring up in him quite so early as in his brother, for he was three years old before he aimed at a tune. His first was "God save great George our King," and such like, mostly picked up from the street organs. He did not put a base to them till he had learnt his notes.' We may here add, that Mrs. Wesley—a very sensible woman, whose testimony may safely be relied on—told Mr. Barrington that she had had 'an elder son, who died in his infancy, and who both sung a tune and beat time when he was but twelve months old.' Samuel from his cradle enjoyed the advantage of hearing his brother's performances on the organ, and his superiority may undoubtedly be partly ascribed to this circumstance. He was not five years old when Handel's oratorio of 'Samson' fell into his hands, and by this alone he taught himself to read words. Soon after he learned, without instruction, to write. But before he had acquired the art of transferring his thoughts to paper, he composed, in his mind, much music. 'Thus,' states his father, 'he set "Ruth," "The Death of Abel," &c.' He was eight years old, continues the same, 'when Dr. Boyce came to see us.....He had by this time scrawled down his oratorio of "Ruth." The doctor looked over it very carefully, and seemed highly pleased with the performance. His words were, "These airs are some of the prettiest I have seen: this boy writes by nature as true a base as I can by rule and study."'

The young musician was now introduced into all companies as a prodigy, and excited the astonishment of everybody, including the most distinguished professors. Mr. Barrington fills pages in recounting the marvellous things he not only did, but said; for that acuteness which was so striking a feature in him when a man, was not less conspicuous in his youthful days. When about eight years of age he received some instruction on the harpsichord, as well as in composition, and at the same time studied the violin, to which instrument he devoted much time, and completely mastered it. In 1777 he published eight lessons for the harpsichord, and at this period had acquired so much notoriety that his portrait was engraved, and is said, by Mr. Barrington, to have been a strong resemblance.

We have understood that he began to consider music as his profession when he had arrived at his twelfth year, but have in vain endeavoured to trace his history during his progress from adolescence to manhood. Concerning his general education, we must suppose that it was attended to carefully, for he was a good Latin scholar, was not ignorant of Greek, possessed some knowledge of Italian, and had successfully cultivated that taste for polite literature which he may be said to have inherited. From personal knowledge we can state that his conversation was that of a man of letters accustomed to the best society. His steady friend, Mr. W. Linley, introduced him to Mr. Sheridan, at his villa in Surrey, where he passed two days, the party consisting only of those three. That great wit and most discerning man some time afterwards said of his guest, 'I am no judge of Mr. Wesley's musical abilities, but I will venture to assert that his intellectual powers and education would have enabled him to distinguish himself in any walk of life.'

Mr. Wesley's prospects were early clouded by an accident he met with in 1787. In passing along Snow-Hill one evening, he fell into a deep excavation which had been prepared for the foundation of a new building. It is supposed that the severe injury he sustained was the source of that state of mind which subsequently checked the progress of a career that promised to be so brilliant. During seven years he continued in a low desponding state, refusing the solace even of his favourite art. On his recovery however he prosecuted it with renewed ardour, and then brought into notice the works of Sebastian Bach, at that time alike unknown here and on the Continent. In 1815 he suffered a relapse, and was again obliged to retire from public life during another period of the same duration as the former. In 1823 he once more recovered, and up to 1830 was much engaged in various professional pursuits. The disease then recurred, and it was evident that his constitution was undergoing a great change. He now retired from society, and became inactive; though on the Saturday immediately preceding the day of his decease he exhibited his extemporaneous powers to a friend, and composed some psalm-tunes. On the Monday he took to his room, under a presentiment that he should never quit it, which was too truly verified. He died two days after, on October the 11th, 1837.

Mr. Wesley produced many compositions, but few of them were calculated to please the multitude. He wrote a grand mass for the chapel of Pope Pius VI., for which the sovereign pontiff thanked him in a Latin letter. He then made his *amende* to the Protestant church by composing and publishing a complete Service for the use of our cathedrals. It must however be granted that, as a musician, his celebrity is greater on the Continent than in his own country, that arising from his performances on the organ excepted, for which he was better known here than by his printed works. He left a numerous family.

(Barrington's *Miscellanies; Gentleman's Magazine*, 1837.)

WESSEL, JOHN, Latinized WESSE'LUS, a Dutch divine, was born at Groningen in 1419. At an early age he lost his parents, and was educated by a charitable lady, who afterwards sent him to the college of the priests of St. Jerome at Zwoll, where he studied divinity; but he never took orders, though this has been said. He continued his studies at Cologne, where he perused with great zeal the theological works of the Abbot Rupert, the MS. of which was in a convent at Deutz, opposite Cologne; and being an accomplished Greek and Hebrew scholar, he undertook to purify his religious knowledge by reading the original sources of the Christian religion. He was soon suspected of heterodoxy, and for this reason the university of Heidelberg, where Wessel went to teach divinity, would not admit him among the professors, on the ground that he was not a doctor of divinity, and that they could not confer this dignity upon him because he was a layman. Wessel consequently left Heidelberg, and lived some years at Cologne and Louvain, where he made himself a great name by his private lectures on divinity and philosophy. His philosophical system was that of Aristotle, and his power of argumentation was so great that few doctors ventured to engage in disputes with him. Wessel made himself no less known by several treatises on religion and the state of the church, and he attacked abuses with as much boldness as learning and shrewdness. From Louvain he went to Paris, then the theatre of violent disputes between the Realists, the Formalists, and the Nominalists. Wessel at first attacked the Formalists, but at last he became a Formalist himself. Notwithstanding this change of principles, he maintained his name as one of the greatest dialecticians of his time, and as such the public voice recognised him by the surname of 'Magister Contradictionum,' which was probably given to him in Paris. A divine possessing the learning, the talents, and the character of Wessel might have attained the highest dignities in the church, at a time when the Hussites were defending their religious principles for seventeen years against the thunders of the Vatican and the armies of the Holy Roman empire; and when this war and the degenerate state of the church led to the general councils of Pisa, Constanz, Siena, and Basel. Francis della Rovere, general of the Minorites, who became afterwards pope under the name of Sextus IV., made the acquaintance of Wessel at an early period, and continued to be his friend and patron. It is said that Wessel accompanied Francis della Rovere to the council of Basel; but as this council began in 1431, and was finished in 1443, Wessel must have been very young when he went there, unless he was born in 1398, as some say, though the best authorities agree that he was born in 1419. Francis della Rovere, having been chosen pope in 1471, told his friend Wessel that he was ready to bestow any favour upon him which he should desire, and asked him if he would accept a bishop's see; but Wessel declined honours and dignities, demanding nothing but a Greek or Hebrew bible from the library of the Vatican. After a sojourn of several years at Rome, Wessel returned to Groningen, where he died on the 4th of October, 1489.

Wessel is frequently called a forerunner of Luther, and justly so, inasmuch as he tried to eradicate abuses and errors, and to restore the Christian religion to its original purity. It seems that the doctrines of Wicklif had great influence upon him. But there is this remarkable difference between Luther and Wessel: Luther attacked the foundations of the Roman Catholic system; Wessel only wrote against particular doctrines, such as purgatory, the ban, indulgence, &c., and he took his arguments from the philosophical systems of the middle ages quite as often as from the simple truths of the gospel. He was nevertheless suspected of heresy, and after his death some monks at Groningen burnt a valuable part of his manuscripts. Wessel argued that the pope was not infallible, and that general councils alone were. His principal productions are the treatises and dissertations:—1, 'De Oratione;' 2, 'De Sacra Eucharistia;' 3, 'De Purgatorio et Indulgentiis;' 4, 'De Dignitate et Potestate Ecclesiastica;' 5, 'Propositiones de Potestate Papae et Ecclesiae,' &c. He wrote also numerous notes and additions to the works of the Abbot Rupert, and he used to call this voluminous production 'Mare Magnum.' The editio princeps has the title 'Farrago Rerum Theologicarum,' Leipzig, 1522, reprinted at Basel, 1523. Luther, who esteemed Wessel very highly, wrote a preface to it. This edition is not complete. The first complete edition was published at Groningen, 1614, 4to.; 2nd edition, Amsterdam, 1617, 4to. Some of Wessel's treatises are contained in the first volume of Goldast, 'Monarchia Sacri Romani Imperii.'

(Bayle, *Dictionnaire Critique*, s. v. 'Wesselus.' A biography of Wessel is contained in the *Effigies et Vitae Professorum Academiae Groningae*.)

WESSELING, PETER, one of the first scholars of the eighteenth century, was born on the 7th of January, 1692, at Steinfurt, the capital of the present principality of Bentheim Steinfurt, in Prussian Westphalia, where he received his first education. In 1712 he went to the university of Leyden, where he studied the classical languages under Perizonius, Gronovius, and Wesselius; and in 1714 he went to the university of Franeker, in West Friesland, where he finished his studies under Vitringa, Andala, and Bosius. His first intention was to study divinity, but he soon devoted himself to philology. In 1717 he was appointed conrector of the lyceum at Middelburg, with the title of prorector; in 1719 he was appointed praelector or professor of history and eloquence in the lyceum of Deventer; and in 1723 he became professor of history and eloquence in the university of Franeker, which office he held during eight years. In 1735 he was appointed professor of Greek, and Roman and Greek antiquities, at Utrecht; in 1746 the chair of philosophy of law, or 'jus naturæ,' as it was then, and is sometimes still called, as well as that of the public Roman and German law, was conferred upon him, and he was created doctor of law. He became director of the public library at Utrecht in 1750, or perhaps as early as 1749. Hemsterhuys invited him to teach at Leyden, but Wesseling preferred stopping at Utrecht. Wesseling was rector of the university of Franeker in 1733, and twice, in 1736 and in 1749, he was chosen rector of the university of Utrecht. He died on the 9th of November, 1764. His reputation as a scholar and a sagacious critic was great. Yet he was little disposed to critical investigations, till his friend and colleague at Franeker, Hemsterhuys, succeeded in persuading him, as Ruhnken states, that no learning, however extensive and profound, would be of any use unless it were guided by criticism. Wyttenbach calls Hemsterhuys, Valckenaer, and Wesseling, the triumviri of philology.

The principal works of Wesseling are:—1, An edition of Diodorus Siculus, Amsterdam, 1745-6, 2 vols. fol. This edition contains the prefaces of Henry Stephens and Rhodomann, and the Latin version of Rhodomann, revised by Wesseling, who collected valuable materials, such as the notes of Camusat, and of several other scholars: De la Barre at Paris, Cocchi at Florence, and Assemani at Rome, had examined for Wesseling the manuscripts in the libraries of those three cities. The Bipont edition of Diodorus Siculus is little more than a reprint of the edition of Wesseling, though it contains the notes of Heyne and Eyring, who had access to two MSS. at Vienna, which were not used by Wesseling. 2, An edition of Herodotus, Amsterdam, 1763, fol. Wesseling had collated the best MSS. of England, Paris, and Vienna, and several at Rome which were in the possession of Passionei, or to which this learned cardinal had access. This edition contains the Latin version of Laurentius Valla, and the notes of Gale, Gronovius, Valckenaer, and of the editor: it was considered the best edition of Herodotus, till that of Schweighäuser appeared in 1816. 3, 'Dissertatio Herodotea,' Utrecht, 1758, 8vo., treats on several passages which have been erroneously attributed to Herodotus, and on several other subjects connected with Herodotus. 4, 'Veterum Romanorum Itineraria,' Amsterdam, 1735, 4to., contains the Itinerary of Antoninus, that of Jerusalem, and the 'Synecdemus' of Hierocles, which had previously been published by Bandurius, in his 'Imperium Orientale.' This is a useful edition. 5, 'Observationum Variarum Libri Duo,' Amsterdam, 1727, 8vo.; 2nd edition, by Professor Frotscher, Leipzig, 1832, 8vo., contains various notes on Dion Cassius, Xiphilinus, Ammianus Marcellinus, Euripides, Sophocles, Plato, and other Greek and Roman writers. Besides several other valuable works, such as 'Liber de Judaeorum Archontibus,' 'Notae ad Samuelis Petiti Leges Atticae,' &c., Wesseling wrote eight orations in classical Latin, among which are the following:—'Oratio de Origine Pontificiae Dominationis,' Franeker, 1724, fol.; 'Oratio in Obitum celsissimae et regiae Principis Annae, Foederat. Belgic. Gubernatricis,' Utrecht, 1759, fol.; and nineteen 'Dissertations,' among which are 'Dissertatio Historico-critica de S. Pauli ad insulam Melitam Naufragio;' 'De Origine et Progressu Religionis Christianae in Veteri Persarum Regno;' and 'Epistola ad H. S. Reimarum, qua selecta quaedam Dionis Cassii loca partim emendantur, partim illustrantur.' A complete list of the works and other productions of Wesseling is contained in *Elogium Wesselingii*, in Frotscher's edition of Wesseling's 'Observationum Variarum Libri Duo.' Wyttenbach, *Vita Davidis Ruhnkenii*, p. 46; David Ruhnken, *Elogium Tiberii Hemsterhusii*, 2nd ed., 1789, p. 60, &c. Strodtmann, *Das Neue Gelehrte Europa*, parts iv., ix., xx.; Wesseling's *Preface* to his edition of Herodotus.

WEST, GILBERT, was the son of the Reverend Dr. West, by whom an edition of Pindar was published at Oxford in 1697, and who died in 1716: his mother was Mary, the eldest of the three sisters of Sir Richard Temple, afterwards Lord Cobham; the second of whom, marrying Mr. Richard Grenville, succeeded her brother as Viscountess Cobham, and was afterwards created Countess Temple; and the third of whom married Sir Thomas Lyttelton, father of the first Lord Lyttelton. West is supposed to have been born about 1705. It was intended by his father that he should go into the Church; and with that view he was sent first to Eton and afterwards to Oxford; but, obtaining a commission through the interest of his uncle, Lord Cobham, he was induced to make the army his profession. It is supposed however that his tastes did not well accord with a military life, and he after some time resigned his commission and 'engaged,' says Dr. Johnson, 'in business under the Lord Townshend, then secretary of state, with whom he attended the king to Hanover.' This must have been in 1721, when Townshend, in his second secretaryship, went to Hanover with George I., and the struggle for pre-eminence commenced between him and his colleague Carteret, which ended, three years after, in the removal of the latter (See vol. xxv., p. 102). West probably continued to act as secretary, or in some such capacity, to Townshend till the resignation of that minister, in May, 1730. Johnson states that in May, 1729, his patron rewarded him with a nomination to be clerk extraordinary to the privy council, which however produced him no immediate profit. But he seems to have had some resources, for we are told that soon after this he married, and settled in a very pleasant house at Wickham, in Kent, 'where he devoted himself to learning and to piety,' and where he was often visited by his relations, the first Lord Lyttelton and the elder Pitt. It is said that the education of the young Prince George of Wales (afterwards George III.) was once offered to him, 'but that he required a more extensive power of superintendence than it was thought proper to allow him.' It was not till 1752 that he reaped the benefit of Townshend's nomination, by succeeding to one of the clerkships of the privy council; and soon after his friend Pitt, now in office, made him treasurer of Chelsea Hospital. But he did not long enjoy this increase of income; in 1755 he lost his only son; and on the 20th of March, 1756, he was himself carried off by a stroke of palsy.

Gilbert West is the author of several poetical productions, of which his version of some of the Odes of Pindar, first published in 4to., in 1749, are the best known, or rather attracted most notice in his own day, for the work is now nearly forgotten. It has little merit, except some elegance or smoothness of versification; though Johnson, whose critical examination however had only extended to the comparison of the first Olympic Ode with the original, describes it as apparently 'the produce of great labour and great abilities.' The publication is entitled 'Odes of Pindar, with several other Pieces in prose and verse, translated from the Greek:' the two most important of the other translations are one of the 'Iphigenia in Tauris,' from Euripides, and one of Plato's 'Menexenus.' There is also an elaborate 'Dissertation on the Olympick Games.' West's literary reputation principally rests on his 'Observations on the Resurrection,' first published in 1730, and since often reprinted. This tract, for which the University of Oxford, in March, 1748, made the author a doctor of laws by diploma, used to rank as one of the ablest examinations in English theological literature of a particular point in the evidences of Christianity, forming a companion to Lord Lyttelton's 'Dissertation on the Conversion of St. Paul,' which is addressed to West, and was written in consequence of the convictions which West's conversation was the means of suggesting or impressing. Both West and Lyttelton had at one time adopted infidel principles, and 'when West's book was published,' Dr. Johnson tells us, 'it was bought by some who did not know his change of opinion, in expectation of new objections against Christianity.' These disappointed purchasers avenged themselves, it seems, by calling him a Methodist. West, though not a follower of Wesley or Whitefield, was very regular in the performance of his religious duties, so much so that Johnson eulogizes him as equally entitled with Crashaw to 'the venerable names of poet and saint,' and as having been, when he was brought to the grave, 'one of the few poets to whom the grave might be without its terrors.'

(Johnson's *Lives of the Poets.*)

WEST, BENJAMIN, the most distinguished historical painter of the English school, was born on October 10th, 1738, at Springfield in Pennsylvania, in the United States of North America: he was the tenth child of John and Sarah West. John West was born and educated in England, and was of the Quaker family of the Wests of Long Crendon in Buckinghamshire, of whom was Colonel James West, the friend of John Hampden, and who were descended from Lord Delaware, renowned in the wars of Edward III. and the Black Prince. Benjamin's birth was brought on prematurely by a vehement sermon preached in the fields near his mother's residence by Edward Peckover; the subject was the corrupt state of the old world and its imminent destruction. Mrs. West was carried home ill, and Benjamin was born after an illness of twelve days. The peculiar circumstances of his birth gave rise to various surmises and prophecies regarding the child's future destiny, and those which promised his future greatness were credulously cherished by his father. The first indication West gave of his talent was in his seventh year, when set to watch the sleeping infant of his eldest sister. He drew a sort of likeness of the child in red and black ink, a feat which appeared so wonderful in the eyes of his parents, that they recalled to mind the predictions of Peckover. When he was about eight years old, a party of Indians paid a visit to Springfield, and struck with the drawings young West had made of birds, fruits, and the like, they taught him to prepare the red and yellow colours with which they stained their weapons; and these, together with the indigo given him by his mother, with the aid of some hair-pencils supplied from his mother's favourite cat's back, enabled him to make more satisfactory efforts than his pen-and-ink sketches had been. A merchant of the name of Pennington and a cousin of the Wests saw some of these attempts, and upon his return home he sent his young cousin a box of colours with pencils, canvas, and six prints. Young West from this time forsook school and almost shut himself up with his presents in a garret, which he converted into his studio. He made a picture from two of these prints, and Galt, West's biographer, saw this early attempt in the same room with the great painting of Christ rejected; and he relates that West told him that there were touches in that first essay which he had never surpassed.

In his ninth year West accompanied his friend Mr. Pennington to Philadelphia, and that gentleman introduced him to a painter of the name of Williams, who was delighted with the boy's efforts, gave him two books to read, Du Fresnoy's and Richardson's, and invited him to come and see his pictures whenever he pleased. From this time West was determined to become a painter, and his parents were pleased with his resolution. His notions of a painter were very grand. The following anecdote is characteristic:—He was about to take a ride with a schoolfellow to a neighbouring plantation: 'Here is the horse,' said the boy, 'bridled and saddled; so come, get up behind me:' 'Behind you,' said Benjamin; 'I will ride behind nobody.' 'Oh, very well,' said the other; 'I will ride behind you: so mount.' He mounted, and away they rode. 'This is the last ride I shall have for some time,' said the boy: 'to-morrow I am to be apprenticed to a tailor.' 'A tailor,' exclaimed West; 'you will surely never be a tailor?' 'Indeed but I shall,' returned the other; 'it is a good trade. What do you intend to be, Benjamin?' 'A painter.' 'A painter! what sort of trade is a painter? I never heard of it before.' 'A painter,' said West, 'is the companion of kings and emperors.' 'You are surely mad,' said the other; 'there are neither kings nor emperors in America.' 'Ay, but there are plenty in other parts of the world. And do you really intend to be a tailor?' 'Indeed I do; there is nothing surer.' 'Then you may ride alone,' said West, leaping down; 'I will not ride with one willing to be a tailor.'

West's first patron was Mr. Wayne, who gave him a dollar each for three poplar-boards upon which he had drawn some figures; and he was at the same time assisted by Dr. Morris, who gave him some money to purchase prepared pannels with. Another patron was Mr. Flower, a justice of Chester, in Pennsylvania, who took young West for a short time to his house, where he made the acquaintance of a young English lady, governess to Mr. Flower's daughters, who told him stories of Greek and Roman history, which the young painter listened to with enthusiasm, and spoke of in after-life with pleasure. His first painting which attracted much notice was the portrait of Mrs. Ross, of Lancaster, a neighbouring town. This led to many other portraits, and a gunsmith of the same place requested him to paint a picture of the death of Socrates. West said he could paint faces and men clothed, but he asked what he was to do with the slave who presented the poison, who, he thought, should be naked. The gunsmith answered his question by going to his shop, and returning with one of his workmen, who was half naked, and offering him as a model. The picture was painted, and attracted much attention.

Upon his return to Springfield, when he was about sixteen years of age, the propriety of his following professionally such a vain and sensual occupation as that of a painter was canvassed by his Quaker friends; but after they had satisfied themselves of the distinction between the use and the abuse of the art, they agreed unanimously that in his case they might suspend the strict operation of their tenets; and his becoming a painter by profession was sanctioned by the whole Quaker community of Springfield. Shortly after this event, West served as a volunteer under Major Sir Peter Halket, and went in search of the remains of the army which had been lost under General Braddock. But from this service he was soon called home by the illness of his mother, and he arrived just in time to see her die. After this event, which he appears to have greatly felt, he left his home, and established himself, then only in his eighteenth year, as a portrait-painter at Philadelphia. He charged two guineas and a half for a head, and five for a half-length. He painted at this time his picture of the Trial of Susannah. From Philadelphia he went to New York, and doubled his prices. Here he had an opportunity of going to Rome, a journey he had long desired to make. Mr. Allen, a Philadelphia merchant, then at New York, was about to send some corn to Leghorn, and he offered West a passage in the vessel. West had saved some money, which, when added to a cheque for fifty guineas, that Mr. Kelly, a merchant of New York, gave him in a letter to his agents at Philadelphia when he sat to him for his portrait, besides paying him for the picture, enabled him to undertake the journey. He arrived at Rome in July, 1760, and was well received. When he was introduced, by Lord Grantham, to the old Cardinal Albani, who was blind, as a young American who had come to Rome to study the arts, the Cardinal asked whether he was black or white. The virtuosi of Rome, thinking that West, as an American, could have seen nothing of art, were anxious to see what effect the noble works of antiquity would have upon him; and, says Galt, 'thirty of the most magnificent equipages in the capital of Christendom, filled with some of the most erudite characters in Europe, conducted the young Quaker to view the masterpieces of art. It was agreed that the Apollo should be first submitted to his view. The statue was enclosed in a case; and when the keeper threw open the doors, West unconsciously exclaimed, 'My God! a young Mohawk warrior!' The Italians were surprised and mortified with the comparison of their noblest statue to a wild savage; and West perceiving the unfavourable impression, proceeded to remove it. He described the Mohawks; the natural elegance and admirable symmetry of their persons, the elasticity of their limbs, and their motions free and unconstrained. 'I have seen them often,' he continued, 'standing in the very attitude of this Apollo, and pursuing with an intense eye the arrow which they had just discharged from the bow.' This criticism was afterwards repeated as one of the best that was ever pronounced upon the Apollo.

West however soon attracted other attention than that of mere curiosity. He painted a portrait of Lord Grantham, which was placed in the gallery of Crespigné, where artists and amateurs used to meet. The picture was almost universally supposed to be by Mengs, and all were greatly surprised when they heard that it was painted by the young American. Mengs himself is said to have told West that he had no occasion to come to Rome to learn to paint; and he advised him immediately to visit the principal cities of Italy, and examine the various great works in them, and then to return to Rome and paint some historical picture. An illness prevented West from putting this plan into execution; he was confined through a fever eleven months at Leghorn. When he recovered, instead of being without means, he found to his great astonishment that his agent had orders to give him unlimited credit. He owed this to the generosity of two Philadelphia merchants, Mr. Allen and Governor Hamilton. He now pursued the plan recommended by Mengs; and after he had examined all that was worth studying in Florence, Bologna, Venice, and Parma, he returned to Rome, and painted two pictures, which were well received; one of Cimon and Iphigenia, and one of Angelica and Medora. He was elected a member by the academies of Florence, Bologna, and Parma. Of the works of the two great masters of Rome he has expressed the following opinion: 'Michael Angelo has not succeeded in giving a probable character to any of his works, the Moses perhaps excepted. The works of Raphael grow daily more interesting, natural, and noble.'

In 1763 West visited England on his way back to his own country; and in London he had the good fortune to meet three of his best friends, Messrs. Allen, Hamilton, and Dr. Smith, who had always taken great interest in him. He soon made connections by the help of his many friends, and the two pictures mentioned above, and a portrait of General Monckton, second in command to Wolfe at Quebec, all of which he exhibited in town. procured him a few commissions. He painted the parting of Hector and Andromache for Dr. Newton, and the Return of the Prodigal Son for the bishop of Worcester. Lord Rockingham offered him 700*l*. per annum to decorate his mansion in Yorkshire; but this offer, by the advice of his friends, he declined. His success was such as to induce him to remain in this country, and having been long attached to Elizabeth Shewell, a young American lady, he requested her to come over to him to England, which she did, and they were married in 1765, at St. Martin's-in-the-Fields.

West's good fortune seemed to keep pace with his years. Dr. Drummond, the archbishop of York, commissioned him to paint a picture of Agrippina landing with the Ashes of Germanicus; and the prelate was so well pleased with the performance, that he attempted to procure the painter an annuity by subscription, so as to enable him to desist from painting portraits and to confine himself to historical subjects. He proposed to raise 3000*l*., he and his friends subscribing 1500*l*.; he however failed in the enterprise, but he praised both the painter and the picture so highly to George III., that the king desired he would send the young painter with his picture to him. West was well received by the king, who presented him to the queen, and commissioned him to paint a picture for him of the Departure of Regulus from Rome. This was the commencement of nearly forty years' intimacy with George III. West's excellence as a painter however was not the only source of his good fortune; he was an excellent skater, and acquired many acquaintances of rank through this accomplishment. When the Serpentine river in Hyde Park was frozen over, a great circle of spectators was frequently seen to admire the young American painter cutting the Philadelphia salute.

The picture of Regulus was exhibited in the first exhibition of the Royal Academy, of which West was one of the principal members; he had previously been a member and director of the Society of Artists, incorporated in 1765. But his death of General Wolfe was the first work which caused much stir among artists. Instead of representing his actors in Greek and Roman costumes, as was usual, he very sensibly painted them in their own dresses; an innovation which Sir Joshua Reynolds had tried to dissuade him from. The following is, according to Galt, West's account of this subject. He says, 'When it was understood that I intended to paint the characters as they had actually appeared on the scene, the archbishop of York called on Reynolds, and asked his opinion; they both came to my house to dissuade me from running so great a risk. Reynolds began a very ingenious and elegant dissertation on the state of the public taste in this country, and the danger which every innovation incurred of contempt and ridicule, and concluded by urging me earnestly to adopt the costume of antiquity, as more becoming the greatness of my subject than the modern garb of European warriors. I answered, that the event to be commemorated happened in the year 1758, in a region of the world unknown to Greeks and Romans, and at a period of time when no warriors who wore such costume existed. The subject I have to represent is a great battle fought and won, and the same truth which gives law to the historian should rule the painter. If, instead of the facts of the action, I introduce fictions, how shall I be understood by posterity? The classic dress is certainly picturesque, but by using it I shall lose in sentiment what I gain in external grace. I want to mark the place, the time, and the people; and to do this I must abide by truth. They went away then, and returned again when I had the painting finished. Reynolds seated himself before the picture, examined it with deep and minute attention for half an hour; then rising, said to Drummond, "West has conquered—he has treated his subject as it ought to be treated—I retract my objections. I foresee that this picture will not only become one of the most popular, but will occasion a revolution in art."' West was now thoroughly established both in the king's favour and in that of the public, and he continued to produce in rapid succession a series of large and in many respects excellent historical pictures, and there can be no question that the great reputation he acquired was relatively well merited, though his works will not bear comparison with those of the great masters of Italy. Lord Grosvenor purchased the picture of the Death of Wolfe, and West made a copy of it for the king. He painted also for the king, the Death of Epaminondas as a companion to it: the Death of the Chevalier Bayard; Cyrus liberating the Family of the King of Armonia; and Segestus and his Daughter brought before Germanicus. He painted the following series of large historical works for George III. at Windsor:—Edward III. embracing the Black Prince, after the battle of Cressy; the Installation of the Order of the Garter; the Black Prince receiving the King of France and his Son prisoners at Poictiers; St. George killing the Dragon; Queen Philippa defeating David of Scotland in the battle of Neville's Cross; Philippa interceding with Edward for the Burgesses of Calais; Edward forcing the passage of the Somme; and Edward crowning Sir Eustace de Ribaumont at Calais.

After the completion of these works, West proposed to the king to paint a great series upon the Progress of Revealed Religion; but his majesty, before consenting to this proposal, consulted some of the dignitaries of the church as to the propriety of introducing paintings into a place of worship: Bishop Hurd answered for himself and colleagues, and said that the introduction of religious paintings into his majesty's chapel could in no respect violate the laws or usages of the church of England. Out of thirty-five subjects proposed by West, all were approved of by the bishops: he afterwards added another to the number. He divided the series into four dispensations,—the Antediluvian, the Patriarchal, the Mosaic, and the Prophetic. Half of the subjects were from the Old Testament and half from the New. They were all sketched, and twenty-eight of them were executed, for which West received 21,705*l*. He painted also in the meantime nine pictures of portraits of the royal family, for which he received 2000 guineas.

After the death of Reynolds, in 1792, West was unanimously elected president of the Royal Academy, and the king sent the Duke of Gloucester to him to inquire whether the honour of knighthood would be acceptable to him. 'No man,' said West, 'entertains a higher respect for political honours and distinctions than myself, but I really think I have earned greater eminence by my pencil already than knighthood could confer on me. The chief value of titles is to preserve in families a respect for those principles by which such distinctions were originally obtained—but simple knighthood to a man who is at least as well known as he could ever hope to be from that honour, is not a legitimate object of ambition. To myself then your royal highness must perceive the title could add no dignity, and as it would perish with myself, it could add none to my family. But were I possessed of fortune, independent of my profession, sufficient to enable my posterity to maintain the rank, I think that, with my hereditary descent and the station I occupy among artists, a more permanent title might become a desirable object. As it is however, that cannot be, and I have been thus explicit with your royal highness, that no misconception may exist on the subject.' The duke immediately took the painter by the hand, and said, 'You have justified the opinion which the king has of you; he will be delighted with your answer.'

In 1801, during the illness of George III., West met with perhaps the first reverse in his life: Mr. Wyatt. the royal architect, called upon him, and told him that the pictures painting for the chapel at Windsor must be suspended until further orders. 'This extraordinary proceeding,' says his biographer, 'rendered the studies of the best part of the artist's life useless, and deprived him of that honourable provision, the fruit of his talents and industry, on which he had counted for the repose of his declining years. For some time it affected him deeply, and he was at a loss what steps to take.' He wrote a letter to the king on the 26th of September, which was carried to the court by Wyatt, but he received no answer to it. When the king recovered, West sought and obtained a private audience, and he found that the king did not know of the order to suspend the paintings, and that he had not received any letter from him. He spoke very kindly to West, and said, 'Go on with your work, West; go on with the pictures; and I shall take care of you.' This was West's last interview with his early, constant, and truly royal patron. 'But he continued,' says Galt, 'to execute the pictures, and in the usual quarterly payments received his 1000*l*. per annum till his majesty's final superannuation; when, without any intimation whatever, on calling to receive it, he was told it had been stopped, and that the paintings for the chapel, of Revealed Religion, had been suspended. He submitted in silence—he neither remonstrated nor complained.' During the thirty-three years which West worked for George III., he received 34,187*l.* from the king. This sum was held up to the public by West's enemies, without any statement of how it had been earned; and although it is a large sum in itself, yet when West's rank and abilities, and his years of toil for it, are considered, it makes but a poor income, and much less than would satisfy any successful portrait-painter of that or the present day. After the peace of Amiens West visited Paris, where he was remarkably well received, to see the great collection of works of art which Bonaparte had assembled in the Louvre. After his return he retired from the president's chair in the Academy owing to a strong opposition among its members. Wyatt, the architect, was put in his place, but in the following year, 1803, he was, with one exception, unanimously restored to the chair. The dissenting voice was supposed to be that of Fuseli, who voted for Mrs. Lloyd, an academician, and when he was taxed by some of the members with having given this vote, says Mr. Knowles, his biographer, he answered, 'Well, suppose I did; she is eligible to the office—and is not one old woman as good as another?' The impatient extravagance of Fuseli accorded little with the persevering diligence of West.

When West lost the patronage of the court, although sixty-four years old, he commenced a series of great religious works on a larger scale than any of those for George III. The first of this series was, Christ Healing the Sick, which was purchased by the British Institution for 3000*l.* and presented to the National Gallery. The picture was painted as a present for an hospital established by the Quakers at Philadelphia; but when it was sold, West sent them a copy of it with some alterations in its stead. The copy was exhibited at Philadelphia, and the profits of the exhibition enabled the committee of the hospital to enlarge the building.

The success of this piece induced West to continue even with greater works. He painted a Crucifixion, sixteen feet by twenty-eight; also an Ascension, and Inspiration of St. Peter, and a Descent of the Holy Ghost on Christ at the Jordan, all of very large dimensions. In 1814 he exhibited a picture of Christ rejected by the Jewish High-Priest, one of his best works: and in 1817 he exhibited his extraordinary picture of Death on the Pale Horse, from the Revelations. Others of his great works are the Brazen Serpent, in the possession of Mr. Neeld, and St. Paul on the Island of Melita, now the altar-piece at Greenwich Hospital. Besides these works, he painted several others of a different kind, which were very popular: of these the Battle of La Hogue is one of the best; there is an excellent engraving of it by Woollet; the same artist engraved his picture of the Death of Wolfe. John Hall also engraved three beautiful plates of Penn treating with the Indians, the Battle of the Boyne, and Cromwell dismissing the Long Parliament. The Battle of the Hogue and the Death of Wolfe are accounted Woollet's masterpieces. The Departure of Regulus, and its companion, Hannibal swearing enmity to the Romans, have been scraped in mezzotinto by Valentine Green.

In 1817 West lost his wife, and he survived her little more than two years; he died at his house in Newman Street, March 11, 1820, and was buried with great pomp in St. Paul's cathedral. Two sons survived him.

West's works are numerous: he painted or sketched about four hundred pictures, many of which are the largest works that have been executed in this country, and he left about two hundred drawings in his portfolios. He drew well, and many of his works are finely composed; but in colouring he was not very successful, his pictures are too often of a uniform reddish-brown tint; and in expression he was decidedly deficient in character, and monotonous both in feature and countenance: in invention he has frequently shown great power. It is owing to this character of his works that some of his finished pictures have been less admired than their original sketches. He was however, notwithstanding these defects, one of the first painters of his age, and he still remains unrivalled by any historical painter of this country. When West was elected president of the Royal Academy, he imitated the example of Sir Joshua Reynolds, and read discourses to the students at the distributions of prizes. As literary compositions these discourses are nothing remarkable, and they are chiefly distinguished for their simplicity and common sense. The British Institution arose out of a favourite plan of West's, which failed, to establish a national association for the encouragement of works of high art. There is a full-length portrait of West, by Sir Thomas Lawrence, in the National Gallery.

(Galt, *Life and Studies of Benjamin West*, &c.; Cunningham, *Lives of British Painters*, &c.; *Annual Biography and Obituary*, vols. i. and v.)

WEST BROMWICH. [STAFFORDSHIRE.]

WEST INDIES is a term at present exclusively applied to the archipelago which constitutes the eastern boundary of the Gulf of Mexico and the Caribbean Sea, and separates them from the Atlantic: on the west this mediterranean sea is divided from the Pacific by the Mexican Isthmus. The term was adopted when it was known that the countries discovered by Columbus did not form a part of India or Hindustan, and it was for some time synonymous with America, until it was gradually restricted to its present signification. Geographers sometimes call these islands the Columbian Archipelago, as nearly all the islands were discovered by Columbus. This archipelago extends from 10° to 27° 30′ N. lat. and from 39° 30′ to 85° W. long., and the islands are divided into three groups: the Bahamas, between 27° 30′ and 20° S. lat. and between 70° and 80° W. long.; the Greater Antilles, between 23' 30′ and 18° N. lat. and 65° and 85° W. long.; and the Lesser Antilles, extending from 19° to 10° N. lat. and from 59° 30′ to 66° W. long.

The most northern portion of this archipelago, or that part which is north of 20° N. lat., rests on an extensive bank, which is intersected by arms of deep water. The most remarkable of these arms is that which is known as the Old Bahama Channel, and divides the bank into two nearly equal parts. To the north and north-east of it is the Great Bahama Bank and the Bahama Islands; and on the south of it the bank on which the Island of Cuba rests. The Old Bahama Channel is connected at its north-western extremity with the Florida Straits by two arms, enclosing Cay Sal Bank, of which the northern is called Santaren Channel and the southern Nicholas Channel. The Florida Straits themselves ought to be considered as the northern continuation of the Old Bahama Channel, as they divide the Bahama Bank from the continent of North America. In the language of sailors the Old Bahama Channel is considered as terminating on the east between Cape Maysi in Cuba, and the island of Heneagua (the Inagua of our maps); but in a more comprehensive view, we must include in it the deep sea which separates the minor banks north of Hayti from this island, so that it extends to the Mona Passage, or the strait between Hayti and Puerto Rico. The most narrow portion of the Old Bahama Channel is between 22° and 23° N. lat., where its width hardly ever exceeds twelve miles.

The Bahama Banks consist of the Great and Little Bahama Banks, and six smaller banks, which lie to the south-east of Great Bahama Bank. Little Bahama Bank, the most northern of all, extends about 100 miles from north-west to south-east, and is between 30 and 40 miles wide. Along its eastern edge is the Island of Abaco, and on the southern that of Grand Bahama. Between this bank and Great Bahama Bank is Providence Channel, which unites Florida Straits with the Atlantic, and is from 20 to 40 miles wide. Great Bahama Bank extends about 300 miles from south-east to north-west, and is about 150 miles wide, so as to cover an area of about 45,000 square miles. But a considerable portion of this surface is occupied by two remarkable inlets of deep water, which extend parallel to one another in the longitudinal direction of the bank. That which nearly intersects the middle of the bank opens into Providence Channel, and is called the Tongue of the Ocean. Near its entrance are the islands of New Providence and of Andros. The second inlet of deep water is near the Atlantic, into which it opens by a strait lying south of the island of St. Salvador, which is the first place where Europeans landed in America. This inlet is called Exuma Sound, from the island of that name, which is situated towards the southern extremity on its western shores, which north of the island are beset with almost innumerable islets, which lie along it in a row, and extend over more than 80 miles. The outer edge of the bank, or that which is turned towards the Atlantic, is in nearly its whole extent raised above the surface of the water; and here are three large islands, Eleuthera, St. Salvador, and Long Island, of which the first is more than 80, the second about 60, and the last about 70 miles long. There are no islands along the inner edge of the bank, or that which is washed by the Florida Straits, Santaren Channel, and Old Bahama Channel, with the exception of a few rocks, which are hardly above the surface of the sea.

The minor banks are situated south-east of Great Bahama Bank, and are six in number, of which however only three contain islands. The first is the Bank of Crooked Island, which is separated from the Great Bahama Bank by Crooked Island Passage, through which the vessels generally pass which return from Jamaica to Europe. This bank extends hardly more than 50 miles from south-west to north-east. It has the form of a triangle, and its edges are formed by islands, except towards the south-west. The largest islands are Crooked Island and Aklin's Island. Between Aklin's Island, or the eastern edge of Crooked Island Bank, and the Caicos Bank, is a wide opening of the sea, which lies due north to the Windward Passage, or the wide strait between Point Maysi in Cuba and Mole St. Nicholas in Hayti. In this wide opening are the islands of Heneagua (Inagua) and Mayaguana (Marignana), with a few smaller ones, which differ from the other Bahama islands in rising much higher above the surface of the sea, and not being contiguous to banks, though surrounded by reefs and cliffs. The Caicos Bank extends more than 70 miles from north to south, and is about 50 miles across; and its islands, the Caicos, lie along the north-eastern and north-western edge of the bank. Between this bank and the following, called Turk's Islands Bank, is the Turk's Islands Passage, which is narrow. The bank itself is small, and contains two small but tolerably fertile islands, Grand Cay and Salt Cay. The three remaining banks, Mouchoir Carré Bank, Silver Bank, and Bajo de Navidad, contain a few naked rocks.

The islands dispersed over these banks are low, with the exceptions above mentioned. They hardly rise more than six feet above high-water mark, and their shores are formed by madrepores or coral. They are all long, and very narrow. Towards the centre of the islands the soil is composed of sand and calcareous rocks, with an intermixture of shells. It is generally hard, and partially covered with shrubs or with low trees, some of which produce dyewoods. The banks themselves rise nearly perpendicularly from an unfathomable depth. Where their edges are not formed by islands, there is a depth of three to ten fathoms of water on them, but this depth decreases gradually towards the interior of the banks, where it is frequently only a few feet. There are also large tracts, which are dry at low-water; and in other places there are single rocks or cliffs. The surface of the banks is composed of calcareous sand intermixed with shells.

The extensive banks which surround the greater part of the island of Cuba prove that this island rests on a bank similar to the Great Bahama Bank. These banks surround the island so as to leave only a few places of comparatively small extent, where large vessels have access. [CUBA, vol. viii., p. 204.] They generally extend from 20 to 30 miles from the shores, and in a few places even to 80 or 100 miles. The eastern portion of Cuba however is free from banks, and in these districts alone the mountains rise to a considerable elevation, whilst those parts which are surrounded by banks contain only hills. The division between these two regions may be marked by a line drawn from Cabo de Cruz on the southern shores to Punta Maternello on the northern.

The mountainous portion of Cuba evidently belongs to another region, which extends far to the east, comprehending the three other Larger Antilles and the Virgin Islands, so as to terminate near 64° W. long. In the most western parts the mountains rise to a great elevation. The Montaños del Cobre in Cuba, to 7200 feet; the Blue Mountains in Jamaica, to 7150; and those of Cibao in Hispaniola, to about 8000 feet. Farther to the east the mountains decrease in height. In Puerto Rico they do not [illegible] 4000 feet, and in the Virgin Islands probably not of Virgin Gorda perhaps do not much These mountains exhibit the mixed tains of Europe, but primitive highest ranges. Between them there are valleys of considerable width, and on their sides smaller ones, all of which are very fertile. There are considerable plains, as in Jamaica and Hispaniola, which however are destitute of trees and less fertile. The mountains, their declivities, and the valleys are thickly wooded in their natural state.

The strait which lies between Virgin Gorda and Anguilla separates this region from the islands of volcanic origin, which extend from 18° 20′ to 12° N. lat. and between 60° 50′ and 63° 10′ W. long. in a curved line. These islands consist, either entirely or for the greater part, of mountains and rocks of volcanic origin. Anguilla, which lies at the most northern extremity, and Barbuda and Barbadoes, which do not lie in the line of the row, but farther to the east, are exceptions. These islands are not much elevated, and they exhibit no traces of volcanic action, but consist mostly of limestone rocks. The greater number of the others are entirely composed of lava or other rocks of volcanic origin; but in St. Martin, St. Bartholomew, Guadaloupe, Martinique, and Granada are tracts consisting of limestone or sandstone. Two of these islands have active volcanoes: that of Guadaloupe made its last eruption in 1797, and that of St. Vincent in 1812. The others contain extinct craters or solfataras in different degrees of activity. The surface of these islands, like that of all countries consisting of volcanic rocks, presents great and sudden irregularities. The mountains rise from 2500 to more than 5000 feet above the sea. The highest are the Morne Diablotin in Dominica (5318 feet) and the Souffrière in Guadaloupe (5113 feet), both of which lie nearly in the centre of the chain. Proceeding south and north they become lower, but Mount Misery in St. Christopher is still 4454 feet, and Morne Rouge in Grenada 3840 feet high. On the eastern shores of the islands, which are exposed to the strong currents from the Atlantic, the rocks rise with a very steep ascent, and the indentations between them are generally too short and too much exposed to the trade-wind to constitute harbours. On the western shores the mountains are less elevated and their declivities gradual; and here the inlets are of greater extent, and form good harbours.

The fourth natural division of the Columbian Archipelago comprehends the islands of Tobago and Trinidad, which chiefly consist of primitive rocks, and resemble in their formation the north-eastern coast of Venezuela. There are no traces of volcanic action on them, except some mud-volcanoes on Trinidad. This island consists of three ranges of mountains, including two wide plains. The mountains do not exceed 2400 feet above the sea-level, and have gentle declivities.

Climate.—All the islands of the Columbian Archipelago, with the exception of the most northern Bahamas, are within the tropic; and their climate, as in other countries thus situated, is regulated by the progress of the sun, and the trade-winds, which depend on that progress. The year is divided into two seasons, the dry and wet. All the islands which are south of 18° N. lat. have two dry and two wet seasons, and this is also the case with the southern shores of the islands of Puerto Rico, Hispaniola, and Jamaica. The long dry season sets in when the sun approaches the southern tropic, about the end of November or the beginning of December. In this season the weather is generally very constant. Showers of rain indeed occur, but not frequently; and the sky is cloudless for several weeks and even months in succession. This weather lasts till the sun approaches the equator. Towards the end of March a change in the atmosphere takes place in the most southern islands, but it occurs about a month later in those near 18° N. lat. The short rainy season begins, which in the southern islands lasts about six weeks, but in the northern only 15 or 20 days. Showers are then frequent, and sometimes several occur in one day, but they hardly ever continue for an hour. When the sun passes over the zenith of the islands, the short dry season begins, and it lasts till the sun has reached the northern tropic. In July the long rainy season sets in, and continues to the month of November. These rains, which are ushered in by violent gusts of wind, and accompanied by terrific thunder-storms, are generally not heavy in July; but they become so in August in the southern, and in September in the northern islands. They then descend in torrents, and sometimes continue for twenty-four hours without interruption; but they usually fall in showers, several of which occur in one day, and sometimes as many as twenty. In the southern islands they begin to diminish in September, and in the northern in October. In November the showers are moderate and less frequent.

On the island of Cuba and on the northern coasts of the other Greater Antilles and the Bahamas, the seasons are not so distinctly marked. Though fine weather prevails during the long dry season, it is frequently interrupted by rain. It must however be observed that the heaviest rains fall in those months when the rainy season is at its height in the islands lying farther south. The quantity of rain which annually falls in these countries is considerably less than in those islands where the seasons are more regular. In the former it amounts to between 48 and 60 inches, and in the latter to 60 or 70 inches.

The mean annual temperature differs very little in places situated between the tropics. In the West Indies it is about 78°, as may be inferred from the observations contained in the following table, in which those made at Puerto d'España in Trinidad, the most southern island, are placed by the side of the observations made at the Havana, in Cuba, and at Nassau, in Old Providence (25° N. lat.), one of the Bahamas.

Mean of the Monthly Temperature observed.

	At Puerto d'España.	At the Havana.	At Nassau.
January . . .	76·5°	70·°	69·°
February . . .	76·5	72·	73·
March	77·5	75·7	76·
April	78·5	79·	78·
May	77·5	82·6	79·
June	78·	83·1	83·
July	79·	83·8	87·
August	79·5	83·8	88·
September . .	79·	82·	87·
October	78·5	79·5	80·
November . . .	79·	74·8	74·
December . . .	76·5	70·	70·
Mean annual temperature . .	78·	78·	78·7

But though the mean annual temperature is nearly the same all over the Archipelago, the difference between the hottest and coldest month at Puerto d'España is only 3 degrees; whilst at the Havana it is nearly 14 degrees, and at Nassau 19 degrees. There is of course a considerable difference in the mean temperature of the seasons, as appears from the following table:—

	At Puerto d'España.	At the Havana.	At Nassau.
Winter, Dec. to Feb. . .	76·5°	70·7°	70·7°
Spring, March to May .	77·8	79·1	77·7
Summer, June to Aug. .	78·8	83·4	86·
Autumn, Sept. to Nov. .	78·8	78·8	80·3

The greatest heat experienced at Puerto d'España does not exceed 93°, or 15 degrees above the mean annual temperature. At the Havana the thermometer sometimes rises, but rarely, to 92°; but it sometimes descends as low as 45°, and in its vicinity ice is occasionally formed, after a long continuance of northern winds in December or January. [CUBA, vol. viii., p. 204.] With this exception, it is stated that no frost is experienced even on the summits of the high mountains of Cuba or Jamaica.

When the sun is in the southern hemisphere, the archipelago enjoys the full benefit of the trade-winds, blowing from north-east and east-north-east, and diffusing over it a refreshing coolness. But when the sun has passed the equator, the trade-winds retire to the northward as far as 15° or 16° N. lat., and are replaced by south-eastern winds, which are warm and usually gentle; they continue to blow with diminishing force till June, when they are frequently interrupted by calms. During the long rains, the wind blows from all the points of the compass, and frequently in very violent gusts. This is also the season of the hurricanes, which rarely occur in July, but generally in August or September. They are not experienced in Trinidad and Tobago, and are more frequent and destructive on the Lesser Antilles than in Jamaica or Cuba. In Cuba they usually occur in October. When the trade-winds are not strong, the heat is moderated by the daily alternation of the sea- and land-breezes, the first blowing by day, and the land-breeze by night. The calms between the breezes are the hottest part of the day, but they last only from one to two hours.

All the islands of the Columbian Archipelago are subject to earthquakes; but they are not violent, except on the islands of volcanic formation, where they prove sometimes very destructive, which has been the case this year in Guadaloupe. The climate is considered healthy from November to June, but during the great rains various diseases, especially fevers, are prevalent.

Sea and Currents.—The navigation of the archipelago is much affected by the currents which prevail in the surrounding seas. The Guiana or Guyana Current [ATLANTIC OCEAN, vol. iii., p. 29], which runs from Cape St. Roque, in Brazil, along the shores of Guyana, and sets to the north-west, enters the Caribbean Sea by the straits which lie between the islands of Trinidad and of Martinique. It is strongest between Trinidad and Granada, where it runs from a mile to a mile and a half per hour, and has less strength between the last-mentioned island and St. Lucia, where it runs less than a mile per hour. Between St. Lucia and Martinique the current is reduced to 21 miles per day. North of Martinique a weak current is met with, running only from eight to ten miles per day, and hence it is considered as being only the continuation of the drift current of the Northern Atlantic. But weak as it is, it renders the communication between the islands very tedious, especially in the season when the trade-winds are not in force, and calms prevail.

A current running in a different direction prevails along the north-eastern edge of the Bahama Banks. It sets along the banks to the east-south-east, and varies much in strength according to the seasons. Rennell thinks it probable that this current is only the continuation of the southern counter-current of the Gulf-Stream.

In the sea between this current and the Guyana Current the extraordinary phenomenon occurs which is called the 'Ground-sea,' or, in Jamaica, the 'North Sea.' It is a swell of the sea, to which the south-eastern Bahamas, the north-eastern coast of Jamaica and Hispaniola, but chiefly Puerto Rico and the Virgin Islands, and in a less degree the northern Caribbee Islands, are subject. This heavy swell sets in generally in October, and continues, though with some intermission, till April and May. During June, July, and August it appears only occasionally, and for a short time. It takes place when the air is calm, when there has been no indication whatever of a previous gale, or even when light airs have for a considerable period come from the southward of east. The sea approaches from the north the shores of the islands in undulating masses, which suddenly rise to large ridges crested with foam, and form billows which burst upon the beach with great impetuosity. When the waves dash against cliffs, the spray often flies more than 100 feet high, and is attended with loud roarings resembling thunder, which subside into a rumbling noise caused by the nodules and fragments of rock which the breaker brings to the shore. Wave then follows wave in quick succession, there being only a short interval after the third. The sea for many miles from shore assumes a peculiar aspect. Different tints of blue, from the lightest to the darkest, form a strong contrast with the snowy foam of the breaking waves when they strike against the hidden rock, or with the white line which is visible along the whole coast. The phenomenon of the 'ground-sea' has not been explained satisfactorily, and seems not to occur in other parts of the globe, except along the south-western coast of Sumatra, where the surf, as described by Marsden in his 'History of Sumatra,' exactly resembles the ground-sea of the Columbian Archipelago.

Productions.—The grains, plants, vegetables, and fruit-trees, which are cultivated either for the purpose of obtaining articles of export or as food, have been noticed under the several islands, and also the domestic animals. The wild animals which existed on the archipelago when the Europeans first arrived were, the agouti, peccary, racoon, alco or native Indian dog, and the wild boar. They are now all extinct or nearly so, with the exception of the wild hog, which is still common on most islands. Monkeys are still found on several islands, and in Jamaica there is a smaller kind. Birds are numerous, and nearly all of them are fit for food. There are macaws, parrots, wild guinea-fowls, quails, several species of wild pigeons and partridges, snipes, wild ducks, grey ducks, teal, plovers, widgeons, mocking-birds or nightingales, curlews, spoonbills, divers, herons, rails, and sandpipers. The most remarkable of the birds are the humming-bird and the carrion crow: without the last-mentioned bird, it is said that these islands would hardly be habitable.

Fish are abundant and excellent. Madden enumerates 24 species in Jamaica, all of which are excellent food. In the sea surrounding Cuba and Jamaica the manatee and the remora, or sucking-fish, are met with, but very rarely. Turtles are abundant on the Bahamas and other low islands. In Jamaica is the mountain-crab, which is one of the delicacies of the island. The cotton-tree worm, or casi, is eaten by the negroes. There are several kinds of large lizards, among which is the guana, which formerly was eaten by the whites, but at present only by the negroes. Alligators are numerous. There are also several kinds of snakes, and some are large, but they are innoxious. The mosquitoes, cockroaches, and ants are troublesome. Fire-flies are very abundant.

Divisions and Area.—The Columbian Archipelago is divided into three groups, the Bahamas, the Greater Antilles, and the Lesser Antilles. They contain 86,023 square miles, which is rather less than the area of Great Britain, when the adjacent islands are included. The Bahamas contain 5424, the Greater Antilles 75,638, and the Lesser Antilles 4961 square miles. With the exception of Hispaniola, or Hayti, which constitutes an independent republic, the islands composing this archipelago are subject to six different European nations—the Spaniards, English, French, Danes, Dutch, and Swedes.

The Spanish possessions are the largest, and comprehend more than half the area of the archipelago; they consist of—

	Square Miles.
Cuba, with its dependencies, comprehending	43,412
Puerto Rico, with	2970
Culebra and Bique, two islands belonging to the Virgin Islands, with . . .	55
	46,437

The English possessions are next in extent; and they consist of—

Jamaica, one of the Greater Antilles, with .		4256
The Bahamas, with		5424
And the following Lesser Antilles:—		
Virgin Islands (Tortola, Virgin Gorda, &c.), with	94	
Anguilla	29	
Barbuda	72	
Antigua	107	
St. Christopher	68	
Nevis	38½	
Montserrat	47	
Dominica	277	
Santa Lucia	275	
Barbadoes	164	
St. Vincent	131	
Grenadines	30	
Granada	109	
Tobago	120	
Trinidad	2030½	
		3,592
		13,272

The French possess only a few of the Lesser Antilles, namely—

Guadaloupe, with several smaller islands in its vicinity, as the Saintes, Deseada, and Marie Galante, containing	631
Martinique	380
	1,011

The Danes possess three of the Virgin Islands, namely—

St. John, St. Thomas, and Santa Cruz, containing	164

The Dutch possessions consist of three Lesser Antilles, namely—

St. Eustathius	24
Saba	10
Martin	80
	114

The Swedes possess only the small island of—

St. Bartholomew	25

The Island of Hispaniola, including the adjacent islands of Samana, Tortue, and Gonave, is estimated to contain	25,000

Population and Inhabitants.—The population amounts to 3,200,000 individuals. But it is very unequally distributed over the islands. The Bahamas, which exceed in surface the Lesser Antilles by 463 square miles, had in 1839 only 23,048 inhabitants, whilst the population of the last mentioned group exceeded 600,000. This is chiefly to be ascribed to the inferiority of the soil of the Bahamas, and to its general unfitness to produce the cane, but partly also to their being settled only at a comparatively late period. [BAHAMAS, vol. iii., p. 273.] That the last-mentioned circumstance must be taken into account in forming an opinion on this subject is evident from the rapid increase of the population of the Bahamas of late years. In 1837 they had 19,943 inhabitants; and in 1839, 23,048: so that in two years the increase amounted to 3105, or nearly to 16 per cent. In the British Antilles, on the contrary, the population has decreased since the abolition of the slave-trade, and in some of them considerably. It is however supposed that the emancipation of the slaves will increase the population in the British Antilles, though it will probably diminish the commercial produce of the islands; such has been the effect on the island of Hispaniola, whose population has certainly increased in this century, and the value of its commercial produce has been greatly diminished. The Spanish islands, which, up to the emancipation of the Spanish Main, had been neglected by the government and nation, but which, since 1815, have attracted the attention of both, have in about twenty-five years nearly doubled their population. The islands belonging to the other European nations have either remained stationary, or their population has increased, though not much.

Population of the West Indies in 1840, founded on different censuses, taken between 1830 and 1840:—

Hispaniola (supposed) . .		1,000,000
Spanish islands—		
Cuba	900,000	
Puerto Rico, with dependencies	380,000	
		1,200,000
British islands—		
Bahamas	23,048	
Jamaica	311,070	
Virgin Islands	20,000	
Anguilla (supposed) . . .	800	
Barbuda (supposed) . . .	2000	
St. Christopher	22,482	
Nevis	7434	
Montserrat	7119	
Antigua	37,031	
Dominica	18,660	
Santa Lucia	14,179	
Barbadoes	102,007	
St. Vincent	27,122	
Granada and Grenadines . .	20,994	
Tobago	11,748	
Trinidad	39,328	
		665,022
French islands—		
Guadaloupe, with dependencies.	127,574	
Martinique	116,031	
		243,605
Danish Virgin Islands—		
St. John	2490	
St. Thomas	7000	
Santa Cruz	32,000	
		41,490
Dutch islands—		
St. Martin (supposed) . .	4000	
Saba (supposed) . . .	450	
St. Eustathius . . .	2500	
		6950
The Swedish island of—		
St. Bartholomew		1600
		3,158,667

The original inhabitants of these islands are extinct, with the exception of a few families of Caribs, on the islands of St. Vincent and Trinidad. The present population is com-

d of whites and negroes, and the offspring of these two
. In the tables published by government since the
ncipation of the slaves the number of inhabitants be-
ing to each race is not separately stated, and it is there-
impossible to determine the present proportion be-
n them. But from the census published formerly, and
r facts, it is evident that in the British islands the ne-
s constitute about three-fourths of the population; in
, about one-half; but in Puerto Rico, only one-sixth.
proportion between the two races in the islands which
g to other European nations is nearly the same as in
British islands. In Hispaniola both races are so mixed,
the bulk of the people are considered mulattoes.

story.—The greater number of the islands composing
olumbian Archipelago were discovered by Columbus.
is first voyage he first fell in (12th Oct., 1492) with
sland of St. Salvador, one of the Bahamas, which the
es called Guanahani. He afterwards visited the Ba-
 Islands, which lie between St. Salvador and Cuba,
ailed along the north-east coast of the last-mentioned
d from Punta Maternello to Cape Maysi, whence he
d to Hispaniola, of which he discovered a great part
e northern coast. In his second voyage (1493) he dis-
ed all the Lesser Antilles north of 15° N. lat., and also
o Rico, and in the following year the southern coast
ba. In his third voyage (1498) he discovered Trini-
nd the adjacent part of Venezuela, with the islands of
arita and Cubagua. In his fourth voyage he dis-
ed the Bay of Honduras and the whole of the coast of
al America from Cape Gracias à Dias to Puerto Bello,
n returning from this coast to Hispaniola, also the
l of Jamaica. The other islands were discovered
r at the same time or soon afterwards. Columbus
d the first settlement on his second voyage, and
e beginning of the sixteenth century the other Greater
les were occupied and settled by the Spaniards, who
pted to exclude Europeans from having any com-
al intercourse with these islands. But as the
ards did not think it worth their while to occupy
maller islands, they became the resort of that extra-
ary society of pirates known by the name of Buc-
rs, who infested the Spanish possessions during
xteenth and still more in the following century. Thus
 islands became better known in Europe, and with
sistance of the Buccaneers several nations settled per-
ntly in them. Other islands were wrested from the
ards by war, as Jamaica by the English, or by treaty,
 western portion of Hispaniola by the French. After
xtermination of the Buccaneers [BUCCANEERS, vol. v.,
6], which took place about 1700, the islands began to
 peace, and they soon rose to great importance, as the
nd for their principal produce, sugar and coffee, in-
ed rapidly in Europe, and most of the other countries
ich those articles might be obtained were shut out
a free commercial intercourse. Thus the English
s, as also those of other European nations, with the
tion of those of Spain, had risen to a high degree of
ation at the end of the eighteenth century. Several
s which have taken place during this century have
derablly affected the condition of the English posses-
; such as the abolition of the slave-trade, the emanci-
n of the slaves, and the free intercourse not only of
nd, but also of other European nations, with countries
cing similar articles. The possessions of other nations,
t the Spaniards, have also partly been affected by some
se causes.

yan Edwards, *History of the West Indies*; Humboldt's
ge aux Régions Equinoctiales du Nouveau Continent;
r's *Voyage to the West Indies*: *West India Sketch-*
; Schomburgk, *On the heavy Swell along the West*
 Islands, in *London Geogr. Journal*, vol. v.; West's
reibung von St. Croix; Lavaysse's *Description of*
zuela, Trinidad, Margarita, and Tobago; Macken-
 Notes on Haïti; Flinter's *Account of the Present*
 of Puerto Rico; Stewart's *Present State of Jamaica*;
en, *A Twelvemonth's Residence in the West Indies*;
ables of the Revenue, Population, and Commerce of
nited Kingdom, 1840.)

ESTALL, RICHARD, R.A., one of the more distin-
ed of the English historical painters of the last gene-
, was born in 1765, probably in London. In 1779 he
pprenticed to Mr. Thompson, an engraver, in the city,
raldry on silver, but his superior abilities having been perceived by Mr. Alefounder, a miniature painter, he was recommended by that gentleman to study drawing, and make painting his profession. He accordingly obtained leave from his master in the last year of his apprenticeship to draw in the evenings at the Royal Academy, and in 1786 he was at liberty to follow the bent of his own inclination. He took, jointly with his friend Sir Thomas (then Mr.) Lawrence, a house in Soho Square, in the corner of Greek Street, which they held together for some time.

Westall's first performances which attracted the notice of the public were some highly finished historical pieces in water-colours, in which he was without a rival: of these the following were particularly admired:—Sappho in the Lesbian Shades, chanting the Hymn of Love; Jubal, the first voice of the Lyre; the Boar that killed Adonis brought to Venus; the Storm in Harvest; the Marriage Procession (from the Shield of Achilles); besides many others. He made also a series of graceful designs to illustrate Milton, for Alderman Boydell; and he was a contributor to the 'Boydell Shakspere.' He painted at the same time several large historical pictures, but he met with so little success in the disposal of them, that he was almost compelled to confine himself to making small designs for booksellers, and in the number and popularity of his designs of this class he was second only to Stothard. They added however little to his reputation, for, owing probably to the great number required of him, he fell into a peculiar and decided mannerism. Among many other works, he illustrated Crabbe's 'Poems,' and Moore's 'Loves of the Angels.' Westall was elected a member of the Royal Academy in 1794, the same year in which Sir Thomas Lawrence and Stothard were elected. Towards the close of his life he became very much embarrassed in his means, owing to some unsuccessful speculations in foreign pictures and some imprudent partnership engagements. His last occupation was giving lessons in drawing and painting to her present majesty while Princess Victoria. He died on the 4th of December, 1836.

Although Westall's circumstances were, during the last few years of his life, not very prosperous, they were not so bad as was represented in several newspaper accounts that appeared at the time of his death; for he had the usual allowance granted by the Royal Academy to its superannuated or distressed members. His sister, Miss Westall, depended entirely upon him for support, and he allowed her regularly 80*l*. a year until his death. After her brother's death the Duchess of Kent settled an annual pension upon her of 100*l*.

In 1808 Westall published a book of poems illustrated by himself. As an historical painter he will never hold a high rank: some of his earlier works display a fine feeling for light and shade, and a certain elegance of colouring; but his later works were extremely mannered, formal in composition, and stiff and affected in design.

(*Gentleman's Magazine.*)

WESTBURY. [WILTSHIRE.]

WESTERAAS. [SWEDEN.]

WESTERAATEN, ISLANDS OF. [TRONDHIEM.]

WESTERHAM. [KENT.]

WESTERIK. [SWEDEN.]

WESTERN AUSTRALIA extends over the western portion of the Australian continent, and comprehends, according to an arrangement lately made by government, all the countries lying west of 129° E. long., so that the boundary-line between it and the other parts of the Continent joins the Indian Ocean west of Cambridge Gulf and the Southern Sea, nearly in the middle of the Australian Bight. Thus Western Australia contains about one-fourth of the whole continent, and lies between 35° and 14° S. lat. and between 113° and 129° E. long.

We are particularly acquainted only with that portion of it where British colonies have been settled, and of which a description has been given under SWAN RIVER [vol. xxiii., p. 367]. The remainder is almost entirely unknown. Two years ago an enterprising traveller, Mr. Eyre, travelled along the coast from Adelaide on the Gulf of St. Vincent in South Australia, to King George's Sound in Western Australia. According to the report that has reached us, he found this tract to be nearly a useless waste, consisting chiefly of sandhills, or of a gravelly soil on which there was a scanty vegetation. It is remarkable that, in this journey of more than 1000 miles, his progress was not once impeded or retarded by any large river. Thus we may now consider it a well established fact, that along the southern coast of Australia, which extends about 2000 miles, only one large river, the Murray, finds its way to the sea, and it seems probable that the countries adjacent to this coast on the west of the Murray River, like many other extensive countries near the tropics, are entirely destitute of rain. If this should be found to be so, this tract may be considered the Sahara of Australia.

The country north of the settlements and contiguous to the sea is certainly better, but as far as it has been explored, that is, to the vicinity of Shark Bay (25° S. lat.), it contains no large tracts of land fit for cultivation, or available for other useful purposes, though the surface is rather broken, and in some places rises into hills of moderate elevation. North of Shark Bay, even the outline of the coast is very little known, with the exception of some projecting portions. It appears to present a much greater variety than the other parts of Australia. In some parts the sea to some distance from the shore is covered with numerous islands, islets, and rocks, which render these countries so difficult of access, that a considerable extent of the coast-line, especially opposite Dampier Archipelago, has not been examined and surveyed. This unexplored coast extends over more than 500 miles. Farther to the north, between Point Gantheaume and Cambridge Bay, where it is called Tasman Land, the coast has been partly surveyed, and is much more broken than any other part of Australia: it consists of numerous widely-projecting promontories and headlands, between which there are wide bays, and several narrower inlets, which penetrate inland to a great distance from the open sea. Some of the projecting promontories are very hilly and rise to a considerable elevation. We know very little of the natural powers of Tasman Land, as the coast only has been slightly examined, and nothing is known of the interior, even at the distance of two or three miles inland.

The soil of the settled portion is of indifferent quality, and this is one of the reasons of the slow progress of the colony. It would however probably have improved much more rapidly in population and cultivation, if shortly after its settlement other countries in the neighbourhood, as South Australia, New Zealand, and Port Phillip in New South Wales, had not been opened to those who left their country with a view of settling in the southern hemisphere. As all these countries are more fertile than Western Australia, they have recently attracted all the emigrants from Britain, and several families which formerly had settled in Western Australia have removed to South Australia and Port Phillip. It therefore cannot be a matter of surprise, when we find that the population is stationary. It consisted, in 1834, of 2070 individuals; and in 1839 it amounted only to 2154 persons.

No grains or roots are cultivated, except those grown in England. The principal objects of agriculture are wheat, barley, oats, rye, and potatoes, of which the average produce per acre, in 1839, was 22 bushels of wheat, 30 of barley, 35 of oats, 20 of rye, and four tons of potatoes, which shows that the soil, though not distinguished by fertility, will repay the labour bestowed on it. Maize is not grown, though, on the other side of the continent, in New South Wales, it constitutes an important article of cultivation. We are not acquainted with the circumstances which have prevented the cultivation of this useful grain. The progress of cultivation has been much more rapid than that of population. The number of acres under crop, in 1834, was 1036; and in 1839 it amounted to 2578. More than half of this area is sown with wheat, namely, 1481 acres (1839). Barley is also cultivated to some extent; oats and rye much less. We do not know how far the attempts to transplant to this region the fruit-trees of Europe have been successful.

The domestic animals imported from Europe thrive very well, and increase rapidly, especially sheep, goats, and swine, as appears from the following table:—

Number of Domestic Animals.

Years.	Horses.	Horned Cattle.	Sheep.	Goats.	Swine.
1834	162	500	3,545	492	374
1839	382	1,394	20,829	3,814	1,299

[illegible] said of the botany and zoology of Aus- [illegible] 126, is applicable, at least in a [illegible] stralia. It does not appear that metals of any kind have been found there, but a few quarries have been opened, from which limestone and millstones are obtained. On the island of Rottenest, which is nearly opposite the entrance of the harbour of Fremantle, there is a salt-work, in which a moderate quantity of salt is made.

There are several harbours in the settled part of Western Australia, but only that of Fremantle at the mouth of the Swan River, and that of Albany in King George's Sound, are visited by large vessels. The subjoined table shows the number of vessels which visited these two ports in 1839, and also the countries to which they belonged.

Vessels Visiting the Ports of Western Australia in 1839.

Ports.	From Great Britain and British Colonies.		From United States.		From other Foreign Countries.		Total.	
	Ships.	Tons.	Ships	Tons.	Ships.	Tons.	Ships.	Tons.
Fremantle	18	3,506	12	3,488	..	..	30	6,994
Albany	20	4,831	8	2,687	6	2,293	34	9,811
	38	8,337	20	6,175	6	2,293	64	16,805

History.—That part of the Australian continent which is now comprehended under the name of Western Australia was called, up to the end of the last century, New Holland, which name had been given to it by the Dutch navigators, who discovered all its coasts in the seventeenth century, between 1616 and 1628. Though the Portuguese for more than a century before that time had annually sent several vessels and even fleets to the East Indies, they never approached the coasts of Australia, because their track lay along the eastern shores of Africa and through the Channel of Mozambique. But the Dutch, who wished to form commercial relations with the islands of the Indian Archipelago, in the expectation of large profits from the spice trade, followed a more direct route between the Cape of Good Hope and the Sunda islands, and they soon fell in with the western coast of Australia. Dirk Hartoge discovered, in 1616, the most western point of that continent, Dirk Hartoge's Island, and sailed along the coast northward to North-west Cape. The adjacent country was called by him Endracht's Land, from the name of the vessel in which he sailed. Three years later (1619) Van Edels fell in with the coast south of Endracht's Land, which received his own name, but is now called Austral-ind. [SWAN RIVER, vol. xxiii., p. 371.] In 1622 that portion of the coast where the British settlements now are was discovered by the vessel Leeuwin (Lioness), and named after it; and in 1627, Peter Nuyts sailed along the southern coast from Cape Leeuwin to the vicinity of Spencer's Gulf. A year later Commodore De Witt sailed along the north-eastern coast, which extends from North-west Cape eastward, and this part of it received his name. This coast was afterwards visited by Dampier, and the numerous islands which line it are called, after him, Dampier's Archipelago. The most northern coast of Western Australia was probably discovered by Tasman, in 1644, in his second voyage [TASMAN, vol. xxiv., p. 77], and received from him the name of Van Dieman's Land, but as the large island south of Australia is known by this name, geographers have lately substituted for it that of Tasman's Land. From that time Western Australia was occasionally seen by the navigators of several nations, but never examined, except that Dampier surveyed Shark's Bay. Captain King surveyed a great part of the northern coasts, and several places farther south were visited by the French expedition under Captain Baudin, in 1805. Captain Stirling visited the Swan River in 1825, and his favourable representations gave rise to the settlements on its banks. [SWAN RIVER, vol. xxiii., p. 370.]

(*Collection of Papers on Western Australia;* Barrow's 'State of the Colony of Swan River,' in the *London Geographical Journal*, vol. i.; 'Recent Information from Australia,' in the *London Geographical Journal*, vol. ii.; and *Tables of the Revenue, Population, Commerce, &c. of the United Kingdom*, 1840.)

WESTERWALD. [GERMANY.]

WESTMANLAND. [SWEDEN.]

WESTMANNIA. [SWEDEN.]

WESTMEATH. [Meath, West.]

WESTMINSTER, a city in the county of Middlesex, one of the constituent parts of the British metropolis, containing the royal residence, the houses of the legislature, the supreme courts of law, the chief public offices of the executive government, and the magnificent abbey church of St. Peter, which is one of the places of interment for persons illustrious by their talents, position, political character, or military and naval achievements. [London.]

The limits of the city and liberty of Westminster are formed on the southern and chief part of the eastern side by the left bank of the river Thames. The boundary leaves the river about midway between Waterloo bridge and Hungerford market, and with a little deviation follows the course of the Strand eastward to Temple Bar, being separated from the river in this part by what is termed the liberty of the duchy of Lancaster and by the western part of the Temple. The boundary turns northward from Temple Bar up Shire Lane, and then runs in an irregular line westward, keeping to the south of Lincoln's Inn Fields till it reaches Drury Lane: it then turns northwestward up Drury Lane to Castle Street, and again turning westward and then northward runs by Castle Street, West Street, and Crown Street, Soho, to the eastern end of Oxford Street. The northern boundary runs in a very direct line westward along Oxford Street and the north side of Hyde Park and Kensington Gardens, making a small detour in one place, so as to include St. George's burying-ground, to the northern end of the Serpentine river. From this point the western boundary follows the course of the Serpentine and of a stream which runs from its south-eastern extremity, now for the most part covered over, west of Kinnerton Street (which runs at the back of Wilton Crescent), Lowndes Street, Chesham Street, Westbourn Street, and the Commercial Road, to the Thames just in front of Chelsea Hospital. The area of the city is 2500 acres, the number of houses, by the census of 1831, 21,892, namely, 20,616 inhabited, 864 uninhabited, and 412 building; by the same enumeration the population comprehended 46,004 families, or 201,842 individuals. This statement does not include the population of the liberty of the duchy of Lancaster, now added to Westminster for parliamentary purposes, or the area or population of the precinct or chapelry of the Savoy; both which are taken as parts of Ossulston hundred in the county of Middlesex. The general description of the city is given elsewhere. [London.] In the present article we propose to give an historical sketch of its origin and of the extension of its buildings and population.

The city appears to have owed its origin to a church erected here by Saebyrht or Sebert, king of the East Saxons (or, to follow Camden, of the East and Middle Saxons), and dedicated to St. Peter. Saebyrht was under the supremacy of his uncle Æthelbyrht, or Ethelbert, king of Kent, and Bretwalda, or lord paramount, of the Anglo-Saxons, and had been converted to Christianity after his uncle, by the preaching of Mellitus, who was one of the companions of the monk Augustine. The mission of Mellitus to the East Saxons took place A.D. 604; and as Saebyrht appears to have died about the same time as Æthelbyrht, A.D. 616, we have an approximation to the date of the foundation of the church, which must have been some time between those two periods. Saebyrht and his wife Athelgoda were buried in the church of St. Peter, which appears to have been afterwards called West-Minster from its position with relation to St. Paul's, the metropolitan church of the East Saxons. Some have sought to carry the antiquity of the church to a much higher period, and have affirmed that St. Peter himself visited Britain and erected a small chapel or oratory here; others, more moderate, ascribe the first ecclesiastical structure on the spot to King Lucius, who is said to have reigned in Britain about the latter part of the second century, and to have built a church here from the ruins of a heathen temple which had been overthrown by an earthquake. The existence however of any church prior to that raised by Saebyrht is, to say the least, very doubtful: and at the time when that was erected the place was in so uncultivated a state, that the Saxons called it 'Thornege,' the 'Isle of Thorns.' The island was formed by an arm of the river, called Long Ditch, now a common sewer; or probably by a low marshy tract, from the midst of which the higher ground emerged, on which the church was built.

The church of Saebyrht appears to have been destroyed by the Danes about the time of Alfred, and remained desolate until the reign of Edgar, who caused it to be rebuilt, and established in the place, about A.D. 958, a Benedictine priory or abbey of twelve monks, who were however poorly provided for. If this establishment was not an abbey from its foundation, it became one not very long after. The church nevertheless appears to have been held in high esteem, for, A.D. 1040, the body of Harold I., the son of Canute, who died at Oxford, was brought here for burial. The body of the dead king was taken up the same year by order of his half-brother and successor Hardacnute, or Hardicanute, and thrown into a ditch. In the reign of Edward the Confessor, successor of Hardicanute, Westminster was the residence of royalty: the palace built or occupied by Edward appears to have been on or near the same site as the residence of succeeding kings and of the present houses of parliament: it has given name to Old and New Palace Yard, Palace Stairs, &c. It is not unlikely that Westminster had been occasionally the residence of the Anglo-Saxon kings before Edward's time, as Scotland Yard is said to have derived its name from a palace assigned by Edgar as the residence of the king of Scotland, when visiting the English court to do homage for his crown; and it is probable that this occasional residence would be near the ordinary abode of the English king. The abbey church of St. Peter at Westminster was rebuilt by Edward the Confessor with great magnificence, and that prince, on his decease, A.D. 1066, was buried in it, as was also Editha, his wife, daughter of Earl Godwin. Edward built also a parish church, that of St. Margaret, for the inhabitants, who previously had the use of a part of the abbey church.

The parish of St. Margaret originally comprehended the whole of the present city and liberties, with the exception possibly of the two parishes of St. Mary-le-Strand and St. Clement Danes. The boundaries of the parish are described in a judgment, given A.D. 1222, by Cardinal Stephen Langton, archbishop of Canterbury, and other arbitrators, on occasion of a dispute between the bishop of London and the abbot and monks of Westminster, as to whether the abbey was subject to the bishop's jurisdiction. The original judgment is given in Wharton's 'Historia de Episcopis et Decanis Londinensibus et Assavensibus.' The parish also comprehended several 'villae' beyond the city limits, as Knyghtebrigge (now Knightsbridge), Westburne (Westbourne), and Padyngtoun (Paddington), with its chapel. The church and burial-ground of St. Martin-in-the-Fields were not included in the parish, though surrounded by it on every side. When this church of St. Martin was erected is not known; it was perhaps originally a chapel of the monks of the abbey, who had a garden near it, the site of which has preserved its name with little alteration, Convent, now Covent Garden. The church of St. Clement Danes was in existence at the time of the massacre of the Danes in England on St. Brice's day, A.D. 1002, by order of King Ethelred II., and many of the proscribed nation fled to it for sanctuary. The churchyard was, in A.D. 1039, the common burial-place of the Danes, and in it part of the remains of King Harold I. were deposited, after being disinterred from their resting-place in St. Peter's abbey by order of Hardicanute. The Strand (so called in the Saxon Chronicle) was at this time apparently the road or street between London and Westminster, and upon it Earl Godwin and his son Harold drew up their land forces in their insurrection against Edward the Confessor, A.D. 1052. The churches of St. Martin and St. Mary-le-Strand both existed at the time of Langton's judgment (A.D. 1222); but how long before cannot be ascertained. St. Mary's church was then called the Church of the Innocents, or of St. Mary and the Innocents; and there is reason to think, from the notice of it in Langton's judgment, that it was then parochial. St. Martin's was made parochial some time between the delivery of the judgment and the year 1363. The parish was formed by dismembering all the northern and western parts of St. Margaret's parish, comprehending not only the present parish of St. Martin, but those of St. Paul, Covent Garden; St. Anne, Soho; St. James's; and St. George's, Hanover Square.

After the Conquest, Westminster continued to be the usual residence of the kings of England, and St. Peter's abbey the usual place of their coronation. Edward I. afterwards fixed in the bottom of the inauguration chair a stone which he had brought from Scone in Scotland, the possession of which was thought to secure possession of the government of that kingdom. William Rufus built a large hall as a banqueting-room to the palace; and this, with other public works which were carried on at the same time, was made the occasion of great oppression to the people; so that 'many men,' says the Saxon chronicle (A.D. 1097), perished thereby. This banqueting-hall was pulled down and rebuilt by Richard II., and is the present Westminster Hall.

Henry III. began to rebuild the abbey church of St. Peter, having caused the antient edifice of Edward the Confessor to be pulled down in A.D. 1245. He had previously built a new Lady-chapel. He was buried in the new church, A.D. 1273, and several of his successors on the throne have also been buried there. The new church was not completed until long after Henry's death. In A.D. 1297 that part of the abbey which had been rebuilt was much damaged by fire; and in A.D. 1303 the king's treasury, then kept in the abbey, was robbed of a vast sum (said in Allen's 'History of London,' but we know not on what authority, to have been 100,000*l.*); and the abbot and nearly fifty of his monks were apprehended and sent to the Tower on suspicion of being concerned in the robbery: twelve of them were detained in prison two years.

Henry III. granted to the abbot of St. Peter's a fair and a market, which were held at Touthull, on the west side of the abbey, a locality known in later times as Tothill Street and Tothill Fields. The wool-staple, or wool-market, of the metropolis was also established at Westminster, and contributed to the prosperity of the place, which was then quite separate from London. Between them was the village or hamlet of Charing, the last place where the body of Eleanor, the faithful and beloved queen of Edward I., rested on its way to St. Peter's abbey, where it was buried. Charing Cross, one of those erected by Edward at all the places where the body had rested, was demolished during the troubles of the reign of Charles I.; but the place where it stood has retained its name.

In the reign of Henry VII. the Lady-chapel of St. Peter's, built by Henry III., was pulled down, and in place of it was built the more extensive and costly structure now known as Henry the Seventh's Chapel. This was the last important addition or alteration made in the abbey before the Reformation, or indeed until early in the last century, when the western towers were rebuilt under the direction of Sir Christopher Wren. Since that time a considerable part of the abbey has been renovated, but no additions have been made.

At the dissolution the yearly revenues of St. Peter's abbey were estimated at 3977*l.* 6*s.* 4¾*d.* gross (Speed), or 3471*l.* 0*s.* 2¼*d.* clear (Dugdale). A MS. valor makes the revenue 3033*l.* 17*s.* 0¼*d.*; and according to another account (Stevens) it was 3307*l.* 17*s.* 0¼*d.* The abbot had a seat in parliament, and the abbey was considered to be the second in the kingdom. On the dissolution Henry VIII. first converted it into a college of secular canons, appointing the ex-abbot to be dean; but he soon after changed his mind, and established a bishopric at Westminster, assigning to it the county of Middlesex as a diocese, and appointing to the abbey, now made a cathedral, a dean and twelve prebendaries. This was about A.D. 1541. On the translation of the first bishop, Thirlby, who had wasted the revenues, to Norwich, A.D. 1550, the bishopric was discontinued; but the chapter remained till the time of Mary I., who again made it a Benedictine abbey, though retaining popularly the designation of Westminster Abbey; but in the reign of Elizabeth it was made a collegiate church, which, except during the troubles of the time of Charles I. and the Protectorate, it has since continued to be. Westminster School is a part of the collegiate establishment, and is endowed out of the revenues of the former abbey.

At the time of the Reformation, Westminster comprehended the parishes of St. Margaret, St. Martin-in-the-Fields, St. Clement-Danes, and St. Mary-le-Strand; and the chapelry of St. John the Baptist, in the Savoy, a precinct attached to the house erected by Peter, Count of Savoy, uncle to Eleanor, wife of Henry III. The church of St. Mary-le-Strand was pulled down by the Protector Somerset, in order to the erection of his mansion of Somerset House, which occupied the site; and the inhabitants long remained without a parish church, attending either at St. [illegible]es or at the Savoy Chapel. Early in the reign of Queen Elizabeth, about A.D. 1560, according to the plan republished by Vertue in 1737, Westminster was united to London by an unbroken line of buildings, extending from the palace of Whitehall at Westminster, by Charing Cross and along the Strand; those on the south side of the Strand consisting chiefly of the mansions of the nobility, with gardens reaching down to the river; and those on the north side, between Drury Lane and St. Martin's Lane, being also mansions, having gardens behind them; then a park or garden, apparently part of the former Convent (or Abbey) Garden, which has given name to the neighbourhood; then open fields, extending to Holborn and to the hamlet or village of St. Giles's. In the neighbourhood of Westminster Abbey and Hall, which formed the nucleus of the city, the buildings were thick, and formed a town of several streets. About Charing Cross there were houses extending along what is now Cockspur Street to the end of Pall Mall; but the Haymarket was a country road, separated from the fields by a hedge on each side. The Mews at Charing Cross existed, and their eastern wall, with that of St. Martin's churchyard and of the park or garden, noticed as extending at the back of the houses on the north side of the Strand, lined St. Martin's Lane on each side for some distance; but the greater part of that lane was lined with hedges, and had fields on each side, which were used for feeding cattle or drying clothes.

In the neighbourhood of the church of St. Clement-Danes, and at the Strand end of Drury Lane, about Clement's Inn, the houses were more thickly grouped, but the greater part of Drury Lane was skirted by fields, occupying, on the one hand, the space now occupied by Lincoln's Inn Fields and the neighbourhood, and on the other, the site of the present Covent Garden Market, Long Acre, and Castle Street. Hyde Park and St. James's Park and Palace were in existence. Hyde Park, which then included the site of Kensington Gardens, had formerly been a demesne of the abbots of St. Peter's, Westminster, and had been obtained by exchange by Henry VIII., who also erected St. James's Palace and laid out St. James's Park. Whitehall Palace, previously York Place, the residence of the archbishops of York, had been purchased by the same prince, in consequence of a fire which had destroyed the greater part of the old palace of Westminster. Speed's plan of Westminster, published in 1610, a few years after Elizabeth's death, gives the city but little more extension than the plan of 1560, showing that during the reign of that princess there had been little change.

In the interval between the publication of Speed's plan and the close of Charles II.'s reign a great increase of buildings took place in the part of Westminster adjacent to the Strand. The greater part of the area contained within the limits of the city of Westminster east of St. Martin's Lane had been covered with streets; and westward from St. Martin's Lane the buildings had extended to the irregular line formed by Wardour Street, Pulteney Street, Warwick Street, and Piccadilly nearly to the Green Park, at that time still united to St. James's Park. Lincoln's Inn Fields, the scene of Lord Russell's execution, the piazza or square of Covent Garden, now a market, Leicester Fields, now Leicester Square, and Soho Square, then called by some King Square, had been laid out and built. The city had also extended westward along the south side of St. James's Park, and southward, along Millbank, to the Horse Ferry opposite Lambeth Palace. The churches of St. Paul, Covent Garden (at first a chapel built by the Earl of Bedford, A.D. 1640), and St. Anne, Soho (A.D. 1678), had been built, and districts taken from the parish of St. Martin-in-the-Fields assigned to them as parishes. A vacant space between Carey Street and Portugal Street, since built over, was called Little Lincoln's Inn Fields, and a space south of the piazza, Covent Garden, now also built over, was occupied by the gardens of Bedford House, which then stood on the north side of the Strand near where Exeter Hall now stands.

The troubles which attended the closing years of the Stuart dynasty, the Revolution, and the wars which followed it, appear to have checked the further increase of the city of Westminster, for a map of London and Westminster 'as they are now standing, A.D. 1707,' shows little increase beyond Ogilby and Morgan's great map (dedicated to Charles II., in or after A.D. 1680), except that Golden Square and the streets adjacent had been laid out, and St. James's church erected, to which a district dismembered from St. Martin's had been assigned as a parish. But between A.D. 1707 and 1720, when Strype published a new edition of Stow's Survey with a Map, the buildings had covered the space previously vacant as far as Old and New Bond Street, inclusive of those two streets: toward the Piccadilly end of Old Bond Street the houses had extended westward to about Clarges and Half-Moon Streets, and along Piccadilly itself they had already reached Hyde Park Corner. Hanover Square had been laid out. By the year 1738 the buildings had extended along the whole south side of Oxford Street, and nearly the whole space between Piccadilly and Oxford Street was covered with buildings, as far as Tyburn Lane, now Park Lane, except in the south-western corner about Berkeley Square and May-fair, which were not fully covered as at present till the reign of George III. The churches of St. George, Hanover Square (A.D. 1724), and St. John the Evangelist, near Millbank (A.D. 1728), had been built and made parochial. St. George's parish was dismembered from St. Martin's-in-the-Fields, and St. John's from St. Margaret's. Westminster bridge had been begun, although it was not completed and opened until A.D. 1747.

During the remainder of the eighteenth century considerable increase of the buildings of the city of Westminster took place. Houses were built along the south side of the road to Knightsbridge, beyond the Green Park, which was now made distinct from St. James's Park; Berkeley Square was formed about 1760. May-fair was covered with houses, and Grosvenor Place and Lower Grosvenor Place, with some of the adjacent parts of Pimlico, were built. These parts were built before 1780; and by the close of the century Belgrave Place and other lines of buildings along the Chelsea Road had been erected.

By these successive extensions nearly the whole of the area of the city had been covered with streets and houses. The only considerable space not so occupied, with the exception of the parks, and the gardens of Buckingham, Carlton, Marlborough, Chesterfield, and Devonshire houses, was near the south-western corner of the space comprehended by the boundaries of the city of Westminster. This space partly consisted of the open ground of Tothill Fields, partly of a large extent of garden-ground known as the 'Neat-houses Gardens,' and partly of 'the Five Fields,' and other fields between Pimlico and Knightsbridge. During the present century the extension of buildings of various kinds has nearly covered this area. The Five Fields and the fields toward Knightsbridge are now occupied by Belgrave and Eaton squares, and Ebury Street, which form, with their neighbourhood, one of the handsomest quarters of the metropolis: Tothill Fields and a part of the Neat-houses Gardens are occupied by the Milbank Prison or Penitentiary; by Vincent Square, the ample enclosure of which forms the playground of the Westminster scholars; and by various streets adjacent to them. A part of the Neat-houses Gardens is still occupied only by manufactories or small groups of houses or building detached from each other, and it is here alone that opportunity remains for any material extension of buildings. The gardens of Carlton and Marlborough houses are occupied by new streets and terraces. Waterloo Bridge, originally called the Strand Bridge, and Vauxhall Bridge, both connecting Westminister with the opposite bank of the river, have been built; and it has been proposed to erect bridges for foot-passengers at Hungerford Market and at the Horseferry near Lambeth Palace. The ponds of the Chelsea Water-works have been converted into a canal—'the Grosvenor Canal,' with a basin and wharfs.

Of the population of Westminster until the present century we have no accurate account. It is said by Mr. Rickman, but we know not from what data, to have been about 130,000 at the beginning of the last century. In Maitland's 'History of London,' the number of houses, at a period, we believe, somewhere about the year 1737, is given at 15,445, which, allowing seven persons to a house, which is Maitland's estimate for the whole metropolis, would give 108,115 as the number of inhabitants. This estimate and Rickman's cannot be made to agree except by the supposition of a diminution of population in the earlier part of the last century, a supposition which the great increase of building at that time prevents us from entertaining; or by adopting a higher average of persons to each house, which we are not disposed to admit. We are inclined to think that Rickman's estimate for the beginning of the century is altogether too great, as it would not allow an increase of more than 30,000 during the whole century, which is by no means commensurate with the great increase of the buildings during the period. In 1801 the population was found by actual enumeration to be 158,210; in 1811, 162,085; in 1821, 182,085; and in 1831, 202,080.

The municipal government of Westminster was, until the Reformation, in the hands of the abbot and monks of St. Peter's Abbey. It was afterwards in the hands of the bishop, then of the dean and chapter, till 1585, when an act was passed for regulating it. The dean and chapter now appoint a high steward, who holds his office, except in case of malversation, for life. The high steward appoints a deputy, who is confirmed by the dean and chapter, and who presides at the court leet and at the quarter-sessions. The dean appoints a high constable, who is confirmed in office by the high steward, and is returning-officer at the election of members of parliament. He summons juries, and sits next to the deputy steward in court. The petty constables are chosen at the court leet. Sixteen burgesses, and as many assistants, are nominated by the high steward or his deputy, from the householders of the several districts into which the city has been divided; but their duties are now chiefly confined to attending the court leet. Quarter-sessions are held at the Westminster Guildhall, near the Abbey, by justices of the peace, with the deputy steward as chairman: a court leet is held for the election of constables, preventing or removing nuisances, &c. There are several police-offices and courts of requests within the city. A court of record for the liberty of the duchy of Lancaster is held at Somerset House.

Westminster has returned two members to Parliament since the 1st year of Edward VI. Its elections during the latter part of the last century and during the present have, from the extent of the constituency and the vigour of the struggle, usually excited great attention. The number of voters in 1835-6 was 15,695; in 1839-40 it was 14,254, showing a decrease in four years of 1441.

(Camden's *Reges, Reginae, &c. in Ecclesia B. Petri Westmonasterii sepulti*; Crult's *Antiquities of St. Peter's, Westminster*; Stow's *Survey of London*; Maitland's, Hughson's, and Allen's *Histories of London* (the last of which is little else than a plagiarism from Nightingale's account in the *Beauties of England and Wales*); Wharton, *De Episcopis Londinensibus*, &c.; Tanner's *Notitia Monastica*; Newcourt's *London Diocese*; Ingram's *Saxon Chronicle*; *Maps of London and Westminster* at various periods; *Parliamentary Papers*.)

WESTMINSTER ASSEMBLY OF DIVINES. The principal measures of the Long Parliament, which preceded and led to the convocation of this body, were, briefly stated in the order of time, the following:—

The parliament met on Tuesday, the 3rd of November, 1640. In the front of the grievances about which the Commons immediately began to bestir themselves were placed those relating to religion. On Saturday, the 7th, the first day on which the house entered upon business, Sir Benjamin Rudyards delivered a long speech, which he commenced by observing that they were assembled to do God's business and the king's, and then continued:—'Let religion be our *primum quaerite*, for all things else are but *etceteras* to it. . . . We well know what disturbance hath been brought upon the church for vain petty trifles. How the whole church, the whole kingdom hath been troubled where to place a metaphor, an altar. We have seen ministers, their wives, families, and children undone, against law, against conscience, against all bowels of compassion, about not dancing upon Sundays. . . . And this, belike, is the good work in hand which Dr. Heylin hath so often celebrated in his bold pamphlets. All their acts and actions are so full of mixtures, involutions, and complications, as nothing is clear, nothing sincere in any of their proceedings. . . . . They have so brought it to pass that under the name of Puritans all our religion is branded, and under a few hard words against Jesuits all Popery is countenanced.' The course subsequently taken by the house was in perfect accordance with the key-note thus struck.

On Monday, the 16th of November, arrived the Commissioners from the nation and army of Scotland, attended by a large staff of chaplains, whose fervid sermons in St. Antholin's Church soon added immensely to both the zeal and the numbers of the professors of Presbyterianism among the citizens of London. The noble commissioners themselves also, who, no more than the preachers, dissembled their desire to see the Covenant the law of both countries, are believed to have been active instigators of many of the movements that now took place in opposition to episcopacy both without and within the walls of parliament. On Friday, the 20th, a vote was passed by the Commons, 'That at the receiving of the Communion next Sunday it was the desire of the House that the communion-table may be removed into the middle of the church.' On Friday, the 11th of December, was presented by Alderman Pennington the famous root-and-branch petition 'from many of his Majesty's subjects in and about the city of London and several counties of the kingdom,' setting forth that 'the government of archbishops, lord bishops, deans, &c. hath proved prejudicial and very dangerous both to the church and commonwealth,' and praying that the said government, 'with all its dependencies, roots, and branches,' might be abolished, and 'the government according to God's word' established in its stead. This petition, which is supposed to have been the contrivance of the Scotch commissioners, is said to have had 15,000 signatures. On the 15th and 16th of December, after the matter had been repeatedly debated, various resolutions were voted by the Commons against the powers assumed and the new canons passed by the convocation of the clergy then or lately sitting. Immediately after this commenced the attacks upon Laud, archbishop of Canterbury, and the other 'Popish bishops,' as they were styled; and also the proceedings of the sub-committee of the Committee of Religion, denominated the 'Committee for Preaching Ministers,' appointed 'to consider how there may be preaching ministers set up where there are none, and how to maintain them.' But the work of pulling down proceeded much faster than that of setting up. On the 5th of February, 1641, it was ordered 'That the lord-keeper be desired to leave out the clergy in England and Wales at the renewing the commission of the peace.' On the 13th a bill 'for abolishing superstition and idolatry, and for advancing the worship and service of God,' was brought in, read twice, and committed the same day. On the 10th of March it was resolved 'That the legislative and judicial power of bishops in the House of Peers in parliament is a great hindrance to the discharge of their spiritual function, prejudicial to the commonwealth, and fit to be taken away by bill; and that a bill be drawn to that purpose.' The next day it was in like manner resolved that a bill should be brought in to prevent bishops or any other clergymen being in the commission of the peace, or having any judicial power in the Star-Chamber or in any civil court; and on the 26th, that another bill should be drawn to incapacitate them for being employed as privy-councillors. All these bills were soon after brought in, and carried through the house at a rapid pace. At last on Thursday, the 20th of May, a bill was brought in for the entire abolition of episcopacy; but although it was read a second time on that day week by a majority of 139 to 108, and the principal clauses were afterwards carried in committee, it was dropped for the present on the Lords consenting to pass the bill depriving the bishops of their votes in parliament, which they did at last, in February, 1642.

Meanwhile, at three o'clock on the morning of the 23rd of November, 1641, after a debate which had lasted twelve hours, the Commons, by a majority of 159 to 148, had passed the famous Remonstrance, or Declaration of the State of the Kingdom, addressed to the king, in which they said:—'And the better to effect the intended reformation (in the church), we desire there may be a general synod of the most grave, pious, learned, and judicious divines of this island, assisted with some from foreign parts professing the same religion with us, who may consider of all things necessary for the peace and good government of the church, and represent the results of their consultations unto the parliament, to be there allowed of and confirmed, and receive the stamp of authority, thereby to find passage and obedience throughout the kingdom.' This is, we believe, the first distinctly recorded intimation given by the parliament of their wish to refer the question of religion to a clerical convocation, and it sets forth very explicitly the limits within which they proposed to commit the arrangement [illegible]he matter to such a body. The Remonstrance [illegible] published as soon as it was passed, and [illegible]sented to the king.

The course of events now proceeded with accelerated rapidity. On the 30th of December, 1641, twelve of the bishops were committed on a charge of high treason for having protested against the validity of any acts of parliament that should pass while the popular tumults around the House of Lords prevented them from taking their seats. On Tuesday, the memorable 4th of January, 1642, Charles struck, ineffectually, his first blow at the parliament by his desperate attempt to seize the five members. On the 10th he left Whitehall, never again to enter that royal residence, or his capital, till he was brought thither a prisoner to be tried and led to execution. On the 22nd of August he erected his standard at Nottingham. On the 1st of September the Commons, and on the 10th the Lords, passed an act, entitled 'For the utter abolishing and taking away of all archbishops, bishops, their chancellors, and commissaries, &c.,' by which it was ordained that after the 5th of November, 1643, there should be no archbishop, bishop, chancellor, &c., nor any dean, &c., nor any prebendary, canon, &c., of or within any cathedral or collegiate churches in England or Wales; that their names, titles, jurisdictions, offices, and functions should cease, determine, and become absolutely void; that all the manors, lordships, castles, messuages, lands, &c. belonging to any archbishopric or bishopric should be for the future in the real and actual possession and seisin of the king's majesty, his heirs and successors; and that all impropriations, parsonages, tithes, &c. belonging to any dean and chapter should be put into the hands of trustees, to pay to the deposed archbishops, bishops, deans, &c. such yearly stipends and pensions as should be appointed by parliament.

'It may seem strange,' observes Neal (*History of the Puritans*, ii. 151, edit. of 1837), 'that the parliament should abolish the present establishment before they had agreed on another, but the Scots would not declare for them till they had done it. Had the two houses been inclined to Presbytery (as some have maintained), it would have been easy to have adopted the Scots model at once; but, as the bill for extirpating episcopacy was not to take place for above a year forward, it is apparent they were willing it should not take place at all if in that time they could come to an accommodation with the king; and if the breach should then remain, they proposed to consult with an assembly of divines what form to erect in its stead.'

One of five bills to which it was proposed by the parliamentary commissioners that the king should give his consent in the negotiations at Oxford (from 30th January to 17th April, 1643) was entitled 'A Bill for calling an Assembly of learned and godly Divines and others to be consulted with by the Parliament for the settling of the government and liturgy of the Church of England, and for the vindication and clearing of the doctrine of the said church from false aspersions and interpretations.' This bill was afterwards converted into 'An Ordinance of the Lords and Commons in Parliament,' and passed 12th June, 1643.

The persons nominated in the ordinance to constitute the assembly consisted of a hundred and twenty-one clergymen, together with ten lords and twenty commoners as lay assessors. Among the commoners were John Selden, Francis Rouse, Sir Henry Vane, senior and junior, John Glynn (the recorder of London), John Whyte, Bulstrode Whitelock, Sergeant Wild, Oliver St. John, John Pym, and John Maynard. Among the most distinguished of the clerical members were, Dr. Ralph Brownrigge, bishop of Exeter; Mr. Anthony Burges (considered the head of the Puritans), Edmund Calamy, Dr. Francis Cheynel, Thomas Coleman, Thomas Gataker (the editor of Marcus Antoninus), Dr. Thomas Goodwin, Dr. John Hacket (afterwards bishop of Lichfield), Dr. John Lightfoot, Dr. George Morley (afterwards bishop of Winchester), Dr. William Nicholson (afterwards bishop of Gloucester), Philip Nye, Dr. John Prideaux (bishop of Worcester), Dr. Edward Reynolds (afterwards bishop of Norwich), Dr. Robert Saunderson (afterwards bishop of Lincoln), Dr. James Usher (archbishop of Armagh), George Walker, Dr. Samuel Ward, and John Wallis (the mathematician). Several other persons (about twenty in all) were appointed by the parliament from time to time to supply vacancies occasioned by death, secession, or otherwise, who were called superadded divines. Finally, two lay assessors, John Lord Maitland and Sir Archibald Johnson of Warriston, and four ministers, Alexander Henderson and George Gillespie of Edinburgh, Samuel Rutherford of St. Andrews, and Robert Baillie of Glasgow, were, on the 15th of September, 1643, admitted to seats and votes in the assembly by a warrant from the parliament as commissioners from the Church of Scotland. They had been deputed by the General Assembly, to which body, and to the Scottish Convention of Estates, commissioners had been sent from the two houses of the English parliament, and also from the Assembly of Divines, soliciting a union in the circumstances in which they were placed. This negotiation between the supreme, civil, and ecclesiastical authorities of the two countries gave rise to the Solemn League and Covenant, which was drawn up by Henderson, moderator (or president) of the General Assembly, and, having been adopted by a unanimous vote of that body on the 17th of August, was then forwarded to the English parliament and the Assembly of Divines at Westminster for their consideration.

The meeting of the Assembly of Divines had been forbidden by the king in a proclamation dated the 22nd of June. The only effect however of that prohibition had been to induce the greater number of the members of episcopalian principles to refrain from attending. On Saturday, the 1st of July, the day named in the ordinance, sixty-nine clerical members assembled in Henry the Seventh's chapel, in Westminster Abbey. They appeared, it is recorded, not in their canonical habits, but mostly, after the fashion of foreign Protestant clergymen, in black coats and bands. At subsequent sittings the attendance appears to have ranged between sixty and eighty. About twenty-five of the persons who had been nominated members of the Assembly (including one or two who had died) never took their seats; and even of the sixty or seventy who attended pretty regularly, only from twelve to twenty were frequent speakers.

In theological doctrine the divines of the Westminster Assembly were almost to a man of one mind. They were all, or nearly all, Calvinistic or anti-Arminian. But upon the subject of church government they were divided into several violently hostile sections. Episcopacy, even of the most mitigated kind, could scarcely be said to have any representative in the synod as actually constituted; the great majority were Presbyterians; but there was a small party who passed under the name of Erastians; and there was a more numerous and also a more active body of Independents, or, as they called themselves, Congregationalists, who, formidable from the perseverance and ability of their leaders, were still more so from the ascendancy which their principles were fast acquiring in the parliament, in the army, and throughout the nation. The chiefs of the Independent party in the Assembly were Dr. Thomas Goodwin, Philip Nye, Jeremiah Burroughs, William Bridge, and Sidrach Simpson, often spoken of as the Five Dissenting Brethren: their followers might amount to about as many more. The heads of the Erastian party were Selden, and the two divines, Lightfoot and Thomas Coleman; the only other steady members of the sect being the laymen Whitelock and St. John. In the parliament however Erastianism was nearly as strong as Independency: indeed, however much the two systems might differ in the grounds on which they professed to stand, they came practically to very nearly the same thing, or at least were easily reconcileable; and some persons were probably to be classed as adherents of both.

This position of parties explains and makes intelligible the history of the proceedings of the Westminster Assembly, and the results of its deliberations. The ordinance of the Lords and Commons by which the Assembly was constituted only authorized the members, until further order should be taken by the two houses, 'to confer and treat among themselves of such matters and things touching and concerning the Liturgy, discipline, and government of the Church of England, or the vindicating and clearing of the doctrine of the same,' &c. as should be 'proposed to them by both or either of the said houses of parliament, and no other,' and to deliver their opinions and advices to the said houses from time to time in such manner and sort as by the said houses should be required. They were not empowered to enact or settle anything. It was expressly provided that the Assembly should not assume to exercise any jurisdiction, power, or authority ecclesiastical whatsoever, or any other power except merely this right of delivering their opinion and advice upon the matters submitted to it. As its discussions proceeded, a discordance of principles and views upon various points between the ruling Presbyterian party in the Assembly and the growing Independent or Erastian majority in the parliament became more and more evident; while the progress of events also tended to separate the two bodies more widely every day, and at last to place them almost in opposition and hostility to each other. The Assembly of Divines continued to sit under that name till the 22nd of February, 1649, having existed five years, six months, and twenty-two days, during which time it had met 1163 times. The Scottish commissioners had left above a year and a half before. Those of the members who remained in town were then changed by an ordinance of the parliament into a committee for trying and examining ministers, and continued to hold meetings for this purpose every Thursday morning till Cromwell's dissolution of the Long Parliament, 25th of March, 1652, after which they never met again.

All the important work of the Assembly was performed in the first three or four years of its existence. On the 12th of October, 1643, the parliament sent them an order directing that they should 'forthwith confer and treat among themselves of such a discipline and government as may be most agreeable to God's holy word, and most apt to procure and preserve the peace of the church at home, and nearer agreement with the Church of Scotland and other Reformed churches abroad, to be settled in this church in stead and place of the present church government by archbishops, bishops, &c., which is resolved to be taken away; and touching and concerning the directory of worship or Liturgy hereafter to be in the church.' This order produced the Assembly's Directory for Public Worship, which was submitted to parliament on the 20th of April, 1644; and their Confession of Faith, the first part of which was laid before parliament in the beginning of October, 1646, and the remainder on the 26th of November in the same year. Their Shorter Catechism was presented to the House of Commons on the 5th of November, 1647; their Larger Catechism on the 15th of September, 1648. The other publications of the Assembly were only of temporary importance, such as admonitory addresses to the parliament and the nation, letters to foreign churches, and some controversial tracts. What are called their Annotations on the Bible did not proceed from the Assembly at all, but from several members of the Assembly and other clergymen nominated by a committee of parliament, to whom the business had been entrusted.

The Directory of Public Worship was approved of and ratified by the General Assembly of the Church of Scotland held at Edinburgh in February, 1645; the Confession of Faith, by that held in August, 1647; the Larger and Shorter Catechisms, by that held in July, 1648: and these formularies still continue to constitute the authorized standards of that establishment. The Directory of Public Worship was also ratified by both houses of the English parliament on the 2nd of October, 1644; and so was the doctrinal part of the Confession of Faith, with some slight verbal alterations, in March, 1648. On the 13th of October, 1647, the House of Commons passed an order that the Presbyterian form of church government should be tried for a year; but it was never conclusively established in England by legislative authority; and even what was done by the parliament in partial confirmation of the proposals of the Westminster Assembly of Divines, having been done without the royal assent, was all regarded as of no validity at the Restoration, upon which event episcopacy resumed its authority without any act being passed to that effect.

It is remarkable that there is not in existence, as far as is known, any complete account of the proceedings of the Westminster Assembly of Divines, either printed or manuscript. The official record is commonly supposed to have perished in the fire of London. Three volumes [illegible] notes by Dr. Thomas Goodwin are preserved in Dr. Williams's Library, London: and two volumes by Gillespie in the Advocate's Library, Edinburgh. [illegible] Letters however contain very full details [illegible] during the period of his attendance, and a [illegible] by Lightfoot has also been printed. Much [illegible] to be found scattered [illegible] 'Memoirs of the Westminster Divines,' [illegible] Owen;' and especially Neal [illegible]

The only work that has appeared professing to be a 'History of the Westminster Assembly of Divines' is a 12mo. volume, of 390 pages, with that title, by the Rev. W. M. Hetherington, then minister of Torphichen, published at Edinburgh in the present year, 1843. The reader is referred for a further account of the sources of information on the subject to Mr. Hetherington's Preface, and to a note on p. 521 of Aiton's 'Life and Times of Alexander Henderson,' 8vo., Edinburgh, 1836.

WESTMORELAND, or WESTMORLAND, a northern county of England, bounded on the north and north-western sides by the county of Cumberland, from which, on the northern side, it is separated by Ulleswater Lake, by the river Eamont, which flows from Ulleswater into the Eden, by the Eden itself, and by the Crowdundale, another feeder of the Eden: on the south-west it is bounded by the district of Furness in Lancashire, from which it is separated in one part by Little Langdale Beck, Elter Water, and the Brathay, a stream flowing into the lake of Windermere, or Winandermere, and by the western shore of Windermere itself; the boundary-line then passes round the foot of the lake, up its eastern shore as far as Storr's Hall, and across in an easterly direction to the head of the little river Winster, which separates Westmorland and Lancashire during its whole course to its junction with the æstuary of the Ken, or Kent, just where it opens into Morecambe Bay; on the south it is bounded by Lancashire; and on the south-east, east, and north-east by Yorkshire, from which, in different parts, it is separated by the river Lune and its feeder the Rather, by the upper part of the Eden, of the Swale, and of the Maize, a feeder of the Tees: for a short distance on the north-east it is bounded by the county of Durham, from which it is separated throughout by the upper course of the Tees. It lies between 54° 10′ and 54° 42′ N. lat., and between 2° 9′ and 3° 10′ W. long.

The form of the county is irregular: the greatest dimension or length is from north-north-east to south-south-west, from the junction of the three counties of Cumberland, Westmoreland, and Durham, on the bank of the Tees, to the junction of Westmoreland and Lancashire, on the shore of Morecambe Bay, near the mouth of the Kent, a little more than 41 miles: the greatest breadth, measured at right angles to the length, is from Bowfell, on the border of Cumberland, to the county stone at the junction of the three counties, Yorkshire, Lancashire, and Westmoreland, 32 miles. The area of the county is estimated at 762 square miles; the aggregate areas of the several parishes are estimated at 485,990 acres, or rather more than 759 square miles: the population by the different enumerations of the present century was as follows:—1801, 41,617: 1811, 45,922; increase in ten years 10 per cent.: 1821, 51,359; increase 12 per cent.: 1831, 55,041; increase 7 per cent.: 1841, 56,469; increase 2·5 per cent. It is in area the twenty-ninth of English counties; in amount of population (according to the census of 1831, which we retain, in order to facilitate comparison), the thirty-eighth, being exceeded by all others, except Huntingdonshire and Rutlandshire; and in density of population by far the lowest of all, has only 72 inhabitants to a square mile; Cumberland, the county in this respect next above it, having 111 persons to a square mile. By the census of 1841, Westmoreland was surpassed in population by Huntingdonshire. Appleby, the county town, is in the northern part of the county, in 54° 34′ or 54° 35′ N. lat. and 2° 29′ W. long., 231 miles in a direct line north-north-west from the General Post-Office, London; 270½ miles by the road through Barnet, Hatfield, Biggleswade, Norman Cross, Stamford, Newark, East Retford, Doncaster, Abberford, Boroughbridge, Catterick, Greta Bridge, and Brough; or 286 miles by the Birmingham, Grand Junction, North Union, and Preston and Lancaster railways to Lancaster, and thence by coach-road through Kendal and Shap.

Surface and Geology.—Westmoreland is wholly mountainous. The eastern side is traversed by the great Pennine Chain, and the western side and the centre are occupied by the mountains of the Cumbrian group, which are separated from the Pennine Chain by the valley of the Eden.

The principal ridge of the Pennine Chain enters the county across its northern border just to the south of Cross Fell, and extends across Milburn Forest south-south-east through to the border of Yorkshire in Arkengarth Forest: [illegible] turns south-south-west, and runs, above Kirby [illegible]y of the Eden. On the west side of this ridge the mountains have a steep and almost precipitous descent into the valley of the Eden; on the east they extend a considerable distance, far beyond the boundaries of Westmoreland, subsiding more gradually into the wide valley or plain of the Tees, which occupies the south-east of the county of Durham and the north of Yorkshire. On each side of the ridge a number of transverse valleys are drained by small streams: those on the west side flowing into the Eden; those on the east forming the upper waters of the Tees, the Swale, and the Ure or Yore. The principal mountains of the Pennine Chain in Westmoreland, from north to south, are Dun Fell, Dufton Fell (flanked on the west by Dufton Pike and Knock Pike), Eagles' Chair, Scordale Head (flanked on the south-west by Murton Pike), Warcop Fell (which is flanked by Little Fell on the east and Roman Fell on the west), Middle Fell, Musgrave Fell, and Helbeck Fell, all north of the depression, through which the river Below passes. South of that depression are a number of summits grouped together, and forming the district of Arkengarth Forest, of which the Nine Standards (2136 feet high), Dowphin Seat, Brownber Fell, and Hugh's Seat, the last on the border of Westmoreland and Yorkshire, are among the principal. The northern part of the Pennine Chain is in Milburn or Milbourn Forest: the part near the bend where the range turns to the south-south-west is in Arkengarth Forest, which some make to be a part of Stainmoor Forest; and the southern part is in Swaledale Forest and Mallerstang Forest.

The principal ridge of the Cumbrian Mountains crosses the county from west to east, or, more accurately, it reaches the border of the county on the west side near Helvellyn (3055 feet high), which is just within the border of Cumberland, and runs south-east to Kirkstone Fell, at the head of the valley drained by the Coldrill, or Goldrill, otherwise the Hartsop Beck, which flows into Ulleswater: from Kirkstone Fell it runs east, or rather east by south, to the head of the valley of the Eden, on the eastern side of the county; by which valley, here very narrow, it is separated from the Pennine Chain. It may indeed be considered as united at the head of the valley of the Eden, in Mallerstang Forest, with the Pennine Chain. The ridge about midway between Kirkstone Fell and the valley of the Eden is divided into two parts by a depression through which the Lune passes. The principal mountains along the ridge are Grisdale Brow (988 feet high) and Dow Crags, between Helvellyn and Kirkstone Fell; High Street and Harter Fell, near the head of Kentmere; Birkbeck Fells and Hause Hill, near the head of Borrowdale; Jeffery's Mount, on the west side of the depression through which the Lune flows; Langdale Fells, on the eastern side of the depression; Green Bell, near the head of the Lune; and Wild-Boar Fell, in Mallerstang Forest, near the west side of the valley of the Eden. From each side of the ridge ramifications are thrown off, extending northward to the border of Cumberland, and southward to the border of Lancashire, or the shore of Morecambe Bay.

On the north side a principal branch is thrown off from the main ridge at High Street, a short distance east of Kirkstone Fell, of which branch Dod Hill, Place Fell, Aldsay Pike, Kidsty Pike, the peaks in Martindale Forest, and Swarth Fell are summits. This branch extends nearly to the bank of the Eamont, a principal feeder of the Eden, opposite Penrith; and forms, with that part of the main ridge which is between Helvellyn and Kirkstone Fell, and the part which is between Kirkstone Fell and High Street, a semicircle, having the upper part of the lake of Ulleswater embosomed in its centre. This lake, the upper part of which belongs wholly to Westmoreland, while its lower part is on the border of Cumberland and Westmoreland, is about seven miles long, with an average breadth of half a mile. Hodgson's 'County Survey' however runs the boundary-line of the two counties up the centre of the lake from Glencoin to Pooley Bridge. The upper part of the lake is in the valley of Patterdale, into which open other dales or valleys, including Glencairn or Glencoin, Glenridden, Grisdale, and Deepdale, which are formed by the short branches thrown off towards the lake by the semicircle of mountains which here surround it. Martindale opens at its northern end upon the south-east side of Ulleswater; it lies between the hills of Martindale Forest on the east, and a detached mountain or hill on the west. These dales are watered by mountain streams flowing into Ulleswater, from the lower extremity of which the Eamont flows. There are considerable remains in Patterdale and on the surrounding mountains of the woods which antiently covered the district; the trees are oak, ash, elm, birch, and alder.

From the main ridge near Birbeck Fells an important branch is thrown off in a north-east direction; but between this and the branch ridge, which has been described as parting from the main ridge at High Street, are two shorter branches separated from the High Street branch by the valley of Mardale; from each other by the valley of Swindale; and from the Birkbeck Fells branch by the valley of Wet Sleddale. These three valleys are drained by three streams which unite to form the Lowther, a feeder of the Eamont. The westernmost, flowing through Mardale, expands into the lake of Hawes Water, two miles long and from a quarter to half a mile wide. The stream which waters Wet Sleddale is the most considerable of the three.

The branch from the principal ridge of the mountains at Birbeck Fells is known in the part nearest the ridge as Shap Fell. It extends northward in several ridges, separated by intervening vales. Knipe Scar, and the hills of Shap Moor, Newby High Moor, Ravensworth and Meaburn Moors, and Colby Common, all belong to this branch. The intervening valleys have a general direction north and south, and the waters which drain them unite to form a stream which joins the Eden between Kirkby Thore and Temple Sowerby. Part of the hills which form this branch, including Oddendale Knab, Orton Scar, Asby Moor, Crosby Fell, Ash Fell, and Birk Fell, extend eastward in a direction parallel to the main ridge, from which they are separated by a valley watered by the Lune and its upper affluents.

The branches from the main ridge on the south side extend on the western side of the county a very short distance from the main ridge, subsiding in the valley of Grasmere, by which they are separated from a detached group of the Cumbrian Mountains, which occupies the western extremity of the county. These short branches are separated from each other by valleys opening into Grasmere, and drained by streams which flow into the upper part of Windermere. A branch somewhat longer than those just described extends between Ambleside and the Troutbeck to the shores of Windermere. Another branch, much longer, parts from the main ridge near High Street, and runs southward, across Applethwaite Common and Cleabarrow Heath, towards the mouth of the Kent, being bounded on the east by Kentdale or the valley of the Kent, and on the west by Windermere and the valley of the Leven. Near the principal ridge this branch has not much breadth, but as it advances southward it becomes broader, and is subdivided by the valleys drained by the Winster, the Witherslack brook, the Underbarrow, and other small streams, into parallel ranges of hills, including Cartmell Fell in Lancashire, and Whitbarrow Scar, Lyth Fell, and Underbarrow Scar in Westmoreland. Other branches from the main ridge, subdivided, like that just mentioned, into parallel ranges of hills, overspread that part of the county which lies between the Kent and the Lune. Of these branches one part, including the hills of Sleddale Forest and Potter Fell, separates from the ridge near Harter Fell, and extends between the valley of Kentmere, watered by the upper course of the Kent, and the valley of Long Sleddale, watered by the Sprint, a feeder of the Kent, southward to the junction of this feeder with its principal. Another part, of which Crow Brow and Tod Fell form part, extends southward on the east side of Long Sleddale, which it separates from another valley—that of Whinfell—watered by the Bannisdale or Mint, which joins the Kent just above Kendal. Other parts of this branch, comprehending the heights of Whinfell Common and Lambrigg Park, Hay Fell, Rowland Edge, and, more to the southward, Haverbrack Fell, Arnside Fell, Farlton Knot, and Hutton Roof Crags, extend southward between the Kent and the Lune into Lancashire; the parallel ranges of hills being separated by streams which join the Beelo, a feeder of the Kent. That part of the county which extends across the Lune eastward is occupied by Middleton Fell, Barkin, Barbon Fell, Barbon Beacon, Great Colm, Borwens, and Casterton Fell, all belonging to the group which separates Dentdale in Yorkshire from the lower part of Lonsdale, or the valley of the Lune, in Westmoreland and Lancashire.

The western extremity of the county is occupied by part of another group of the Cumbrian Mountains, separated from that part of the principal ridge which is between Helvellyn and Kirkstone Fell, by the valley of Grasmere, and from the Furness Fells of Lancashire by the valley of Little Langdale, and divided into two parts by the valley of Great Langdale. Langdale Pikes, Silver How, and Loughrigg Fell are between Grasmere and Great Langdale; and Bow Fell (2911 feet high), on the border of Westmoreland and Cumberland, and Wrey Nose, or Wrynose, form the western termination of the valleys of Great and Little Langdale, which are separated from each other by a ridge called Lingmire. Each of the three valleys is drained by a small stream; those which respectively water Great Langdale and Little Langdale unite in the tarn or lake of Elter Water, and afterwards receive a stream from Loughrigg tarn, adjacent to the south foot of Loughrigg Fell, so forming the Brathay; the stream which waters Grasmere receives streams from two tarns in the upper part of the valley, expands in the lower part of the valley into the two lakes of Grasmere and Rydal Water, and flows into the Windermere, forming the Rothay, which, with the Brathay just named, form the principal feeders of that lake.

Geologically the county may be regarded as consisting of three parts. The slate rocks of the Cumbrian Mountain group form the first part or division; the formations of the great carboniferous and mountain limestone series of the North of England, of which formations the Pennine Chain forms the western outcrop, constitute the second part or division; and the new red-sandstone of the valley of the Eden the third.

If a line be drawn in a south-easterly direction from the foot of Ulleswater, passing a little to the south-west of Shap and Orton, and thence to Ravenstonedale, at that place bending to the south till it reaches the border of the county at the point where the road from Sedbergh to Kirkby Stephen enters it: and if another line be drawn nearly at right angles to the former, commencing at Shap Wells, passing by the south side of Wardale Crags, and crossing the valley of Long Sleddale at the hamlet of Little London, the valley of Kentmere near the Hall, and the valley of Troutbeck a little above Town Head, and thence, skirting the southern flank of Wansfell, to Pool Wyke, near the north-west angle of Windermere;—the whole county will be divided into three irregular and unequal districts, each marked by peculiar geological features. We shall consider them in the following order:—

1. The green-slate and porphyry of the north-western district.

2. The upper slates of the south-east.

3. The carboniferous rocks of the north-east, and the new red-sandstone of the basin of the Eden.

1. *Green-Slate and Porphyry.*—This, the middle term of the series into which the Cumbrian slates have been divided, and overlying the lowest member of that series in the adjoining county (the Skiddaw Slate of Sedgwick) occupies the whole of the north-western portion of the county, and is bounded on the south by the range of a series of overlying beds of calcareous slates (Coniston limestone, &c.), and on the north-east by the carboniferous rocks. It comprehends two distinct classes of rock, igneous and aqueous, yet so blended and interjected that they must be considered as the effects of two distinct causes acting together and continued during a lengthened geological period. The igneous rocks include almost every variety of felstone and felstone-porphyry, occasionally pass into greenstone: they more rarely put on a columnar form like that of basalt. The aqueous rocks are composed of quartz in an extremely fine state of comminution, and obtain their typical colour from earthy chlorite derived from the Plutonic silts. All these rocks have, in a greater or less degree, a slaty structure, and from them the finest roofing-slates are quarried. The rocks of this division rise into the highest and most rugged peaks of the whole lake district, constituting the main ridge of the mountains west of High Street, those between Grasmere and Great Langdale, &c. The prevailing strike of the rocks is north-east, and they dip at a high angle to the south east. Garnets are found in [illegible] abundance in the brecciated rocks of this division, [illegible] and other minerals occur in the cellular [illegible] No organic remains have been discovered in [illegible] the group, the interruptions of igneous a[illegible] have been too frequent to permit the exis[illegible]

life. Metallic veins occur in some places; amongst others, a lead-mine is worked south-west of Ulleswater.

2. *Upper Slates of the South-Eastern District.*—This formation is divided by Professor Sedgwick (see 'Proceedings of Geol. Soc. Lon.,' 1832) into three ill-defined groups: 1, the fossiliferous rocks south of Kendal and of Kirkby Moor; 2, a lower group, like the former in lithological structure, but with a more decided slaty impress and fewer traces of fossils; 3, a complicated group of calcareous slates, alternating with hard coarse siliceous beds and several bands of fine roofing-slates, all resting on the fossiliferous limestone of Coniston. Mr. D. Sharpe, in a recent survey of this district, also separates this division of the slate rocks into three groups (see 'Proceedings of Geol. Soc. Lond.,' 1843), and seeks to identify them with the three principal groups of Mr. Murchison's Silurian System. Mr. Sharpe's division will be found in the following descending order on making a traverse from the south-east to the north-west; as, for instance, from Kirkby Lonsdale, where the uppermost beds underlie the old red-sandstone, to the Coniston limestone above Low Wood, at the head of Windermere. First, the Upper Ludlow rocks, occupying the greater part of the district between the lower parts of the Kent and Lune, succeeded by a band of Lower Ludlow rocks; next, a series of unfossiliferous beds (of considerable thickness when expanded in the district of Furness), which are provisionally named Windermere rocks, and are the assumed equivalents of the Wenlock formation; and, lastly, a series of slates (Kirkby Ireleth), grey slaty grits, blue flagstones, and Coniston limestone—the four last being the supposed equivalents of the Caradoc sandstone.

The Coniston limestone forms a well-defined though irregular base to this division of the slates on the north-west (this boundary being rudely marked by the line we supposed to be drawn from Shap Wells to Windermere Head). On the south and south-east it is bounded by Morecambe Bay and the carboniferous rocks, and it extends eastward as far as the border of the county, except where overlaid by the carboniferous series of Yorkshire. The rocks on the east bank of the Lune are separated from those on the western bank by an enormous fault, which ranges in the direction of that river. Middleton and the other Fells on the eastern side of the Lune are composed of the beds of the middle group of this division. The exact age of this upper division of the slates can only be ascertained by an appeal to the organic remains, which are sufficiently abundant in the first or uppermost, and in the third or lowest terms of the series. The rocks to the east of Kendal and those which break out beneath the western escarpment of the carboniferous limestone of Underbarrow Scar abound with Upper Silurian fossils, and the Coniston limestone is charged with Lower Silurian crustacean shells and corals. The middle term is unfortunately without organic remains, and in the absence of separating calcareous bands (Aymestry and Wenlock limestones), Professor Sedgwick's recommendation to separate the whole upper division of the slates of Westmoreland into two groups, an upper and a lower, seems to be as yet the safest plan.

These uppermost slates are harder than those of the lowest series, and give to the mountains formed of them a more angular and picturesque outline and rugged surface; but they do not in these respects equal the middle series of slate rocks, which form mountains of greater elevation and more picturesque character. The mountains formed by the uppermost slates rarely have a height of 1000 feet, being inferior not only to the middle slate mountains (Helvellyn, Langdale Pikes, &c.), but also to the limestone mountains of the Pennine Chain. Among the rocks of this uppermost division two varieties appear predominant: 'the highly fissile, nearly homogeneous variety, with little appearance of mica; and the granular sorts, some of which split with micaceous surfaces, while others contain disseminated mica. These micaceous rocks alternate frequently in vertical or inclined layers; and the coarse kind, incapable of cleavage, with less mica than usual, is observed to alternate, under the name of "galliard," with the homogeneous variety, which alone is worked for slate.' (Phillips, in *Geological Transactions*, 2nd series, vol. iii.)

Valuable flagstones are obtained from these rocks in many places, and copper is found in some parts of them.

3. *Carboniferous Rocks, &c.*—The inspection of any accurate geological map of the lake district will at once point to the fact that a mantle of carboniferous rocks has at one period continuously extended round the whole of the Cumbrian slates. On the north-east of the line we have supposed to be drawn from the foot of Ulleswater to Ravenstonedale, the belt of carboniferous rocks is still unbroken, and resting on the slates.

The mountain limestone occupies all the county north-east of the line of junction, except the valley of the Eden, which is chiefly occupied by the new red-sandstone; a small district between Appleby and Shap, where the limestone is covered by the coal-measures; and a portion of the county east of the upper valley of the Eden, where the limestone is covered by the millstone-grit and shale. The mountain limestone forms the mass of the Pennine Chain, attaining in Cross Fell, which is in Cumberland, but close upon the border of Westmoreland, a height of 2901 feet. The formations of the mountain limestone observed in this county are among the lowest in the series. Among them occurs a stratum of whin sill, or basalt, 60 feet thick. On the steep western escarpment of the Pennine Chain the subjacent beds of old red-sandstone appear, and even the slate rocks beneath the old red-sandstone. There is a remarkable cavern in the mountain limestone at Dunall, five miles from Dufton; and there are several lead-mines near Dufton, where antimoniated lead-ore, lead-ore with such a superabundance of sulphur as to take fire and burn on being held in the flame of a candle, and small quantities of malachite are obtained. Beautiful specimens of flos-ferri, or arragonite, of snow-white colour and satin-like lustre, and witherite, of clove-brown colour and striated texture, have been found in Dufton mine. There are copper-mines near Orton and Kirby Stephen.

The mountain-limestone has been said to rest commonly on the slates. On the western escarpment however of the Pennine Chain, from Cross Fell, 15 miles southward to Highcup, near Murton, the old red-sandstone or conglomerate intervenes, having a dip conformable to that of the limestone. It is observed also in the valley of the Lune near Orton, and lower down near Kirkby Lonsdale, and in the valley of the Mint and several other places near Kendal. It appears here in its common form of a coarse pudding-stone. The subjacent slate, which is coextensive with the old red-sandstone, forms a kind of broken under terrace along the escarpment, and is bounded on its west side by a narrow and irregular but nearly parallel line of greenstone. This small slate and greenstone district is distinguished by three lofty conical summits or 'pikes:' Knock Pike, the most northerly, is chiefly composed of greenstone; Dufton Pike, near Knock Pike, contains both greenstone and slate; and Murton Pike, the southernmost and the loftiest, appears to be almost entirely composed of slate. The line of junction and order of superposition of the greenstone and slate, if they have any order, have not been determined. Imperfect roofing-slate is dug on Langdon Moor, near Murton Pike, and at Middle Rig; and slate-pencils are obtained in several places. Granitic rocks are found in this district, and a species of granite used for fences is quarried near Dufton Pike. Shattered and confused portions of the coal-measures and of the mountain-limestone beds are observed to border the greenstone on the west for about three miles between Melmerby and Kirkland. The coal-seams, which are very thin, are often quite vertical, and the coal has been extracted by sinking perpendicularly downwards as in a well: but as the seams are soon lost, without any clue to lead to their recovery, the coal is now seldom worked.

The millstone-grit is found only on the eastern border of the county, covering the mountain limestone and forming the summit of Brownber Fell, Nine Standards, and Hanging Stones, in Askengarth Forest, in the Pennine Chain, on the east side of the valley of the Eden near its head; and of Wild-Boar Fell on the west side of the same valley, at the eastern end of the main ridge of the Cumbrian Mountains. In the coal-measures which rest on the mountain limestone between Appleby and Shap there are several coal-pits. This small coalfield is covered on its northern side by the new red-sandstone. There are some coal-pits at Helbeck near Brough.

On the southern side of the county the carboniferous limestone appears broken up by enormous faults into detached portions with wide valleys between them: one large mass, with several outliers, commences about two miles north of Kendal, and extends as far south as the shores of Morecambe Bay, resting on the Silurian rocks, with the interposition here and there of the old red-sandstone (Plumgarths, Laverock Bridge, &c.); opposite to its long south-western escarpment of Underbarrow Scar is another mass of limestone (Whitbarrow). The limestone at Kendal is extensively quarried for building purposes, and many of the beds polish into beautiful marble, which is in great demand for ornamental purposes. Another mass of limestone of some extent lies to the south-west of Kirkby Lonsdale.

The new red-sandstone is the most recent formation of this county, and fills all the lower part of the basin of the Eden, from near Brough to the shores of the Solway Frith. It usually appears here as a strong thick-bedded sandstone, and is much used as a building-stone. It rests upon the carboniferous rocks on its south-western side, and, spreading wide on both sides of the Eden, abuts against the upraised terrace of Cross Fell elevated by the great 'Pennine fault.' Immense masses of magnesian conglomerate may be seen at the bed of the Eden near Kirkby Stephen, containing water-worn and unabraded fragments of the mountain limestone and coal-measures. Gypsum is obtained in many parts of the saliferous district in Westmoreland.

Proofs of igneous action are abundant in many parts of this county, porphyritic dykes being found in various parts; there are five which may be observed not very far distant from the 'Shap Granite' in Wet Steddale, in the valley above High Barrow Bridge, on the crest of the hill from that place to Shap, and in two places farther north and near the roadside. But the well-known Shap Fell red porphyritic granite forms the largest portion of erupted rock in the county. It rises at the base of the upper division of the slates, and appears to have cut off the Coniston limestone for some distance; altering, tilting off at high angles, and indurating all the neighbouring rocks. The boulders from this granite are easily recognised, and are found to have travelled in one direction as far as the Yorkshire coast. They are seen resting at the height of several hundred feet above the level of the plain of Eden, against the steep sides of the great ridge of Cross Fell, and they have travelled down the valley of the Kent to Morecambe Bay. The mode of their transport, whether by water, or by ice, or by ice floating in water, is yet an unsolved problem in geological dynamics.

Hydrography and Communications. — The Pennine chain of mountains separates the waters which flow into the Irish Sea from those which flow into the German Ocean. Westmoreland is chiefly on the western side of the chain; but a small portion is on the eastern side of the ridge, and in this some of the upper waters of the Tees have their source. The Tees itself rises just beyond the northern border at the foot of Cross Fell, but its course as far as the fall at Cauldron Snout is on the border of Westmoreland. Its feeder the Maise, which joins it at Cauldron Snout, belongs to Westmoreland, rising in Milburn Forest in the north-eastern part of the county, and having its course within or upon the border. The sources of the Lon or Lune (which must not be confounded with the Lune described below), the Bauder or Baulder, the Greta, and its affluent the Barney, all belonging to the system of the Tees, are within or upon the border of Westmoreland. The Swale, which belongs to the system of the Ouse, has also its source on the border. But all these streams, which belong to the eastern slope of the Pennine Chain, have scarcely any part of their course in Westmoreland; as the ridge of that chain which determines the watershed lies very near if not close upon the eastern border of the county. Of the Tees about eight or ten miles belong to this county; the length of the Maise, which belongs wholly to it, is about the same; about four miles of the course of the Barney belong to Westmoreland; but of the other rivers scarcely more than a mile or two.

On the western side of the Pennine Chain the county is divided by the principal ridge of the Cumbrian Chain into two basins; the basin of the Eden on the north, and the basin of Morecambe Bay on the south, drained by the Kent, the Lune, and other streams, which flow into that estuary. The Eden rises on the border of Westmoreland and Yorkshire, on the side of Hugh's Seat, one of the mountains of the Pennine Chain. Its course for the first two miles is southward; it then abruptly turns to the north, and flows northward ten miles through a narrow valley enclosed between the Pennine and Cumbrian Mountains past Kirkby Stephen to about a mile from the village of Soulby, where it receives on the left bank a stream eight miles long, which rises at the foot of Wild-Boar Fell in Mallerstang Forest and waters Ravenstone dale. From the junction of this stream the Eden flows a mile north-east to Great Musgrave, and then turning north-west flows 15 miles through a valley or plain five or six miles wide past Appleby to the junction of the Crowdundale beck, which rises in the Pennine Chain near Dun Fell, and has a course of seven miles west-south-west along the border of Westmoreland and Cumberland into the Eden, which it joins on the right bank. From the junction of the Crowdundale the Eden flows two miles farther north-west, along the border of the county to the junction of the Eamont on the left bank, after which it quits Westmoreland altogether. Its course in this county is 30 miles; in Cumberland about the same; making a total of nearly 60 miles. No part of its course in Westmoreland is navigable.

Below the stream which joins it at Soulby, the Eden receives several other affluents. Those which join it on the right bank are the Beelah or Belay, seven or eight miles long, which waters Stainmoor (or Stanemoor dale); the Helbeck, a stream six miles long, which passes the town of Brough; the Troutbeck, ten miles long, which rises near Scordale head; and the Crowdundale, already noticed: all these rise in the Pennine Chain. On the left bank the Eden is joined by a stream six miles long from Little Ashby; a stream seven miles long from Great Ashby; by a third stream, the Leeth, eleven miles long, from the neighbourhood of Shap (which last receives the Lyvennet, eight miles long, from Crosby Ravensworth), and the Eamont, from Ulleswater, on the border of the county. The Coldrill or Hartsop beck, which rises in the Cumbrian ridge at the foot of Kirkstone, may be regarded as the true source of the Eamont: it flows into Ulleswater at its upper end, and the Eamont flows from the same lake at the lower end: the course of the Eamont is north-east along the border of Cumberland and Westmoreland: its total length from the source of the Coldrill, including Ulleswater, which is an expansion of it, is about 20 to 22 miles. About four miles above its junction with the Eden it receives the Lowther, formed by the junction of three becks or streams, which respectively water Wet Sleddale, Swindale, and Mardale: the length of the Lowther from the head of the Wet Sleddale beck, the longest of the three, is more than 16 miles. Haweswater is formed by the expansion of the Mardale beck. All the larger affluents of the Eden which join it on the left bank rise on the northern slope of the Cumbrian ridge.

The Lune, the Kent, the Winster, and the Leven drain the basin of Morecambe Bay. The Lune rises on the northern side of the Cumbrian ridge near the head of the stream, which joins the Eden at Soulby. Its course is northward for two miles, then westward for six miles through a valley formed by the Cumbrian main ridge on the south and the eastward prolongation of the branch thrown off from the main ridge at Birkbeck and Shap Fells on the north. The affluents of the Lune in this part are all small. A little south of Orton the river turns south, and flows 19 miles southward, partly in the county, partly on the border, to Kirkby Lonsdale, a little below which it quits the county to enter Lancashire. No part of its course of 27 miles in Westmoreland is navigable. Its tributary the Rather or Roatha rises in Westmoreland, then enters Yorkshire, and has the lower part of its course on the border of Yorkshire and Westmoreland.

The Kent rises at the foot of High Street in the Cumbrian ridge, and flows south by east about 10 miles through the valley of Kentmere to the junction of the Sprint at Burneside, a stream of nearly equal length which rises in the same ridge east of the Kent and drains the valley of Long Sleddale. This river joins the Kent on the left bank; and about a mile lower down the Kent receives on the same bank the Bannisdale or Mint beck, nine miles long, which drains the valleys of Bannisdale and Whinfell. From the junction of the Mint, the Kent flows 12 miles southward by the town of Kendal into Morecambe Bay. Its whole course of 23 miles belongs to Westmoreland: it is not navigable. Just at its mouth it receives on the right the Pool, formed by the junction of the Underbarrow and another stream; and on the left the Beelo, or Betha, which rises in the hills east of Kendal, flows southward parallel to the Kent, and joins that river by a sudden bend to the west near Beetham. The length of the Pool with the Underbarrow is about 9 miles; of the Beelo 14 miles.

The Winster, also called the Pool, rises in Westmoreland, and flows south, 10 miles, along the border of Westmoreland, and of Furness in Lancashire, into Morecambe Bay. The Leven, which flows out of Windermere, belongs to Lancashire; but the Rothay or Raisebeck, which drains the valley of Grasmere, the streams which drain the valleys of Great and Little Langdale, and the Troutbeck, which all flow into Windermere, and may be regarded as the upper waters of the Leven, belong to Westmoreland. Elterwater, Grasmere, Rydal Water, and some other small lakes or tarns, are connected with the streams which flow into Windermere. The position and dimensions of the lakes of Ulleswater and Haweswater have been given in speaking of the mountains, and the position of others has been noticed. Though Windermere has been described under LANCASHIRE as situated in that county, yet in Hodgson's 'County Survey' it is included in Westmoreland; and 'the Court Rolls at Lowther Castle describe the fisheries (which comprise all the lake) as held under the barony of Kendal by the payment of certain lord's rents, and they are also rated and pay to the relief of the poor in Westmoreland.'

For economical or commercial purposes the rivers and lakes of Westmoreland are of little importance; but in combination with the rugged mountains and the secluded valleys amid which they are found, they give to the county a high degree of picturesque beauty. The forms of the mountains, says Wordsworth, in his 'Scenery of the Lakes,' 'are endlessly diversified, sweeping easily or boldly in simple majesty, abrupt and precipitous, or soft and elegant. In magnitude and grandeur they are individually inferior to the most celebrated of those in some other parts of the island; but in the combinations which they make, towering above each other, or lifting themselves in ridges like the waves of a tumultuous sea, and in the beauty and variety of their surfaces and colours, they are surpassed by none.' The mountains are generally covered with turf, rendered rich and green by the moisture of the climate; forming in some places an unbroken extent of pasturage, in others laid partially bare by torrents and burstings of water from the mountains in heavy rains. Wood is not abundant: the want of timber-trees is particularly felt, but coppices are tolerably numerous. The trees are chiefly oak, ash, birch, and a few elms, with underwood of hazel, holly, and white and black thorns. Scotch firs, beeches, larches, and limes have been introduced of late years. Fern is commonly found on the mountains; heath and furze are found only in places.

The valleys are for the most part winding, and in many the windings are abrupt and intricate; the bottom of the valleys is for the most part formed by a comparatively spacious gently declining area, level as the surface of a lake, except where broken by rocks and hills that rise up like so many islands from the plain.

The small size of the lakes, as compared with those of Switzerland and even of Scotland, is favourable to the production of variegated landscapes, and their boundary-lines are either gracefully or boldly indented: in some parts rugged steeps, admitting of no cultivation, descend into the water; in others, gently sloping lawns and rich woods or flat and fertile meadows stretch between the margin of the lake and the mountains. The margin of the lakes is generally lined either with a fine bluish gravel thrown up by the water, or with patches of reeds and bulrushes; while the surface is variegated by plots of water-lilies. The disproportionate length of some of the lakes would, by making their appearance approximate to that of a river, injure their characteristic beauty, were not this effect prevented, especially in Ulleswater and Haweswater, by the winding shape of the lakes, which prevents their whole extent from being seen at once. The islands are neither numerous nor very beautiful. The water is remarkably pure and crystalline. What are locally termed tarns are small lakes, belonging mostly to small valleys or circular recesses. Loughrigg Tarn, near the junction of the valleys of Great and Little Langdale, is one of the most beautiful. The mountain tarns are difficult of access, and naked, desolate, and gloomy, yet impressive from these very characteristics.

The streams of Westmoreland are rather large brooks than rivers, with very limpid water, allowing their rocky or gravelly beds to be seen to a great depth. The number of torrents and smaller brooks, with their waterfalls and waterbreaks or rapids, is very great. The wide æstuary of the Kent presents at low-water a vast expanse of sands.

The lakes and tarns abound with various species of fish, as trout, eel, bass, perch, tench, roach, pike, char, and others. Sea-fish are also abundant on the shore of Morecambe Bay.

The principal coach-roads in the county are the mail-road from Lancaster (to which the mails are sent from London by railway), to Carlisle and Glasgow; and the road (formerly a mail-road) through Stamford, Newark, Doncaster, and Gretabridge, to Carlisle and Glasgow. The Carlisle mail-road enters the county on the south side, at Burton-in-Kendal, 11 miles from Lancaster, and runs northward by Kendal, Shap, and Brougham, to Penrith; before reaching the last-mentioned town it crosses the Eamont into Cumberland. The road by Newark and Gretabridge to Carlisle enters the county on the eastern side near the head of the Greta and of the Beelah, and runs north-westward by Brough, and Bondgate, a suburb of Appleby, to Brougham, where it joins the road just described. There is a second road from Lancaster to Kendal, through Milnthorpe, crossing the Kent at Levens Hall. Roads lead from Kendal south-westward to Ulverstone and Dalton-in-Furness; westward to Bowness and across Windermere by the ferry to Hawkshead, and Coniston-Water in Furness, and to Egremont and Whitehaven in Cumberland; north-westward by Ambleside to Keswick, Cockermouth, and Workington in Cumberland; north-eastward by Orton to Appleby, with a branch road to Kirkby Stephen and Brough; eastward to Sedbergh, Hawes, Askrigg, and Richmond, all in Yorkshire, with a branch from Sedbergh to Kirkby Stephen, and south-eastward by Kirkby Lonsdale to Settle, Skipton, Otley, and Leeds.

Westmoreland has no railways, and only one canal, the Lancaster Canal, the first act for which was obtained in 1792. This canal commences on the east of Kendal, at a height of 144¾ feet above the level of the sea, and runs southward with some bends by Burton in Kendal to Lancaster and Preston in Lancashire. Near Burton in Kendal it has a descent of 64 feet by eight locks. The canal passes through a tunnel one-third of a mile long at Hincaster Green, 5 or 6 miles south of Kendal, and is carried by an aqueduct bridge over the Beelo near Milnthorpe. About twelve miles of the canal are in Westmoreland.

Agriculture.—Although this county, from its mountainous nature, is more interesting in a picturesque than in an agricultural point of view, it contains some very fertile valleys, in which there are as many well-cultivated farms. The climate is mild and moist in the valleys: the high hills condense the clouds which come over the Atlantic, and cause frequent and abundant rains, which keep the pastures green, but are not so favourable to the ripening of the corn. Much snow often accumulates in winter. The greater part of the surface of this county, which is reckoned to contain 450,000 acres, is mountainous, and only fit for sheep-pastures or for plantations of timber-trees. Dr. Watson, late bishop of Llandaff, who was a native of this county, took much interest in the increase of woods, and made many calculations on the profits of planting, which appeared to offer great advantages to those who would engage in this speculation, and he showed a good example by making many extensive plantations on the sides of barren hills which he had purchased.

The soil in the valleys is mostly a dry gravelly mould, composed of different earths washed down from the hills, and forming a soil well fitted for the cultivation of turnips, of which great crops are raised on some well-managed farms. Towards the east and north of the county the soil is more inclined to clay; and, unless this be well drained, the land is too wet, in spring and autumn, to admit of clean and careful cultivation. Wherever the water has no sufficient outlet, basins of peat are formed; but these are not so extensive as they are in many other hilly countries, owing to the calcareous rocks which form the substratum of a great part of the hills, and which, being porous, prevent the accumulation of water, except in those parts where they form the lakes which make this county so interesting to travellers.

There were formerly a great many small proprietors in Westmoreland who were called *Statesmen*, that is, *Estatesmen*—men who held land of their own, either as freehold, or by a customary tenure, somewhat resembling copyhold, under some great landlord. With the exception of a fine or heriot on the death of a tenant or on alienation, they were held free. The proprietors of these very small farms were an independent set of men, who worked hard and lived frugally. They often joined the trade of weavers to that of farmers; and thus their whole time was usefully employed. The increase of wealth and consequent luxury gradually led to a greater expense of living than the small farms, imperfectly cultivated, could support; and these small proprietors gradually decreased, their farms being absorbed into the greater estates which surrounded them. The larger farms are now usually let on lease for various terms. In some old and many new leases the course of cropping is strictly laid down, which greatly hampers a good farmer in his wish to improve the cultivation. It is to be hoped that more liberal views may yet be taken by the present agents and proprietors, and a greater scope given to improvements. Draining the heavy lands has been of late years much attended to; and in no county is it more beneficial than in this, where the rains are so abundant that the evaporation from the surface of the soil can never keep it in a dry state, if the subsoil is retentive of moisture.

The implements of husbandry were originally very simple and not of the most improved forms, but increased communication by means of good roads, and the influx of visitors attracted by the beauty of the scenery, have contributed much to introduce every improvement on those farms which are the property of men of fortune and occupied by tenants who have sufficient capital. These however are not so numerous as it were to be desired for the improvement of the farms. A considerable portion of every farm is in pasture, which is rich in the valleys and fit for milch cows, moderate on the slope of the hills, and very poor on the mountains: some rough cattle are reared and many mountain sheep feed on the hills. These often suffer much from the severity of the winter; but as they cost little to keep, an occasional loss is not much thought of. Perhaps with a little more attention this might be avoided.

The old system of cultivation was very simple: when the pastures became mossy, owing to the wetness of the climate, they were ploughed up; one or two crops of oats were taken, after which they were well manured and sown with barley, then oats again, when the land was left to run to grass, which it did in about three years. It remained in pasture for five or six years longer, when it became mossy again, and was again broken up and ploughed as before. This alternate husbandry was not expensive; but by the introduction of turnips and clover in the rotation the land has been made to produce a much greater return, while it has been gradually improved; and by sowing good grass-seeds the produce has been much increased in value, while the herbage is more free from natural weeds.

From Kirkby Stephen to Brough and Appleby and thence to Temple Sowerby the soil is a deep sand, which in a dry country would be very unproductive; but which the moisture of the climate of Westmoreland renders more compact on cultivation. Turnips and potatoes grow well here, when plenty of manure is put on. Lime is a great improver of this soil, and fortunately abounds in the county. Near Kendal a great breadth of potatoes is planted for the supply not only of the immediate neighbourhood, but also of the adjacent counties, many thousand loads being annually sent into Lancashire and Yorkshire.

The heavy lands were generally cultivated on the old system of oats, barley, oats, which by the help of the manure raised from the pastures, and before improved rotations were introduced after draining and deep ploughing, was perhaps the most profitable course. The cultivation of heavy wet lands is so much more precarious than that of the lighter, that they have not had so much attention bestowed on their improvement as the light turnip soils. Of late these lands have been found susceptible of as great improvement, by thorough draining; the crops are found not only more abundant, but also more certain; and the inconvenience of not being able to plough and work these soils in spring is obviated by the perfect draining. When this system is more generally adopted on heavy soils, it will be found that the present disinclination of farmers to take farms on such soils will cease, and give place to the more antient predilection for heavy lands, which will bear wheat and beans with little exhaustion.

The cultivation of flax and hemp, which was very common formerly, has now been long discontinued, owing to the competition of the foreign growers: but if ever the present protection given to the growers of corn be removed by an alteration in the corn laws, the comparatively unprotected produce, such as flax and hemp and linseed, will no doubt draw the attention of the farmers again.

Grass-land being abundant and the climate favourable to pastures, a great portion of the soil is devoted to the maintenance of cattle. Good meadows let at a high rent, and are carefully manured with composts. Great crops of hay are made in favourable years, and, as those who keep horses generally hire a meadow to make hay of, it is seldom sold in the dry state. Young cattle are kept on inferior lands in summer, and have hay and straw in winter, with turnips where these are raised: a few are fatted at three years old, but most of them are sold to graziers in Yorkshire and Lancashire. Scotch cattle are purchased in September, at the great fair at Brough-hill, held in that month: they are wintered in coarse pastures and occasionally in straw-yards; the next year they are put on the best grass and are fit for the butcher in October. A few horses are reared, but not to any extent. The sheep are of a hardy kind, fit for the mountain-pastures; they are brought down to the valleys at the approach of winter and kept in the enclosed grounds till April. The folding of sheep on turnips is not so general as it ought to be, especially on the gravelly and sandy soils. The goodness of the farming may generally be judged of by the extent of land on which turnips are raised to be eaten on the land by sheep. The plantations are extensive in most parts of the county.

The bishop of Llandaff, as we mentioned before, made considerable plantations of oak, ash, elm, beech, sycamore, Scotch fir, and larch, which last have thriven best. Many ornamented cottages and small villas have been built on the borders of the several lakes; and men of talent and reputation have taken their temporary and some their permanent abode there. This has tended to improve the immediate neighbourhood more rapidly than would otherwise have been the case. Yet this improvement seldom extends far from the centre where it commenced; and much land remains unproductive, of which the value might be greatly raised by a judicious outlay of capital, either by planting or by cultivation. Draining can be effected at a small expense, where stone is so abundant: lime is cheap, and labour reasonable: with these means many a spot now covered with heath might present to the view of the traveller cultivated fields. If something should be lost in picturesque scenery, much would be gained in usefulness; and the intermixture of well-cultivated farms and barren rocks would not render the scene less interesting.

The fattening of hogs and the curing of bacon and hams are well understood in Westmoreland, and many hams are sent to other parts of the country. The breed is not large. The hogs are not made so fat as they are in some places; the hams are more delicate, and are very well cured and smoked. They are often sold as York hams, whereas the latter are much larger and fatter, the Yorkshire breed of hogs being large and fattening very readily. Although the curing of hams is tolerably well understood in most places, it may be useful to state the mode in which they are cured in Westmoreland. They are rubbed over very hard with bay-salt, and laid in a stone or leaden trough. Every third or fourth day they are turned and rubbed with the brine which has run out, and with fresh bay-salt mixed with a little saltpetre. A more modern and generally used plan is to lay the hams on an inclined plane after covering them with bay-salt, and to allow the brine to drain off into a vessel placed to receive it. Some add treacle or brown sugar, which gives a peculiar flavour. In three weeks they are fit to be hung in a wide chimney, where wood is burned on the hearth. Saw-dust kept burning slowly without flame is as good as wood to smoke and dry the hams. When they are sufficiently dry they are sewn up in coarse linen cloths, and packed in hogsheads or put into sacks. They lose 20 per cent. of their weight in curing and drying.

There are weekly markets in several towns, but the most considerable are those of Kendal and Appleby.

There are fairs in the following places:—*Ambleside*, Wednesday in Whitsun week, October 29; *Appleby*, Whitsun week, June 10; Brough, 2nd Thursday in March, 2nd Thursday in April, Thursday before Whitsuntide; Borugh-hill, September 30, October 1; Kendal, March 22, April 29, November 8 and 9; Kirkby Lonsdale, October 5, Holy Thursday, St. Thomas's day; Kirkby-Stephen, 1st Monday before March 20, April 25, Midsummer-day, September 30, October 27; Milnthorpe, May 12, October 17; Orton, May 3, Friday before Whitsunday, 2nd Friday after Old Michaelmas-day; Temple-Sowerby, last Thursday in February, March, October, 2nd Thursday in May.

Divisions, Towns, &c.—The name of Westmoreland is commonly taken to be derived from its physical character and position—the West Moor-land; and to this derivation of the name there seems no solid objection, though Messrs. Nicolson and Burn, in their history of Westmoreland and Cumberland, demur to it, on account of the older form of the name being always Westmerland, and its Latinized form Westmeria or Westmaria. In the Saxon Chronicle, where it is mentioned A.D. 966, it is called Westmoringaland. The county is divided into two baronies—the barony of Kendal, which appears to have been antiently a part of Lancashire, and comprehended, so late as the time of Henry VIII., several places now in Lancashire; and the barony of Westmoreland—sometimes called the barony of Appleby, sometimes the bottom of Westmoreland—which now comprehends some places formerly included in the barony of Kendal. Of Westmoreland, under that name, there is no notice in Domesday, nor any survey of the barony of Westmoreland; but many places in the barony of Kendal, and some adjacent places in Lancashire and Yorkshire, are mentioned. There was a sheriff of Westmoreland as early as the reign of Henry II., but the barons of Kendal contested his right of jurisdiction in their barony. The earldom of Westmoreland was created by Richard II., in favour of Ralph Nevill of Raby. Some county antiquaries have thought that there are notices of an earldom of Westmoreland about the time of the Conquest. There is some diversity in the customs of inheritance in the two baronies of Kendal and Westmoreland: in other respects the division into baronies is little used.

Another division is into four wards, which, with their areas, relative position, and population in 1831, are as follows:—

Name of Ward.	Position.	Area in Acres.	Population in 1831.
East ward . .	N.E.	182,080	14,455
Kendal ward .	S.W.	147,440	27,252
Lonsdale ward .	S.E.	38,350	5,440
West ward . .	N.W.	118,120	7,894
		485,990	55,041

The town of Kendal is included in Kendal ward. Kendal and Lonsdale wards are in the barony of Kendal; the East and West wards in that of Westmoreland. This latter barony had antiently three wards—East, Middle, and West; but the Middle ward has been divided between the other two.

Westmoreland has no city; it contains the county-town of Appleby, the parliamentary borough of Kendal, and the market-towns of Ambleside, Brough, Burton in Kendal, Kirkby Lonsdale, Kirkby Stephen, Milnthorpe, Orton, and Shap. Appleby is described elsewhere. [APPLEBY.]

Kendal, more accurately Kirkby Kendal, or Kirkby in Kendal, *i. e.* the kirk or church town in the dale or valley of the Ken or Kent, is in Kendal ward, 263 miles from the General Post-Office, London, viz. 241 miles by railway to Lancaster, and thence by coach 22 miles. It was made a market-town by licence from Richard I., and became, by the settlement of the Flemings, in the reign of Edward III., the seat of a considerable manufacture of woollen cloths (which took from the town the name of Kendals), and continued to be so down to quite modern times: indeed the woollen manufacture is not quite extinct even now. The town was incorporated in 1576 by Queen Elizabeth. Before the turnpike-road was made in 1752, nearly two hundred pack.horses were employed weekly, some of them making two journeys in the week, in bringing provisions and merchandise to the town, or in taking away its manufactures; besides two waggons twice a week from Lancaster, carrying in all about sixty horse-loads, and two or three carts making several journeys, and carrying altogether about forty horse-loads weekly between Kendal and Millthorpe. The parish of Kendal, which extends into Lonsdale ward, has an area of 68,360 acres, and is divided into twenty-seven townships or chapelries, each separately maintaining its own poor; the population of the whole parish in 1831 was 17,564. The parliamentary borough comprehends the two townships of Kirkby Kendal and Kirkland, and such parts of the township of Nether Graveship as are adjacent to the township of Kendal. The statistics of the three townships in 1831 were as follows:—

	Houses.				Families employed in				
	In-hab.	Unin-hab.	Build.	Total.	Agri-culture.	Trade, &c.	All others.	Total.	Per-sons.
Kirkby in Kendal	2092	15	3	2110	67	1538	546	2151	10,015
Kirkland . . .	289	49	..	338	2	230	70	302	1,250
Nether Graveship	63	3	..	66	6	33	24	63	312
	2444	67	3	2514	75	1801	640	2516	11,577

This statement does not exactly give the statistics of the parliamentary borough, since it includes a portion of the township of Nether Graveship which is not comprehended in the borough, and which we have no means of distinguishing. The difference however is not of great importance.

The town is chiefly on the slope of a hill rising from the right or western bank of the river Kent; one principal street runs nearly parallel to the course of the river, over which are three stone bridges; another principal street branching from this leads to Stramongate bridge, the northernmost of the three bridges. The streets are macadamised, and lighted with gas; the houses in the principal streets are generally good, built of limestone and roofed with blue slate; many of those in the narrow streets or lanes opening into the main streets are old houses, of rough stone plastered. The church, dedicated to the Holy Trinity, stands near the south end of the town, in Kirkland township; it is chiefly of late perpendicular character, and of poor workmanship, remarkable for its unusual width, which is 110 feet, as compared with the length—140 feet; the nave has four aisles, and terminates at the east end in five divisions—one the chancel, the other four chapels. There is a low engaged tower. The church contains a wooden ceiling of tolerable workmanship, and a little screen-work. There are—a church or chapel of ease (St. George's) handsomely rebuilt in 1841 on a new site on the eastern bank of the Kent, another church (St. Thomas's) erected in 1837, several dissenting meeting-houses, and a Roman Catholic chapel; a town-hall, a house of industry, and a house of correction. A small portion of the town is on the east or left bank of the river Kent, and on the same side are the ruins of the old castle of the barons of Kendal, consisting of the outer wall, with two round and two square towers. The Castle-how, or Castle Law Hill, an antient earthwork, is on the west side of the town, opposite the castle. It consists of a circular mound, having a ditch and rampart round its base, and a shallow ditch and a breast-work surrounding its flat top, on which is an obelisk erected in commemoration of the Revolution of 1688.

Considerable manufactures are carried on at Kendal: they gave employment in 1831 (in the three townships) to 677 men, besides women and children; the articles made were cotton checks, kerseys and other woollens, linsey, blanketing, fancy waistcoating, carpets, girths, hosiery, sacking, and worsted. The market is on Saturday, for corn and provisions, and is the only market of consequence in the county; there are three yearly fairs for horses, horned cattle, and sheep, and a statute-fair for hiring servants.

The corporation under the Municipal Reform Act has six aldermen and eighteen councillors, with a commission of the peace; the parliamentary limits have been adopted for municipal purposes, and the borough is divided into three wards. Quarter-sessions are held, and petty sessions weekly; and there are a civil court which takes cognizance of actions from 40*s*. to 40*l*., and a Court of Requests for debts under 40*s*. The corporation has a revenue of nearly 500*l*. a year from quit-rents and freehold land and houses, besides several wharfs on the canal; it has also considerable property in trust for charitable uses.

Kendal was made a parliamentary borough by the Reform Act; it returns one member. The number of voters in 1835-6 was 354; in 1839-40 it was 351: showing a decrease in four years of 3.

The living of Kendal is a vicarage, of the clear yearly value of 600*l*., with a glebe-house: the vicar presents to the perpetual curacy of St. George, which is of the clear yearly value of 200*l*. Thirteen of the townships in the outpart of the parish constitute distinct chapelries, and there is another chapel (Burneside) in the parish: with two exceptions, the vicar presents to the perpetual curacies of these chapels. The parish is in the rural deanery of Kendal, in the archdeaconry of Richmond, in the diocese of Chester.

There were, in 1833, in the three townships composing the borough, an infant-school with 90 children; three dame-schools, or other schools for children quite young, with 66 children of both sexes; thirty-five other day-schools, with 1212 scholars, namely, 285 boys, 330 girls, and 597 children of sex not distinguished in the return; giving a total of 1368 children, or between one in eight and one in nine of the population, under daily instruction. There were besides 12 persons under instruction in the evening. One of the day-schools, with 12 boys, was a free grammar-school; two others, with 67 boys, were maintained wholly or partly by endowment or subscription; and two others, with 145 boys and 172 girls, were national schools, partly supported by endowment and subscription, and were Sunday-schools also. There were, besides these, nine Sunday-schools, with 799 children; making a total of 1114 children, or less than one in ten of the population, under instruction on Sundays.

In the outparts of the parish were twenty-four day-schools of all kinds, with from 725 to 735 children, namely, 279 boys, 157 girls, and from 289 to 299 of sex not distinguished in the returns; giving nearly one in eight of the population under daily instruction: there were also eight Sunday-schools, with 442 scholars, namely, 224 boys, 173 girls, and 45 of sex not distinguished in the returns; giving about one in thirteen or fourteen under instruction on Sunday.

The Easter, Michaelmas, and (by adjournment) the Epiphany sessions for the county are held at Kendal, and the town is one of the polling-stations for the county.

Ambleside is in the chapelry of Ambleside, which is partly in Windermere, but chiefly in Grasmere parish, both in Kendal ward, 14 miles north-west of Kendal, and 277 from the General Post-Office, London, by railway to Lancaster and thence by coach through Kendal. Camden notices that there were here the traces of an antient town, with the remains of a fort evidently Roman: and that Roman medals and other antiquities had been dug up here: there are now few if any traces of the town and fort. The chapelry had, in 1831, 194 houses, namely, 180 inhabited, 13 uninhabited, and 1 building, with a population of 213 families, or 1095 persons, nearly one-half agricultural. The town lies in a beautiful valley near the upper end of Windermere Lake, and on the left or east bank of the little river Rothay, or Raisebeck. The town is laid out in a rambling irregular manner, which however combines with the peculiarities of its situation to impart to it a more picturesque character. 'No two houses are alike either in form or magnitude,' and the flatness of their roofs and the simplicity of their whole structure give to the place somewhat of the appearance of a Swiss village. The streets are not paved. The chapel is in the highest part of the town, and is a plain, but neat, commodious, and substantial building, rebuilt in 1812. Ambleside is a place of considerable resort for visitors to the lakes of Cumberland and Westmoreland, and has some good inns. The market, which is chiefly for provisions, is on Wednesday; and there are two yearly fairs for cattle and general merchandise: the principal one, held in October, is called the tip (*i.e.* tup) fair. The population returns for 1831 do not give any account of manufactures here, but the authorities somewhat earlier mention a manufacture of linsey woolseys: probably it had been given up before 1831. The living is a perpetual curacy, of the clear yearly value of 80*l*., in the parish of Grasmere, in the rural deanery of Kendal, in the archdeaconry of Richmond, in the diocese of Chester. There were in the chapelry, in 1833, seven day-schools of all kinds, with from 208 to 213 children, namely, from 35 to 40 boys, 20 girls, and 153 children of sex not stated. The boys were in the free grammar-school, which was endowed. There were two Sunday-schools, with 108 scholars, namely, 40 boys and 68 girls. Of the population, nearly one in five was under instruction in the week, and one in ten on the Sunday.

Brough, or Burgh-under-Stainmoor, is in the East ward, 262 miles from the General Post-Office, London, by the ex-mail road to Carlisle and Glasgow, or 28 miles north-east of Kendal, and 291 from London by railway to Lancaster and from thence through Kendal. Many Roman coins have been dug up, and some antiquaries have identified the place with the Roman station Verteræ of Antoninus. The town had antiently a castle, which was, together with the town, taken and sacked by King William of Scotland in A.D. 1174. The castle was ruined by an accidental fire A.D. 1521, but was repaired by Anne, countess-dowager of Pembroke, Dorset, and Montgomery, A.D. 1660. Its remains stand on an eminence, in the midst of what is supposed to have been the Roman station. The chief parts still standing are some portions of the keep and some other towers: the keep is, in its general form and appearance, similar to those of the Tower of London, Rochester Castle, &c. The whole parish has an area of 22,650 acres, and had, in 1831, a population of 1882, besides those contained in Kaber township, which was partly in Kirkby Stephen parish and was included in the Kirkby Stephen return. The township of Brough, in which the town stands, had, in 1831, 191 houses, namely, 181 inhabited, 8 uninhabited, and 2 building, with a population of 212 families, or 966 persons. The town is divided by the Helbeck, a small feeder of the Eden, into two parts, respectively designated Market Brough and Church Brough, the former on the north, the latter on the south side of the stream: the houses are plain, but tolerably commodious. The church is large, but of poor architecture, mostly of late perpendicular character: it has a square embattled western tower, and in the windows is some antient stained glass. There are meeting-houses for Methodists and Independents. The market is on Thursday, but is of little importance. There are two great cattle-markets yearly, and two yearly fairs, one of which, called Brough-hill Fair, is held on a common two miles from the town, near the Appleby road, and is a great fair for cattle, horses, wearing apparel, and hardware. There are coal-pits and lead-mines in the parish: the coal-pits employed 63 men in 1831. The living is a vicarage, of the clear yearly value of 492*l*., with a glebe-house, in the rural deanery of Westmoreland, in the archdeaconry and diocese of Carlisle. There is a chapel at Stainmoor in the parish, the perpetual curacy of which is of the clear yearly value of 119*l*. There were in the whole parish, in 1833, nine day-schools of all kinds, with 302 scholars, namely, 115 boys, 62 girls, and 125 children of sex not stated in the return; giving nearly one in six of the population under daily instruction. One of the day-schools was also a Sunday-school, and there were four other Sunday-schools: the whole contained 193 scholars, namely, 25 boys, 30 girls, and 138 children of sex not stated; giving rather more than one in ten of the population under instruction on Sunday.

Burton in Kendal is in Lonsdale ward, in the southern part of the county, near the border of Lancashire, 252 miles from the General Post-Office, London, chiefly by railway, on the road from Lancaster to Kendal, about 11 miles from each of those towns. The parish has an area of 9170 acres, and extends into Kendal ward, and into the hundred of South Lonsdale in Lancashire: the population, in 1831, was 1931. The township of Burton in Kendal, in which the town stands, had, in 1831, 167 houses, namely, 152 inhabited, 14 uninhabited, and 1 building, with a population of 156 families, or 733 persons. The town is well built, and has a respectable appearance, although many of the houses are old: there is a good market-place, with a stone cross in the centre. The church is an old building of plain architecture, with a square tower: there is a meeting-house for Independents. There are some manufactures of linen and canvas in the parish, which employed, in 1831, 44 men in the township of Holme adjacent to Burton in Kendal township: 18 men were employed in manufacture, probably of the same kind, in Burton township. The market, held on Tuesday, was said to be, sixty or seventy years ago, the greatest corn-market in the county: it is now of less importance. There are one or two yearly fairs. The living is a vicarage, of the clear yearly value of 199*l*., with a glebe-house, in the rural deanery of Kendal, in the archdeaconry of Richmond, in the diocese of Chester. The perpetual curacy of the chapel of Preston Patrick in the parish is of the clear yearly value of

78*l*. There were in the whole parish, in 1833, nine day-schools of all kinds, with 237 scholars, namely, 36 boys, 37 girls, and 164 children of sex not stated in the return; giving about one in eight of the population under daily instruction. There were also four Sunday-schools, with from 182 to 192 scholars, namely, 55 boys, 57 girls, and from 70 to 80 children of sex not stated; giving about one in ten of the population under instruction on Sunday.

Kirkby Lonsdale (*i.e.* church-town in the dale or valley of Lon or Lune) is in Lonsdale ward, 256½ miles from the General Post-office, by railway to Lancaster; 15½ miles north-east of Lancaster, and 11½ south-west of Kendal. The parish has an area of 33,760 acres, and had, in 1831, a population of 3949. Kirkby Lonsdale township has an area of 2980 acres: there were in the township, in 1831, 341 houses, namely, 323 inhabited and 18 uninhabited; with a population of 332 families, or 1686 persons: about one-fourth of the population was agricultural. The town is on the right or west bank of the Lune, over which is an antient stone bridge: it consists of several streets, the three principal meeting in the market-place in the centre: the streets are lighted, but not paved. The houses are well built of freestone and roofed with slate. The church is large, 120 feet long and 102 feet broad, divided into four aisles or portions by three rows of pillars; it contains some antient portions amid many alterations, and has a square tower sixty-eight feet high, with a peal of six good bells. There are two or three meeting-houses for dissenters. There is a small manufacture of canvas and linens, which gave employment, in 1831, to about 18 men. The market is on Thursday, and there are three yearly fairs, two for cattle and one for woollen cloth. The living is a vicarage, of the clear yearly value of 250*l*., with a glebe-house, in the rural deanery of Kirkby Lonsdale, in the archdeaconry of Richmond, in the diocese of Chester. There are five chapels in the parish, to the perpetual curacies of which, having each a clear yearly value of from 66*l*. to 85*l*., the vicar presents. There were in the whole parish, in 1833, fifteen day-schools of all kinds, with from 471 to 481 scholars, namely, 222 boys, 159 girls, and from 90 to 100 children of sex not stated in the return; giving nearly one in eight of the population under daily instruction. There were eleven Sunday-schools, with 544 scholars, namely, 231 boys, 273 girls, and 40 children of sex not stated in the returns; giving nearly one in seven of the population under instruction on Sunday.

Kirkby Stephen is in East ward, 279½ miles from the General Post-office, London, by railway to Lancaster, from which town it is distant 38½ miles north-north-west; it is 23½ miles north-west of Kendal. The parish of Kirkby Stephen (with that part of the township of Kaber which extends into Brough parish, but is included with Kirkby Stephen in the population return) has an area of 31,870 acres, and had in 1831 a population of 2798: the township of Kirkby Stephen had, in 1831, 252 houses, namely, 239 inhabited, 12 uninhabited, and 1 building; with a population of 311 families, or 1409 persons: a very small portion of the population of the township was agricultural.

The town is on the left or west bank of the Eden, and consists principally of one street running nearly north and south, parallel to the river, neither paved nor lighted. The houses are generally pretty good. The church is on the east side of the principal street, and is a large antient building with a square tower. There is a modern market-house. Kirkby Stephen has no manufacture; but there are copper and lead mines in the parish, and slate-quarries and coal-pits, which give employment to a few men. The market is on Monday for corn, flour, oatmeal, and provisions: there are several yearly fairs or great markets for cattle, horses, blankets, and woollen and cotton goods; and two statute-fairs for hiring servants. The living is a vicarage, of the clear yearly value of 356*l*., with a glebe-house, in the rural deanery of Westmoreland, in the archdeaconry and diocese of Carlisle. There are chapels at Mallerstang and Soulby in the parish, the perpetual curacies of which are of the clear yearly value of 64*l*. and 78*l*. respectively. There were in the whole parish, in 1833, fourteen day-schools, with from 367 to 372 scholars, namely, 149 boys, 82 girls, and from 136 to 141 children of sex not stated in the return; giving two in fifteen of the whole population under daily instruction. There were three Sunday-schools, with 174 scholars, namely, 100 boys and 74 girls; giving one in sixteen of the population under instruction on Sundays. Several of the schools have small endowments.

Millthorpe, Milthorpe, or Milnthorpe, is in Heversham parish, in Kendal ward, 256½ miles from the General Post-office, London, by railway to Lancaster; 15½ miles north of Lancaster, and about 8 south of Kendal. Heversham parish has an area of 19,350 acres, and had, in 1831, a population of 4162: the township of Millthorpe with Heversham has an area of 2590 acres; there were, in 1831, in the township 298 houses, namely, 280 inhabited and 18 uninhabited; with a population of 288 families, or 1509 persons: about a third of the population was agricultural. The town stands on the north bank of the river Beelo, and consists chiefly of one long street running from east to west, nearly parallel to the river, over which, at the lower end of the town, is a bridge of one arch. The houses are many of them neat, some of them handsome. The church of Heversham is about a mile north of the town: it was rebuilt after a fire in A.D. 1601: there are an episcopal church or chapel, and an Independent meeting-house in the town. Millthorpe is a member of the port of Lancaster: small vessels by the help of the tide get up the river to the town. There are some manufactures of worsted and woollens: these branches of industry, in 1831, employed 38 men in the township and 45 in other parts of the parish. There are (or were a few years since) flax and paper mills. The market is on Friday, and there are two yearly fairs for cattle. The living of Heversham is a vicarage, of the clear yearly value of 516*l*., with a glebe-house, in the rural deanery of Kendal, in the archdeaconry of Richmond, in the diocese of Chester: the perpetual curacy of the chapel at Millthorpe is in the gift of trustees; its value was not returned. There were in the whole parish, in 1833, twenty-three day-schools of all kinds, with about 800 scholars, namely, 409 boys and 314 girls, and 77 children of sex not distinguished in the returns; giving nearly one in five of the population under daily instruction. There were two Sunday-schools, and three of the day-schools were Sunday-schools also: the whole contained 380 scholars, namely, 183 boys, 142 girls, and 55 children of sex not stated; giving one in eleven of the population under instruction on Sundays.

Orton (antiently Scar Overton) is in the East ward, 277 miles from the General Post-office, London, by railway to Lancaster, and then through Kendal, from which town it is distant 14 miles north-north-west. The parish has an area of 24,430 acres. There were in it, in 1831, 309 houses, namely, 295 inhabited, 11 uninhabited, and 3 building, with a population of 311 families, or 1501 individuals. These returns include a small portion of Shap and Kendal parishes. We have no means of determining what part of the population was in the town or its immediate neighbourhood; but from two-thirds to three-fourths were agricultural. The town consists chiefly of one irregular street, neither paved nor lighted. The church, which is on the north side of the town, is an antient building with a low embattled tower: it contains a monument to Dr. Richard Burn, vicar of the parish, author of the 'Justice of the Peace' and 'Ecclesiastical Law,' and one of the authors of the 'History of Westmoreland and Cumberland.' A small manufacture of canvas and linen is carried on in the parish; it employed about ten men in 1831. The market, which is of little importance, is held on Friday; there is a yearly fair, and a fair or great market is held on Friday, once a fortnight from after Whitsuntide to the feast of St. Simon and St. Jude. There are the remains of a beacon, and of an old fort or encampment, a large tumulus, and some other antiquities in the neighbourhood. The living of Orton is a vicarage, of the clear yearly value of 192*l*., with a glebe-house, in the rural deanery of Westmoreland, in the archdeaconry and diocese of Carlisle. There are no episcopal chapels in the parish, but there is a Methodist meeting-house. There were in the parish, in 1833, five day-schools, with 230 scholars, namely, 92 boys, 53 girls, and 85 children of sex not stated in the return; giving about two in thirteen of the population under daily instruction. Three of the schools (one of them a grammar-school with 52 boys and 25 girls) had small endowments. There was one Sunday-school with 75 scholars, namely, 35 boys and 40 girls; giving one in twenty of the population under instruction on Sunday.

Shap (antiently Hep or Heppe) is in the West ward, 279 miles from the General Post-office, London, by railway to ster; and 16 miles north by west of Kendal. There ntiently in this parish a Premonstratensian abbey, ed originally at Preston in Kendal (now Preston k, a township in the parish of Burton in Kendal) by as, son of Gospatric or Cospatric, not in the reign of I., as stated by Nicolson and Burn, but in the reign ry II., as stated by Tanner and Dugdale. This abbey moved in the lifetime of its founder to the secluded of Wet Sleddale, in the parish of Shap, watered by one streams that form the Lowther. The yearly revenues abbey at the dissolution were 166*l.* 10*s.* 6½*d.* gross, *l.* 17*s.* 7½*d.* clear. Some picturesque ruins of this still remain on the west bank of the stream. The itual church has been very spacious, and was built ry durable freestone. The tower and some fragments chancel remain, and the foundations of the cloisters ie offices, many of them vaulted underneath, may seen. The parish, including part of the chapelry rdale, has an area of 27,770 acres. There were, in 198 houses, namely, 190 inhabited and 8 unin-d, with a population of 203 families, or 1084 persons: e, 8 houses (6 inhabited and 2 uninhabited), 6 fami-id 23 persons were in the chapelry of Mardale; but re no means of ascertaining what proportion of the ider belonged to the town and its immediate neigh-iod: two-thirds of the whole population were agri-l. The town consists of one long street, extending the mail-road from Lancaster by Kendal to Carlisle asgow. The church is on the east side of the town, tains some antient parts amid many alterations. is a chapel in Swindale, in the parish. The market, is small, is held on Monday; and there is one yearly cattle and pedlery: there are some limestone and uarries. The living is a vicarage, of the clear yearly of 73*l.*, with a glebe-house: the vicar presents to the ial curacies of Mardale and Swindale chapels, the yearly value of which is 76*l.* and 56*l.* respectively. were in the whole parish, in 1833, two day-schools, scholars, namely, 13 boys, 7 girls, and 39 children not stated in the returns; giving only 1 in 18 of the tion under daily instruction. There were no Sun-iools.

sions for Ecclesiastical, Legal, and Parliamentary es.—The county is divided between the dioceses of and Chester; the East and West wards, constitut- antient barony of Westmoreland, form the rural y of Westmoreland, in the archdeaconry and dio- Carlisle: Kendal and Lonsdale wards are included rural deanery of Kendal, in that part of the archdea-of Richmond which is in the diocese of Chester; ie exception of Kirkby Lonsdale parish and its ent chapelries, which are included in the rural y of Kirkby Lonsdale, in the same archdeaconry and . Both the rural deaneries of Kendal and Kirkby le comprehend several parishes in the county of ter. The number of parishes in the county is com-ely small, being only thirty-two; but as many of ishes, from their great extent, which averages more ,000 acres, or nearly 24 square miles each, and rises instances (Kirkby Stephen and Kirkby Lonsdale) e 30,000 acres, and in one instance (Kendal) to near acres, have been divided into chapelries, the num-ecclesiastical charges is much greater, as the follow-le shows:—

I. DIOCESE OF CARLISLE.

Archdeaconry of Carlisle.

s.	Parishes.	Rec-tories.	Vicar-ages.	Perpet. Curacies.	Chapelries.	Total of Eccl.Charges.
ore-	25	13	11	10	2	36

II. DIOCESE OF CHESTER.

Archdeaconry of Richmond.

. .	6	2	4	23	1	30
dale	1	.	1	6	.	7
	7	2	5	29	1	37
the ty	32	15	16	39	3	73

ceses of Carlisle and Chester are both in the eccle-l province of York, in which consequently the whole is included.

The county is included in the northern circuit. The assizes are held at Appleby. The Epiphany and Midsummer quarter-sessions for the county are held at Appleby, the former being always adjourned to Kendal; the Easter and Michaelmas sessions at Kendal. There is a county gaol and house of correction at Appleby; and a county house of correction at Kendal.

The prison at Appleby is inconveniently and insecurely placed at the base of a hill which has been partly cut away to afford space for its erection. It was erected in the latter half of the last century; and many alterations have been made, so that it is now a mass of buildings so irregular as to render any effective system of discipline almost impracticable. From its situation the free circulation of air is obstructed and damp is generated: it is destitute of a boundary-wall, and is overlooked from without, so as to admit of communication with the prisoners. It comprehends four day-rooms; twenty-one cells for felons or misdemeanants; two refractory cells, a condemned cell, and five sleeping-rooms for debtors; with chapel, airing-yards, and apartments for the keeper. There are a tread-mill, crank-mills, and dressing-machines, for the employment of the prisoners. The prison is described by the inspectors as being clean and orderly. The number of prisoners is usually small, from fourteen to eighteen or nineteen; and they are not commonly of a very bad description, though the large cattle-fairs at Appleby and Brough Hill bring practised thieves from London and Glasgow. A majority are uneducated; a third part are unable to read or write, and those who can do so are commonly very ignorant on religious subjects.

The prison at Kendal is on a rising ground at the northern extremity of the town, and is surrounded by a boundary-wall of stone: it contains a house for the keeper and accommodation for fifty prisoners; and was erected at the joint expense of the county and of the borough of Kendal. It contains nine day-rooms, including three for women; nineteen separate cells for felons or misdemeanants; one refractory cell, one solitary cell, and six sleeping-rooms for debtors. There is accommodation for forty-six male and female felons and misdemeanants, and twenty debtors. The prisoners are employed in picking wool or grinding corn by crank mills. The daily average number of prisoners during the past year (1842-3) is twenty-one. The inspectors describe the prison as clean.

Before the passing of the Reform Act, four members were returned to Parliament from the county of Westmoreland, namely, two for the county itself, and two for the borough of Appleby. By the Reform Act Appleby was disfranchised, and Kendal made a parliamentary borough, to return one member. The borough of Kendal was made by the Boundary Act to comprehend the townships of Kendal and Kirkland and those parts of the township of Nether Graveship which adjoin the township of Kendal. The court of election for the county is held at Appleby, and the polling-stations are Appleby, Kirkby-Stephen, Shap, Ambleside, Kendal, and Kirkby-Lonsdale. The constituency in 1835-6 and 1839-40 was as follows:—

	1835-6.	1839-40.
County of Westmoreland . .	4845	4480
Borough of Kendal . . .	354	351

showing a decrease in four years of 365 voters in the county constituency, and of 3 voters in the constituency of the borough of Kendal.

History and Antiquities.—In the earliest historical period this county appears to have been included in the extensive territory of the Brigantes (Βρίγαντες, Ptolemy); and upon the subjugation of South Britain by the Romans, it was comprehended in the province of Maxima Caesariensis.

Richard of Cirencester places two nations not mentioned by Ptolemy, the Volantii (or Voluntii) and the Sistuntii, on the west side of the Pennine Chain, extending from Cumberland, through Westmoreland into Lancashire. He describes them as two confederated nations: 'Arctiori ut videtur fœdere conjuncti.' Possibly the Sistuntii of Richard may be the Segantii, or Setantii, of Ptolemy, who mentions one of the æstuaries of Lancashire as 'the Port of the Segantii,' or Setantii, Σεγαντίων, or in some editions Σεταντίων λιμήν. The Eden, with its æstuary the Solway Frith, is apparently the Ituna (Ἰτούνα) of Ptolemy, and the Bay of Morecambe is the æstuary of Moricambe (Μορικάμβη εἴσχυσις) of the same writer.

A Roman road ran through the county nearly in the line of the ex-mail road by Greta Bridge to Carlisle. It entered the county on the east side, and crossing Stainmoor, ran north-westward by Brough, Warcop, Bondgate, and Clappergate, suburbs of Appleby, Kirkby Thore, and Temple Sowerby, to Brougham, where it crossed the Eamont into Cumberland. Between Brough and Kirkby Thore it is (or was a few years since) tolerably perfect: it is there six yards wide, and, on level ground, is formed of three layers of stone, of the aggregate thickness of a yard, the lowest layer being the largest. In other places it was sometimes made of gravel or of flint. A road called 'The Maiden Way' branched off from this at Kirkby Thore and ran northward over the moors to Caervorran, one of the stations on the Roman Wall, in Northumberland. An antient camp, or fort, an oblong quadrangle of irregular form, stands on the line of the Roman Way (which passes through the camp) east of Stainmoor, and so exactly on the border of Yorkshire and Westmoreland, that part of the camp is in each county. The fragment of Re-Cross or Rere-Cross, the antient boundary-mark of the Scottish principality of Cumberland, and now of Westmoreland and Yorkshire, stands inside the camp. A square stone fort called Maiden Castle, defended by two ramparts, an inner one of stone with a small ditch, and an outer one of earth with a ditch, stands on the line of the road, about two miles west of the camp just noticed.

The Antonine station or town Verteræ is by Horsley and other antiquaries fixed at Brough. Mr. Reynolds, in his 'Iter Britanniarum,' fixes Verteræ at Bowes in Yorkshire (which Horsley and other antiquaries regard as having been the Lavatræ of Antoninus), and considers Brough as having been the Brovonacæ of Antoninus. Brovonacæ is by Horsley and others fixed at Kirby Thore, to the south-east of which village, on Speedy Moor, are the remains of a camp or fort called Whelp Castle, at the place seemingly where the Maiden Way diverged from the principal Roman road. In the neighbourhood of this camp or fort, if not on the site of it, the remains of buildings, consisting of walls and arched chambers or vaults; a Roman altar, with the inscription 'Fortunæ Servatrici;' urns, earthen vessels, and other antiquities, have been dug up. A Roman inscription, 'Deo Belatveadro lib. votvm fecit Iolvs,' was dug up here.

The Brocavum of Antoninus is fixed by Horsley and others at Brougham. Mr. Reynolds thinks Brocavum to be the same as Brovonacæ which he fixes at Brough; but a comparison of the second iter of Antoninus with the fifth, leads us to coincide in the opinion that they are different places. Some antiquaries have proposed to fix the Aballaba of the Notitia at Appleby, misled apparently by the similarity of the names; and perhaps for a similar reason Amboglanna has been identified with Ambleside: but by Horsley and most other antiquaries, Amboglanna and Aballaba are fixed respectively at Burdoswald and Watch Cross, on the line of the Wall. Horsley proposed to fix the Calatum (Κάλατον of Ptolemy, one of the towns of the Brigantes, which is apparently the same as the Galacum of Antoninus) at Appleby; Camden had identified it with the station at Whelp Castle near Kirkby-Thore; others propose to fix it at Kendal. The Alone of Antoninus, or, in the Notitia, Alione, which Horsley fixes at Whitley Castle in the south-west corner of Northumberland, others propose to fix at Ambleside, where the evident traces of a Roman station or town have been observed; and through which a Roman road ran from Kendal in the direction of Keswick. Horsley would fix the Dictis of the Notitia at Ambleside.

A number of Roman inscriptions have been found in Westmoreland, several of which are given in Horsley's 'Britannia Romana:' none of them however assist us in fixing the position of the several towns mentioned above.

There are a number of camps and earthen forts in different places; though it is doubtful to what period some of them are to be referred. Near the south end of Dun Fell, on Milburn Forest, is a round camp or fort, surrounded with deep ditches, called 'Green Castle.' An altar, with the inscription DEO SILVANO, was found here. There are several appearances of camps and roads on the waste ground of Milburn Forest. At the end of Yanwath-wood, on the west bank of the Lowther, opposite Lowther Hall, is another round fort called 'Castlesteads:' and at the south end of Eamont bridge is a circular enclosure, formed by a lofty embankment with a ditch inside, which some have supposed to be a tilting-ground of the middle ages. It is called 'Arthur's round table.' At Tebay near Orton, on the banks of the Lune, is a circular mound with a trench round it, partly washed away by the stream. At Sayle Bottom near Great Asby are a number of barrows, with a deep trench and a breast-work on two sides of the ground which they occupy; and at Sandford, between Warcop and Appleby, near the line of the Roman road, are some more barrows, two small camps, and the ruins of a small round fort, the walls of which are of immense thickness and built with red stone strongly cemented with lime and sand.

There are some monuments generally regarded as Druidical. Near 'Arthur's Round Table' was found in 1800, under an artificial hillock, a complete circle of stones enclosing an area nine feet in diameter, and having in the centre a slab of stone, supported on blocks or pillars of the same material. Mayborough Castle, in the same neighbourhood, is a circular enclosure of loose stones, having an entrance on the east. The area enclosed by it is about 88 yards (some accounts make it about 100 yards) in diameter; near the middle is (or was) a large stone three yards high (other accounts make it twelve feet high, and twenty-seven feet in girth); and formerly there were several other stones. The stone barrier which forms the enclosure is now in ruins and is thinly covered with trees and bushes; some accounts make it in its present ruined state thirty yards thick at the base. On the waste near Helton, between the rivers Lowther and Eamont, is a remarkable upright stone called 'Helton-Copstone,' and about a quarter of a mile to the north of it is a circle of stones, ten yards in diameter, called 'the Druids' Cross.' Another circle twenty-one yards in diameter, called 'the Cock-stones,' stands at the head of Ellerbeck, in the neighbourhood of Ulleswater; and there is a large cairn on the descent from the moor towards Pooley, at the lower end of Ulleswater. There is a circle seventy feet in diameter, formed of large stones, on Lowther Scar; and near Shap are the remains of two converging lines of huge stones of unhewn granite, called 'Carl Lofts.' Pennant, who has described this monument, assigns it to the Danes. In Gunnerkild Bottom, near Shap, is a circle of stones called 'the Druids' Temple,' which has certainly been used for a burying-place.

Westmoreland was probably conquered by the Angles of Northumbria, under Ecgfrid, who took several districts between the Ribble and Cartmel and Carlisle from the Cumbrian Britons, about A.D. 685. It became part of the kingdom of Northumbria, of which it shared the fate. The county is mentioned only once in the Saxon Chronicle, where it is called 'Westmoringaland.' It is there recorded to have been ravaged (A.D. 966) in the reign of Edgar by Thored the son of Gunner, probably a Danish chieftain. In the later Anglo-Saxon and in the earlier Anglo-Norman period it is said to have been included in the kingdom or principality of Cumbria, held by the heir presumptive of the crown of Scotland. William the Conqueror erected the baronies of Westmoreland and Kendal. Little notice of the county occurs in history, except in the record of some of the Scottish invasions. Appleby Castle was taken by William of Scotland and the town destroyed A.D. 1173; and the town was again destroyed by the Scots in the reign of Richard II. The barony of Kendal was held by the families of Taillebois or Talebois, who after a time took the name of De Lancastre, and Fitz-Reinfred, the members of which family also took the name of De Lancastre. The male line of the family failing, the inheritance was divided: one part, called 'the Richmond Fee,' came to the Lindesey family; another part, 'the Marquis Fee,' to the Ross family, afterwards by marriage to the Parrs; and the third part the 'Lumley Fee,' to the family of Thweng, afterward of Lumley. The barony of Westmoreland was at first united with that of Cumberland, and held by the family of De Meschiens, and then by other families, until, by forfeiture of Hugh de Morville, one of the murderers of Thomas à Becket, it came to the crown. It was granted by John to Robert de Veteripont, in whose family it remained for a time, then passed to the Cliffords, who became also earls of Cumberland, afterwards to the Tuftons, earls of Thanet. The earldom of Westmoreland was created by Richard II. in favour of Ralph Nevill of Raby, whose heirs held the earldom until it was forfeited by Charles Nevill, who was one of the leaders of the great rising in the north against Queen Elizabeth.

The castles of Appleby [APPLEBY], Kendal, Brough, Buley, Howgill, and Brougham, with Shap Abbey, are the principal remains of the buildings of the middle ages. Kendal and Brough Castles and Shap Abbey have been noticed. Buley or Bewley Castle is on the left bank of the Eden below Appleby, and is a mere ruin, showing little remains of its former strength. Howgill Castle, near Milburn on the northern border of the county, is occupied as a farm-house; some of the walls are more than ten feet thick. Of Brougham Castle there are considerable remains. The keep is standing, but all the inner apartments are destroyed, except one vault, the roof of which is formed of groined arches supported by an octagon pillar in the centre. Castle Folds, on Orton Scar, is a walled enclosure, now in ruins, apparently designed as a place of security for cattle during the inroads of the Scots.

In the civil war of Charles I., Appleby Castle was occupied by a royalist garrison, but was obliged at last to surrender. It was much damaged in the struggle. One of the islands in Windermere was the stronghold of Colonel and Major Philipson, brothers, royalists. The major by his daring exploits acquired among the Parliamentarians the nickname of Robin the Devil. In the rebellion of 1745-6 there was some little fighting at Kendal (14th December, 1745), between the towns-people and a party of the rebels then on their retreat toward Scotland; and a few days after a rather severe skirmish at Clifton, on the road to Penrith, between the rear-guard of the insurgents and the forces of the Duke of Cumberland.

(Arrowsmith's *Map of England and Wales*; Greenough's *Geological Map of England and Wales*; Jefferys's *Survey of Westmoreland*; Conybeare and Phillips's *Outlines of the Geology of England and Wales*; Papers by Winch, Buckland, John Phillips, and Sedgwick, in the *Geological Transactions*; Wordsworth, *Description of the Lakes*; Nicolson and Burn, *History of Cumberland and Westmoreland*; Clarke, *Survey of the Lakes of Westmoreland, Cumberland, &c.*; West, *Guide to the Lakes*; *Tour of the English Lakes*, published by Ackermann, 1821; Rickman, *Essay on Gothic Architecture*; *Beauties of England and Wales*; Horsley, *Britannia Romana*; Reynolds, *Iter Britanniarum*; Richard of Cirencester, *De Situ Britanniæ*; *Maps of Antient Britain*, by the Society for the Diffusion of Useful Knowledge; Palgrave, *Rise, &c. of the English Commonwealth*; *Parliamentary Papers*; Professor Sedgwick's 'Letters on Geology of Lake District' in Wordsworth's *Scenery of the Lakes*; and Hodgson's *County Map, geologically coloured*, by Professor Sedgwick; *Communication from Kendal.*)

STATISTICS.

Population and Occupations.—Reckoning according to the proportional number of the population engaged in agriculture and manufactures in 1831, Westmoreland ranks the nineteenth in the list of agricultural counties, and the twenty-fourth as a manufacturing county. In 1831 there were 1435 occupiers of land employing labourers, 1685 occupiers not employing labourers, and the number of agricultural labourers was 3474. The remainder of the male population aged 20 and upwards was distributed as follows:—1074 employed in manufactures; 3621 in retail trades and handicrafts; 602 capitalists, bankers, and members of the professions; 1195 non-agricultural labourers; 254 domestic servants; other males aged 20 and upwards, 746; and there were 2586 female servants. The following details are from the Returns of 1831:—' Between 500 and 600 men are employed at Kendal in making cotton-checks, kerseys, linsey, blanketing, fancy waistcoating, carpets, girths, hosiery, and sacking; at Kirland, Melthorpe, Stainton and Nether-Grave-ship, and Hilton, worsted and woollens are made; canvas and linens at Holme, Kirkby-Lonsdale, Kirkby-Thore, and Orton; bobbin is made at Stanley, Strickland-Roger, Hugill, and a few other places; gunpowder at Sedgwick and Longdales.'

In 1831 the number of inhabited houses was 10,353, inhabited by 10,984 families, and there were 44 houses building and 421 uninhabited.

The population of the county at the following decennial periods, when the census was taken, was as under:—

	Males.	Females.	Total.	Increase per Cent.
1801	20,175	21,442	41,617	
1811	22,838	23,084	45,922	10·3
1821	25,513	25,846	51,359	11·8
1831	27,576	27,465	55,041	7·1
1841	28.213	28,241	56,454	2·3

From 1801 to 1841 the population increased 14,837, or 26 per cent. According to the Fourth Report of the Registrar-general, in the three years ending 30th June, 1841, the proportion of marriages to the population was 1 in 163; births 1 in 35; and deaths 1 in 48: the proportion for England being respectively 127, 31, and 45. The increase of population from 1831 to 1841 is remarkably small, being only 2·3 per cent. By the census of 1841 it appears that the number of persons to a square mile is 74.

The population, &c. of each hundred and borough in 1841 is shown in the following table communicated by the Commissioners of the Census:—

WARD, &c.	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
	English Statute Acres.	In-habited.	Un-inhabited.	Building.	Males.	Females.	Total of Persons.	Under 20 years.		20 Years and upwards.		In this County.	Elsewhere.
								Males.	Females	Males.	Females.		
East (Ward) . . .	182,080	2,784	223	5	7,031	6,778	13,809	3,225	3,019	3,806	3,759	11,419	2,390
Kendal (Ward) . . .	147,440	3,347	300	14	9,437	9,001	18,441	4,468	4,279	4,969	4,725	14,873	3,568
Lonsdale (Ward) . .	38,350	1,049	71	3	2,857	3,154	6,011	1,363	1,621	1.494	1,533	4,235	1,776
West (Ward) . . .	118,120	1,508	77	11	4,100	3,868	7,968	1,858	1,734	2.242	2,134	6,339	1,629
Kirkby-Kendal (Town) .	..	2,161	204	6	4,788	5,437	10,225	2,328	2,392	2,460	3,045	8,193	2,032
Totals	485,990	10,849	875	39	28,213	28,241	56,454	13,242	13,045	14,971	15,196	45,059	11,395

County Expenses, Crime, &c.—Sums expended for the relief of the poor: 1748-49-50 (annual average). 1802*l.*; 1776, 2835*l.*; 1783-84-85 (average), 5617*l.* The sum expended in

1801 was	13,836*l.*, being	6*s.*	7*d.*	for each inhabitant.
1811 ..	22,338	„	9	8	„
1821 ..	27,207	„	10	7	„
1831 ..	26,586	„	9	7	„
1841 ..	16,532	„	6	0	„

In each of the following years ending 25th March, the expenditure for the relief of the poor was as under:—

1835.	1836.	1837.	1838.	1839.	1840.
20,067*l.*	18,019*l.*	16,162*l.*	15,092*l.*	14,732*l.*	16,532*l.*

The expenditure for the year ending 25th March, 1834, the last year under the old administration, was 22,283*l.* The total difference in the sum expended in that year and 1840 was 5751*l.*, or 26 per cent.: namely, in suits of law, &c., 309*l.*, or 61 per cent.; and in miscellaneous expenses, 1251*l.*, or 61 per cent. The number of Poor-law unions is 3, comprising every parish (108) in the county. The sums expended in the year ended 25th March, 1840, under the principal heads of In-maintenance, Out-relief, and Establishment and Salaries, in each of the three unions, were as follows:—

Name of Union.	Population in 1831.	In-Maintenance.	Out-Relief.	Establishment and Salaries.	Total.
		£.	£.	£.	£.
East Ward . .	14,555	611	2357	598	3,566
Kendal . . .	32,740	2847	5728	1963	10,538
West Ward . .	7,599	249	1768	363	2,[illegible]

The number of persons relieved in these unions during the quarter ending Lady-day, 1840, was 4745 (771 in-door and 3974 out-door), or 9 per cent. of the population [illegible] is the same proportion as for Berkshire, Kent, H[illegible] Herefordshire; the proportion for England and Wales [illegible] $8\frac{6}{10}$. There were 68 lunatics and idiots cha[illegible] the poor's-rate in 1836, or 1 in 869; in Eng[illegible]033. In 1835-6 there were 619 bastard children [illegible] on the poor's-rate, or 1 in 89 of the whole population: in England 1 in 215. The number of illegitimate births in

1830 was 88, or 1 in 19; in England, 1 in 20. The number affiliated in 1834-5 was 69, and 55 in 1835-6. The proportion per cent. of persons married under 21 years of age in the three years ending 30th June, 1841, was 9·57 for women, and 2·82 for men; in England and Wales 13·78 for women, and 4·69 for men: in England and Wales, 9·6 for the two sexes.

The annual value of real property assessed to the property tax in 1815 was 298,199*l.*; property assessed to occupiers, 263,853*l.*; and the profits of trades, professions, &c. were assessed at 51,892*l.* In 1825-6 the centesimal proportion of the various descriptions of property assessed was:—land, 87·6 parts; dwelling-houses, 10·2 parts; mills, factories, &c., 1·8 parts; manorial profits, &c., 0·4 parts. The net rental or annual value of real property assessed to the poor's-rate in 1841 was as follows:—

On landed property . .	£221,054
Dwelling-houses . . .	37,374
All other kinds of property .	7,907
Total . . .	£266,335

In the above year the total amount levied for poor-rates was 22,629*l.*, being a rate of 1*s.* 8*d.* in the pound on the annual value of real property assessed. Taking the annual value of real property in the county in 1841, the rate per head was 4*l.* 14*s.* 4*d.* for each inhabitant; and dividing it by the number of acres, it was 9*s.* 1*d.* per acre, which is lower than for any other county in England, and 2*d.* under the average for Wales.

The county-rate levied at different periods, and the principal disbursements, are shown in the following table:—

	1819. £.	1826. £.	1835. £.	1838. £.
Income . .	3066	6433	2539	4683
Expenditure:—				
Bridges . .	281	3036	219	818
Gaols . .	1636	169	179	67
Prisoners .	96	289	586	634
Prosecutions .	64	90	97	371
Constables and vagrants .	115	204	247	218

The particulars of the county expenditure in 1834 are as follows:—

Bridges, building, repairs, &c. . .	£257
Gaols, houses of correction, and maintaining prisoners . . .	1065
Shire-halls and courts of justice .	6
Prosecutions	259
Clerk of the peace	111
Conveyance of prisoners before trial .	27
Conveyance of transports . .	25
Vagrants, apprehending and conveying	9
Constables, high and special . .	133
Coroner	47
Miscellaneous	302
Debt:—	
Payment of principal and interest .	1400
Total . . .	£3647

The length of streets and highways, and the expenditure thereon, were as under in 1839:—

	Miles.		
Streets and roads repaired under local acts	36		
Turnpike roads	194		
All other highways	795		
	1025		
Amount of rates levied			£3517
Expended in repairs of highways .		£3420	
Law and other expenses		16	
Total expenditure			£3437

The number of turnpike trusts, in 1840, was 10; the income from tolls was 693*l.*; parish compositions in lieu of statute duty, 10*l.*; and total income, 6964*l.*; the total expenditure for the same year being 6648*l.* The bond and mortgage debts amounted to 62,406*l.* In 1836 the debt was equal to 8·4 years' income; for the whole of England the proportion of income to debt being 4·5 years' income: the proportion of unpaid interest to the total debt was 3 per cent. for Westmoreland; for England it is 12 per cent.

In 1839 the church-rates in Westmoreland amou 265*l.*; and the amount from estates and rent cha plicable to the same objects was 27*l.* in 1832. The 1033*l.* was expended in 1839 for the purposes of t blishment, of which 555*l.* was for repairs of church

Crime.—Number of persons charged with offences in the septennial periods ending 1819, 18 and 1840.

	1813-19.	1820-26.	1827-33.
Total . .	97	118	138
Annual average .	13·8	16·8	19·7

The numbers committed, convicted, and acqu each year from 1834 to 1842, were as under:—

	1834.	1835.	1836.	1837.	1838.	1839.	1840.	18
Committed .	23	25	20	25	36	37	38	
Acquitted .	4	6	1	2	5	6	4	
Convicted .	24	19	19	23	31	31	34	

Of 281 persons committed in the nine years fr to 1842 inclusive, 19 were for offences against the 27 for offences against property committed with v 225 for offences against property committed with lence; 2 for malicious offences against propert forgery and other offences against the currency; a offences not included in the preceding classes. T ber of females committed was 53. Taking the mea ber of committals for 1840-41-42, the proportion of committed in one year to the population, was ab 1500, while for England and Wales it is about 1 i

Of 39 offenders (30 males and 9 females) tried assizes and sessions in 1842, there were two charg offences against the person; 10 with offences property committed with violence; 25 (inclu cases of simple larceny) with offences against committed without violence; with malicious against property, none; for uttering base coin, none for misdemeanour. In no one case was sentence recorded. Of 31 persons convicted, 1 was transpo life; 5 for periods above ten and under fifteen for periods above seven and under ten years, none for terms of seven years; making 9 transported. were sentenced to imprisonment for a period ex one year; 5 were imprisoned for above six mon less than one year; and 17 for six months and und the 8 persons acquitted, 5 were found not guilty o in the case of 2 no bill was found; and in 1 there was no prosecution. The degree of instruc ascertained in all but one case: 4 males and 1 could neither read nor write; 22 males and 8 could read and write imperfectly; 1 male could write well; and 2 males had received a superior ed

Savings' Banks.—There is only one of these ins in the county, at Kendal; and the number of de and amount of deposits in each of the following ye as under:—

	1833.	1836.	1837.	1838.	1839.
No. of depositors	711	872	884	897	909
Am. of deposits	£22,813	£25,976	£26,253	£26,471	£24,492

The distribution of the sums invested in 1830, 1 1839 is shown in the following table:—

		1830.		1834.		1
	£	Depositors.	Deposits. £	Depositors.	Deposits. £	Depositors.
Not exceeding	20	324	2,264	392	2,809	523
"	50	197	5,943	230	6,904	241
"	100	90	6,114	87	5,881	94
"	150	35	4,202	32	3,714	30
"	200	22	3,921	26	4,700	21
Above . .	200	6	1,360	3	660	..
		674	23,807	770	24,668	909

The deposits of 8 friendly societies, not reckoned amounted, in 1840, to 1202*l.*

Elective Franchise.—The number of county vote tered, in 1835-6 and 1839-40, was as under:—

	1835-6.
Freeholders of every class . .	3,294
Copyholders and customary tenants	275
Leaseholders for life or term of years	159
50*l.* tenants at will . . .	1,005
Trustees and mortgagees . .	3
Qualified by office . . .	..
Joint and duplicate qualifications	109
	4,845

Education.—Summary of Returns made to Parliament in 1833:—

	Schools.	Scholars.	Total.
Infant-schools . . .	10		
Number of children at such schools; ages from 3 to 7 years:—			
Males . .		22	
Females . .		20	
Sex not specified .		191	
			233
Daily-schools . . .	224		
Number of children at such schools; ages from 4 to 14 years:—			
Males . .		2,535	
Females . .		1,910	
Sex not specified .		2,572	
			7,017
Schools . .	234		
Total of children under daily instruction . . .			7,250
Sunday-schools . . .	80		
Number of children at such schools; ages from 4 to 15 years:—			
Males . .		1,553	
Females . .		1,565	
Sex not specified .		1,585	
			4,703

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	..	..	9	143	1	90
Daily Schools	64	1,922	7	469	148	4,371	5	255
Sunday Schools	6	365	66	4,003	4	165	4	170
Total...	70	2,287	73	4,472	161	4,679	10	515

The schools established by Dissenters, included in the above table, are—

			Scholars.
Infant-schools . .	1,	containing	90
Daily-schools . . .	24	„	705
			795
Sunday-schools . .	21	„	1,558

The schools established since 1818 are—

Infant and other daily schools	45,	containing	1,247
Sunday-schools . .	58	„	3,525

Lending libraries of books were attached to 13 schools.

Two Sunday-schools attended by about 30 scholars were returned from places where no other school existed. Twelve schools, containing 755 children, were both daily and Sunday schools, and duplicate entry is known to have been made in this case; but at all other places Sunday-school children had the opportunity of resorting to other schools, but to what extent they did so cannot be ascertained. In Warwickshire the number of children returned as attending daily-schools was about 1 in 13 of the total population, in Westmoreland nearly 1 in 9. The number of persons married who attested the register by marks in the three years ending 30th June, 1841, was smaller than in any other county, Cumberland excepted: the proportion per cent. being 16 men and 36 women: in Bedfordshire 52 men and 66 women; in England and Wales 33 men and 49 women.

WESTPHALIA is an extensive country in the north-west of Germany, but the tract designated by that name has varied very considerably both in boundaries and extent at different periods of its history. In the middle ages it comprehended the country lying between the Weser, the Rhine, and the Ems; the country between the Weser and the Elbe was called Ost-, i. e. East-phalia: but this name was subsequently suppressed, and the former was given both to the circle of Westphalia and to the duchy of Westphalia and Engern, which formed in ancient times a part of the great duchy of Saxony, and was then called Sauerland, a name which is still retained in the mouth of the people, and extends also to a portion of the former county of Mark. When Henry the Lion was put under the ban of the empire in 1179, the archbishop of Cologne took possession of the Sauerland, and obtained a grant of it from the emperor as a fief, under the name of Westphalia. It remained in the possession of the archbishop of Cologne till 1802, when the archbishopric was abolished, and the duchy was assigned to Hesse-Darmstadt, which ceded it to Prussia in 1815. It had at that time an area of 1500 square miles, with 134,715 inhabitants. This duchy of Westphalia, which was bounded on the east by the circle of the Upper Rhine, and on the three other sides by that of Westphalia, did not form a part of that circle, but belonged to the circle of the Lower Rhine.

WESTPHALIA, THE CIRCLE OF, was, till the peace of Luneville, one of the largest circles of the empire, its area being about 27,000 square miles, with 2,500,000 inhabitants. It was bounded on the west by the Netherlands, on the north by the German Ocean, on the west by Lower Saxony, and on the south by the circle of the Lower Rhine, and comprehended the bishoprics of Münster, Paderborn, Osnaburg, Liege, and Corvey, the duchies of Jülich, Cleves, Berg, and Oldenburg, the principalities of Minden, Verden, and Friesland, the counties of Ravensburg, Mark, Hoya, Diepholtz, Schaumburg, Lippe, Bentheim, Tecklenburg, Lingen, Steinfurt, Rietberg, and many ecclesiastical and temporal lordships.

The peace of Tilsit made Napoleon master of all the Prussian dominions as far as the Elbe, and he occupied the electorates of Hesse and Hanover, and the duchy of Brunswick. He did not then think fit to extend the boundaries of the French empire beyond the Rhine, but he resolved to form a part of these countries into a state dependent on France.

WESTPHALIA, THE KINGDOM OF, was erected on the 15th of November, 1807, and consisted of the territories of Brunswick-Wolfenbüttel and Hesse-Cassel (with the exception of Hanau and Katzenelnbogen), the Prussian provinces of Magdeburg and the Old Mark on the left bank of the Elbe, Halberstadt with Hohnstein, Hildesheim with Goslar, Mansfeld, Quedlinburg, Eichsfeld with Treffurt, Mühlhausen and Nordhausen, Stolberg-Wernigerode, Paderborn, Minden and Ravensberg, the Hanoverian provinces of Göttingen, Grubenhagen, and Osnaburg, the principality of Corvey, belonging to Nassau-Orange, and the county of Rietberg. The area of this new kingdom was 14,500 square miles, with 1,947,000 inhabitants. Napoleon made his youngest brother, Jerome, king, who arrived on the 7th of December, in the capital city, Cassel, bringing with him a constitution, which, though it was framed entirely on the French model, and overthrew all the old forms, might have promoted the welfare and happiness of the people if it had been strictly adhered to. The new kingdom was by no means in prosperous circumstances. The countries of which it was composed had been more or less drained by the French, and some were completely exhausted: in addition to this, Napoleon reserved the half of all the domains to reward his marshals, generals, and others; a garrison of 12,500 men was to be kept in Magdeburg, and not only supplied with provisions, but paid and clothed, and the large arrears of the military contributions which had been imposed on the several provinces were to be paid to France. Yet in spite of all this, the country gradually revived; an army of 16,000 men was soon formed; the introduction of the French codes, and the many innovations introduced with the new government, were not indeed calculated to please the people, yet they became accustomed to them, and found themselves in a better situation than the neighbouring countries, and the government acquired strength and security. But the war between France and Austria in 1809 caused some internal troubles, which gave occasion for many severe measures. The king was compelled by France to increase his army to 30,000 men, which made the conscription extremely burdensome, and caused great financial embarrassments, for which no effectual remedy could be found. The kingdom seemed to obtain some [illegible] by the addition of all Hanover in 1810, by which [illegible] increased to [illegible] square miles, with [illegible] [illegible] of Bavaria [illegible] suffered less than any other part of Germany, as great forbearance was shown in the execution of it.

In 1812 the king led his army to Poland; he himself was sent home by Napoleon, who was dissatisfied with him; but his fine army of above 24,000 men shared in the ruin of the French in Russia, and only a small remnant returned to their own country. A new army was speedily organized, and 12,000 Westphalians followed Napoleon to Saxony; but immediately after the first reverses which it met with in Silesia, two regiments of cavalry deserted to the Prussians. Before the battle of Leipzig, Czernitscheff drove the king from his capital, and occupied Cassel itself, but only for three days. When he left it, the king, accompanied by a French corps, returned, but only to learn the news of the great battle of Leipzig, and to leave his capital and his kingdom; but he first sent away everything valuable in the palace, and even part of the rich contents of the museum. Two days after his departure the Prussians returned to Cassel, and in a few days the former governments were restored in almost the whole of the kingdom.

WESTPHALIA, THE PRUSSIAN PROVINCE, was constituted in 1815, of the duchy of Westphalia and of several principalities, some of them former possessions of Prussia, and the remainder obtained partly by cession or exchange, and partly by the decision of the Congress of Vienna. It is situated between 50° 43′ and 52° 30′ N. lat. and 6° 25′ and 9° 20′ E. long. Its area is 7800 square miles, with 1,328,000 inhabitants. It is bounded on the north-west by Holland; on the north by Hanover; on the east by Hanover, Brunswick, and Hesse-Cassel; on the south-east by Hesse-Cassel, Waldeck, and Hesse-Darmstadt; and on the south-west and west by the province of Jülich-Cleve-Berg.

Face of the Country; Soil; Climate.—The northern half of the province, north of the Lippe, belongs to the great plain of Northern Germany, and has no mountains properly speaking, though some low eminences run from the Egge to the Weser and to the Porta Westphalica, and pass through the government of Minden into Osnaburg: the other half, to the south of the Lippe, consists of small chains of mountains and hills, which contain many valleys. In the northern half the soil is in general sandy, with extensive heaths and morasses, and scanty forests; in the southern half the soil is firm and sand is rare: it is not always productive, but the forests are very fine. The mountains in the province are all offsets of the Harz. To these belong:—1, The Weser chain. 2, The Teutoburgerwald, a remarkable chain which traverses the province like a wall towards the Netherlands, from the Rhine to the middle of the Ems. It has only one opening or break, a regular porta till it comes to Bielefeld. The whole chain is steep and abrupt on the east side, and gently sloping on the west side. It forms the watershed between the Rhine and the Lippe, and is covered with fine forests of oaks, beeches, and other trees, but there are no pines. 3, The Porta Westphalica, a beautiful picturesque chain, which forms a semicircle of 45 miles in diameter, extending from the neighbourhood of Osnaburg, through the district of Minden, to the Steinhuder Lake in Lippe-Schaumburg. There is a pass through this chain, exactly in the centre, about a mile and a quarter below Minden, and this is the celebrated Porta Westphalica.

The principal rivers are the Weser, the Ems, the Lippe, the Röhr, and the Vechta. There are no lakes in this province, nor any large ponds or meres: there are numerous marshes, especially in the northern part: the principal mineral-waters are those of Driburg and Schwelm.

The climate is temperate and healthy: the air is purer, but colder in the southern than in the northern part, where fogs, caused by the marshes, are frequent. The winter is cold and wet, and the heat in summer is often insupportable in the extensive heaths. Epidemic and endemic disorders are more common in the plain than in the mountainous parts; but instances of great longevity are not rare.

The vegetable products are, corn of all kinds, but hardly sufficient for the consumption of the province; peas and beans, garden vegetables, fruit, hemp and flax (which are staple articles), some hops, and in the mountainous part r in great quantities. The minerals are iron, copper, lamine, marble, slate, freestone, salt, and coals: xtensive turf-moors.

ures and Trade.—The manufactures are of considerable importance, especially those of linen, cotton, woollen cloth, silk, leather, hosiery, and paper. There are numerous iron, copper, and steel-works, and manufactories of all kinds of cutlery, and copper, brass, and iron goods. There are also many sugar-refineries, brandy-distilleries, and tanneries in the province. The trade of the province consists in the exportation of its own natural productions and manufactures.

The inhabitants are partly Roman Catholics (nearly 700,000), especially in those districts which formerly belonged to ecclesiastical princes, such as Münster, Paderborn, &c.; in other parts, as Minden, Ravensberg, Siegen, and Marks, the Protestants are the most numerous: there are 11,800 Jews. [ARNSBERG; BIELEFELD; MINDEN; MÜNSTER.]

(Hassel, *Die Preussische Monarchie;* Stein, *Geographisch-Statistisches Lexicon;* Brockhaus, *Conversations Lexicon*; Schlieben, *Gemälde der Preussischen Monarchie.*)

WESTPHALIA, TREATY OF. [GERMANY—*History.*]

WESTPORT. [MAYO.]

WESTRAY. [ORKNEY ISLANDS.]

WESTRI′NGIA, a genus of plants belonging to the natural order Lamiaceæ, and named by Sir James Edward Smith in honour of Dr. Westring, physician to the king of Sweden. All the species are natives of New Holland. They form shrubs from one to three feet in height. The leaves are permanent, and three or four in a whorl, quite entire. The flowers are three or four in a whorl. The calyx is campanulate, 10-nerved, equal 5-toothed, with the throat naked inside. The corolla has a short tube, naked inside; the throat is wide, with a sub-bilabiate limb; the upper lip is flat, bifid, rather spreading; the lower lip spreading, 3-lobed, the middle lobe rather bifid. The stamens 4, erect, distant, inclosed in the tube of the corolla; the upper two are fertile, having 1-celled glabrous anthers; the lower two sterile, with bipartite anthers, dependent and empty; and linear lobes. The style is equally bifid at the top; the lobes are subulate, with a stigmatic surface at the apex. The achenia are coriaceous, and reticulately wrinkled. There are about ten species of this genus described. They are pretty shrubs, and might be cultivated with advantage for variety. They will grow in almost any light rich soil, or one composed of equal parts of loam, peat, and sand. Cuttings of the young wood will strike readily under a hand-glass.

WETHERBY. [YORKSHIRE.]

WETSTEIN, JOHN JAMES, distinguished for his labours on the text of the Greek New Testament, was descended from a family which had long been one of distinction in the city of Basel. His grandfather, John Rudolph Wetstein, who was born in 1614 and died in 1684, was professor of Greek, and afterwards of divinity, in the university there, as was also one of his sons of the same names, who was born in 1647 and died 1711. Another son, Henry, was the well-known learned Dutch printer, and died in 1726. Rudolph, a son of the second John Rudulph, was professor of divinity at Basel; and John Henry, another son, became a bookseller at Amsterdam.

The subject of the present notice was born at Basel in 1693. After having studied divinity under his uncle the professor, and Hebrew under Buxtorf, he was admitted a minister of the national church in 1713, on which occasion he printed a Latin thesis in defence of the substantial genuineness and authenticity of the commonly received text of the Greek Scriptures, under the title of 'Dissertatio de Variis Novi Testamenti Lectionibus,' 4to. To this subject he may be said to have thenceforth devoted his life. He commenced by visiting France and England, as well as the various libraries in Holland, for the examination of manuscripts; he was in England in 1716, and again in 1720, and he appears to have been employed for some years in this work by Bentley, who had himself projected a new edition of the Greek Testament (see Life, by Monk, pp. 311 and 429). It was not till 1730 that Wetstein produced his next publication, a quarto volume of 'Prolegomena' to a proposed new edition of the Greek text according to the most antient codices. By this time however his critical investigations had alarmed a party among his clerical brethren, who had influence enough not only to obtain a decree from the senate of Basel condemning his project as both unnecessary and dangerous, but even to get him prohibited from officiating as a minister. On this he retired to Amsterdam, where the Remonstrants or Arminians appointed him successor to Le Clerc in the professorship of philosophy and history; and although, on his making a public apology for some opinions savouring of Socinianism that had been ascribed to him, the decree of the Basel senate was reversed in May, 1733, he remained at Amsterdam for the rest of his life, and died there, 24th March, 1754. He had meanwhile paid another visit to England in 1746. His edition of the Greek New Testament appeared at last, at Amsterdam, in two volumes, folio, in 1751 and 1752. Notwithstanding many errors by which it is disfigured, this edition (now become very scarce) is of great value for the purposes of the critical student. The first volume of an intended reprint of it, in 4to., corrected and improved, appeared at Rotterdam in 1831, under the care of the learned J. A. Lotze; but his death prevented its being continued. The portion published contained only the Prolegomena. There is also a previous republication of the Prolegomena at Halle, in 1764, under the care of Dr. John Solomon Semler. Two epistles attributed to Clemens Romanus, which Wetstein had printed at the end of his New Testament, from a Syriac MS., have been proved by Lardner to be spurious.

WETTER. [SUNDA ISLANDS, LESSER.]

WETTERN, LAKE. [SWEDEN.]

WETZLAR, the chief town of a circle in the government of Coblenz in the Prussian Rhine province, is situated in a romantic country on the banks of the Lahn, over which there is a stone bridge, and which is there joined by the Dill and the Wetzbach. The town is surrounded with walls, has six gates and two suburbs, and is built on the side of a hill, on ground so very uneven as to be hardly accessible to carriages. There are three Protestant and two Roman Catholic churches, of which the cathedral, dedicated to St. Mary, is a very spacious and fine edifice, with twenty-eight altars. The Jews have a synagogue. The public establishments and institutions are, an hospital, a united Roman Catholic and Lutheran gymnasium, a school of industry, and a Bible Society. The houses are built in the old-fashioned German style. The population is about 4500, of whom 3500 are Protestants, 1000 Roman Catholics, and 100 Jews. The inhabitants have some manufactures of stockings, gloves, and tobacco, some tanneries and oil-mills, and a trade in iron. Wetzlar was formerly a free imperial city, and, from 1693 to 1806, the seat of the imperial chamber, or supreme court of appeal of the empire. By the Congress of Vienna it was assigned, in 1815, to Prussia.

(Müller, *Geographisches Wörterbuch des Preussischen Staates*; Hassel, *Handbuch*, vol. iv.; Stein, *Geogr. Lexicon*.)

WEXFORD, a maritime county in the province of Leinster, in Ireland, bounded on the east by St. George's Channel, on the south by the Atlantic Ocean, and on the west, north-west, and north by Waterford harbour, and the counties of Waterford, Kilkenny, Carlow, and Wicklow. The greatest length of the county is from south-west to north-east; and its extreme extent, measured in this direction, from the promontory called Point Hook, on the east side of the entrance to Waterford harbour, is about 54 miles. Its greatest breadth from east to west, between Greenore Point and the æstuary of the Suir, in Waterford harbour, is about 28 miles; and travelling northward from this line, the breadth does not diminish materially, excepting where the east coast is indented by Wexford harbour, to a point a little north of Newtownbarry, beyond which it contracts suddenly, so that the north-eastern extremity of the county forms a mere promontory, little more than 12 miles across, between the southern part of the county of Wicklow and the sea. The total area of the county of Wexford, according to the Ordnance Survey, is 576,588 acres, 22 poles (rather more than 900 square miles), of which 572,919 acres, 3 roods, 39 poles (about 895 square miles), consist of land, and 3668 acres, 23 poles (rather more than 5¼ square miles), of water. The population, in 1831, was 182,713, which gives an average of about 204 persons to each square mile of land. According to the evidence laid before a select committee of the House of Lords, upon Irish Tithes, in 1831-2, the figures in which differ slightly from the above, Wexford stands fourteenth in the list of Irish counties for superficial extent, but was then the ninth for absolute extent of land under cultivation, and nineteenth for amount of population. In 1841 the population was 202,033, which gives an average of nearly 226 persons to each square mile; and in that year the county stood seventeenth for actual amount of population. The area is about the same as that of the English county of Warwick, but the population in 1831 was less than three-fifths that of Warwickshire; Wexford, the county town, is rather more than 70 miles south of Dublin, measured in a straight line; in about 52° 20′ N. lat. and 6° 27′ E. long. The range of the county of Wexford is from about 52° 6′ to 52° 48′ N. lat., and from about 6° 8′ to 7° 1′ W. long.

Coast-line.—Owing to the position of Wexford at the south-east corner of Ireland, more than one-half of its boundary is formed by the sea. From Kilmichael Point, which is the easternmost point in the county and the northern extremity of its coast-line, to Cahore Point, about 12 miles from it in a southerly direction, but a little inclining to the west, the coast forms a shallow bay, interrupted by very few prominent points. Near the centre of this, which is sometimes called Kilbride bay, a small inlet at Courtown has been formed into a floating dock or harbour for small craft, by the construction of two rough piers. From Cahore Point to the Raven Point, on the north side of the entrance to Wexford harbour, a farther distance of between 16 and 17 miles, trending rather more to the west, the coast-line is unbroken by any inlet or considerable projection. Indeed the whole line of coast from Arklow, which lies a little north of the northern boundary of Wexford, to Wexford harbour, presents no opening which can afford shelter from foul weather, except to small craft; and the danger to shipping is increased by a range of sand-banks which lie parallel to the shore at the distance of a few miles, towards the northern extremity of which the Arklow light-ship is stationed. Wexford harbour is large, and of very irregular form, but the navigation is dangerous, and the entrance is obstructed by a bar. The entrance is between the extremities of two long, narrow, sandy peninsulas, the Raven Point on the north and Rosslare Point on the south; and though it is less than a mile wide, the harbour almost immediately expands to a width of more than eight miles. The town of Wexford lies opposite to, and about four miles from, the entrance of the harbour, which contracts so suddenly opposite the town, as to be crossed by a bridge 1571 feet long, a portion of the roadway of which is made moveable, to allow the passage of masted vessels into the inner portion of the harbour, which again extends, though only for a short distance, to the width of about two miles. A bank of shifting sand outside the entrance to the harbour has been for some years increasing, and it leaves so little depth of water as to render the entrance to the harbour inconvenient for anything beyond the size of fishing-boats; and the navigation of the interior is both intricate and shallow. Several remedial measures have been suggested, but none as yet acted upon. The harbour contains a few small but inhabited islands, called Beg Erin, or Little Ireland, and Great Island, in both of which there are remains of monastic buildings. From Rosslare Point to Greenore Point, nearly seven miles in a south-easterly direction, the coast forms another bay, called Greenore Bay, and opposite the point, about three furlongs from the shore, is a detached rock called Carrick Beacon. From this point, for rather more than five miles, the coast again trends a little westward in an irregular line to Carnsore Point, which forms the south-eastern angle of the county, and of the whole of Ireland. Opposite to this portion of the shore, about seven miles south-east of Greenore Point, is the Tuscar rock, the position of which is marked by a revolving light, and by a bell in foggy weather. On the southern coast, from Carnsore Point to Crossfarnoge Point, a distance of between nine and ten miles in a straight line, is a shallow bay, into which two considerable lakes, called Lady's Island Lake and Tacumshin Lake, open, the former by an artificial communication which is cut every [illegible] or four years through the sand-bank which separates [illegible] the sea; this lake is remarkable for the [illegible] that, while it receives several small rivulets [illegible] natural outlet. South of Crossfarnoge Point [illegible] and Little Saltee islands, the nearest of [illegible] more than two miles from the shore. [illegible] islands is about a mile long, and [illegible] and the smaller is about half that [illegible] contain some rocky pasture, it is [illegible] one-third of the larger island [illegible]

Lewis states that, according to a late return from the incumbent of the adjoining parish on the mainland, the Saltee islands are considered to belong to the county of Tipperary. From the smallest of the two, which lies nearest to the mainland, a ridge of rocks called St. Patrick's Bridge, having only from seven to ten feet of water at low tide, extends to the adjoining shore, affording an exceedingly dangerous obstacle to the navigation. Several small rocky islets occur about this part of the coast, and a floating light is stationed a few miles south of Great Saltee island. Westward of Crossfarnoge Point is Ballyteige Bay, and the coast inclines a little northward as far as the entrance to Bannow Bay, about nine miles west of the point last mentioned. Here a long sand-bank separates Lough Ballyteige, in which is a small island, from the sea. Bannow Bay is an irregular shallow inlet which runs about four miles inland, in a north-easterly direction, to Clonmines, and it has a small island, called Bannow island, at its mouth, from which for a distance of eight or nine miles the coast runs in an irregular line to the south-west, terminating in Hook Head, which is the extreme south point of the county. Along this part of the coast are the small dry harbour, used by fishing vessels, called Fethard Bay, the prominent points Baginbun Point and Baginbun Head, where the shore is rocky and precipitous, and several small bays of little importance. At Hook Head is a lofty lighthouse with a stationary light, and several other lights are established about this part of the coast, which is exceedingly rugged and dangerous, and has been the scene of many shipwrecks. Immediately after doubling this point the shore turns back in a north-eastern direction, forming the south-eastern boundary of Waterford harbour, and reducing Hook to a narrow peninsula, which, for a distance of between three and four miles, nowhere exceeds one mile in width. From Templetown bay, about four miles from Hook Head (within Waterford harbour), the shore again trends towards the west for about five miles, to the æstuary of the Suir. The Wexford coast of Waterford harbour is indented by numerous small bays.

Surface, Geology, Hydrography, and Communications.—The county of Wexford is in a great measure cut off from the rest of Ireland by natural boundaries. From the extremity of its sea-coast in Waterford Harbour, the æstuary of the Suir, and the river Barrow, the lower part of which is called the River of Ross, which flows into it, form the boundary of the county for a distance, in a straight line, of about 16 miles, to the point of junction of the counties of Carlow, Wexford, and Kilkenny. For 12 or 13 miles farther, in a north-easterly direction, the boundary is pretty distinctly marked by the ridges called Blackstairs Mountain and Mount Leinster, the former of which rises in several points, along the boundary-line of the counties of Wexford and Carlow, to elevations of from 1520 to 2409 feet above the level of the sea at low-water, while the latter is marked as of the elevation of 2610 feet in the Ordnance map, also at a point on the boundary-line. Three remarkable summits upon this ridge of mountains, between Wexford and Carlow, are distinguished as 'The Leaps of Ossian's Greyhounds.' A few miles west by south of Newtownbarry, on the slope of Mount Leinster, rises the small river Clody, which forms the boundary of the county to the above town, where, after a rapidly descending course, it falls into the Slaney. From Newtownbarry the boundary-line runs for a short distance up the course of the Slaney, towards the north-west, after which it turns north-east along the tributary river Derry, to a point a little beyond the junction of the counties of Carlow, Wexford, and Wicklow. After leaving the course of the Derry, the boundary-line turns abruptly south for a short distance, and then, again turning north-east, runs over an elevated ridge which forms the southern termination of the mountains of Wicklow, and which is little less elevated than that portion of the ridge which lies south-west of the valley of the Slaney. Many points near this boundary have an elevation exceeding 1000 feet. The last portion of the boundary-line of the county is formed by a small stream which falls into the sea near Kilmichael Point.

Besides the ridges which form part of the natural boundaries of the county, Wexford contains many single hills of considerable elevation, among which are the Forth Mountains, a range which extends in a south-westerly direction for five or six miles from the neighbourhood of the county-town, forming a kind of natural boundary to the baronies of Forth and Bargy, which occupy the south-eastern corner of the county. Carrickadee Rock, one of the highest summits of the Forth, is 776 feet high, and many other points are more than 600 feet. Of the detached hills may be noticed Camaross, 598 feet high, and Carrickbyrne, 767 feet, in the middle of the county; Tara Hill, near the northern extremity, and not far from the coast, of which it forms a striking landmark, 826 feet high; and the Lacken Hill, near New Ross, 629 feet high. Between these and other single elevations the land is broken with low hills and undulations, between which there are many small winding streams. The principal river of the county is the Slaney, which enters from the county of Carlow a short distance north of Newtownbarry, and flows in a tolerably direct course past that town and Enniscorthy to Wexford harbour. It is navigable for large boats as far as Enniscorthy, to which place the tide flows. On the east side it receives, a few miles north of Enniscorthy, the river Bann, which rises in the north-eastern part of the county, and two or three minor streams; and on the western side its principal tributaries are the Urrin and the Boro, both of which enter it south of Enniscorthy. Among the other streams in the county are the Owenavorragh and its tributary the Banoge, the waters of which enter the sea north of Courtown harbour; the Owenduff, the Corock or Corug, and some other small streams, which flow into Bannow Bay; and several rivulets which empty themselves into the lakes on the southern coast. The Barrow or Ross river, and others which form part of the boundaries of the county, have been mentioned already, as also the only lake which claims notice, the Ladies' Island Lake, which is sometimes designated Lough Ta.

Geologically considered, the county of Wexford forms part of the clay-slate tract which extends along the eastern portion of Ireland from the northern part of Wicklow to the Atlantic Ocean. Though considerably inflected in some of the southern parts of the county, the strata generally maintain, in the northern parts, a tolerably uniform direction from north-east to south-west, with a dip to the south-east. The clay-slate is found in immediate contact with granite, which forms the chief component of the ranges that separate this county from Carlow. The Forth Mountain consists principally of quartz rock, with occasional laminæ of clay-slate, and the strata are in some places broken by fissures and veins of quartz, which occasionally show indications of the presence of lead, copper, and iron. Quartz-rock and clay-slate form also the lower grounds in the vicinity of the Forth; and the former, which is sometimes iron-shot and of a deep reddish hue, extends under and to the north of the town of Wexford, and also considerably to the south of the Forth Mountains. Granite appears about Carnsore Point, in the south-east, and at the Carrickbyrne and Camaross Hills; and blocks of that substance are found strewed between those mountains and Bannow, on the south-west. Beds of greenstone also occur in a few places among the clay-slate, which, near Enniscorthy and in several other places, is much intermixed with quartz rock. The principal ranges of elevated land however consist of clay-slate, and good slates are quarried near Newtownbarry, and in other parts adjacent to the granitic chain. A black and slightly carbonated clay is found near Enniscorthy, and has been mistaken for coal. That part of the county which borders on Waterford harbour consists principally of clay-slate in nearly vertical strata, surmounted in two or three places with a cap of sandstone. From Templetown Hill, near the Hook promontory, such a cap declines until it underlies a tongue of flötz limestone, which extends to the extremity of Hook Point, and is arranged in thin strata dipping at an angle of 4° to 8° towards the south. This limestone contains numerous bivalves and corallites. The sandstone rocks form the precipitous coast about Baginbun Point, and appear in several detached spots in the county, among which is the inner haven of Wexford harbour. The rugged eminence called Tara Hill, alluded to above, consists of porphyry, with a base of compact felspar, occasionally passing into hornstone with inlaid crystals of glassy felspar. Greenstone also appears here occasionally. In addition to the limestone at Hook Point, some is found a little south of Wexford town, and also at Duncormuck, about the middle of the southern coast. The Saltee islands are clay-slate surmounted by beds of sandstone. Lead has been found and worked at Caim or Cairme. Silver was formerly raised near Clonmines, where there are the remains of an antient mine, and galena has been found there. Copper-ore exists at Kerlogue, near Wexford, and it is supposed to have been worked formerly; and plumbago and asbestos have been recently discovered at Greenfield, near Enniscorthy. Horns and bones of the moose-deer have been discovered in the alluvial districts on the east and south, where marl occurs; and about seven years ago a perfect fossil specimen of the *Cervus Megaceros*, or gigantic deer of Ireland, of extraordinary dimensions, was found at Ballyhuskard, near the bog of Itty.

In climate, those parts of Wexford which lie open to the sea are milder in temperature than the adjacent counties of Carlow and Kilkenny. Snow seldom remains on the ground in these districts, and agricultural operations may often be carried on without interruption, while lands ten miles inland are covered with snow or locked up with frost. The southern district is exposed to storms in spring and autumn, and to heavy rains in winter; but the climate is peculiarly favourable to the perfection of grain crops, and the harvest is at least as early as in those Welsh counties which lie more southerly on the opposite side of the Channel.

The principal communication between Wexford and the interior of Ireland is by the river Barrow, which communicates with the Grand Canal. A railroad from Wexford to Carlow was projected a few years since, and the plan was submitted to the Irish Railway Commissioners, but nothing has been done towards its formation. The principal roads in the county are—the mail-coach road from Dublin, which enters the county from Arklow, near its northern extremity, and passes by Gorey and Enniscorthy, and thence along the western side of the Slaney to Wexford; a mail road which leaves this county for Carlow, a few miles north of Newtownbarry; and the mail road across the county from Wexford to New Ross. The county is however well supplied with roads in every direction; and the harbours of Waterford and Wexford afford ample facilities for communication by sea.

Soil, Agriculture, Fisheries, and Manufactures.—The soil of the county of Wexford is generally of a cold clayey nature, being deficient of the substrata of limestone and limestone-gravel which occur in the more inland counties; and, generally speaking, the western or inland parts of the county are inferior in quality to the eastern or maritime portions, although the former have an equivalent for the inferiority of soil in the abundance of turf or peat found in the interior, which affords fuel for burning lime, which is obtained from the neighbouring counties. The eastern and southern parts of the county have a deep alluvial soil, abounding with various marls, calcareous sand, and occasionally limestone, but are deficient in peat; and in some parts of the county, where neither turf from the mountains nor coal from England can be readily procured, fuel is exceedingly scarce. With proper under-draining and dressing with lime, the prevailing clayey and gravelly loam produces good crops. The Hook peninsula, which is open on both sides to the ocean, and little elevated above it, produces grass, wheat, and barley of superior quality with remarkable luxuriance. In the baronies upon the sea-coast the land is generally divided into small farms of from five to twenty acres, the active competition for which occasions rents to be high; and on these little farms much industry is often exerted in manuring and otherwise improving the soil with marl, calcareous sand, sea-weed, &c. On the whole the agriculture of Wexford is in a creditable state, considering the natural disadvantages of the soil. The crops consist of the various kinds of grain, of which barley is the principal, beans, tares, rape, turnips, and potatoes, the last being the staple crop, and that upon which most manuring is bestowed. Clover and artificial grasses are also raised to some extent. Dairies are numerous, and much butter is exported, but neither in the selection of cows nor in the processes of the dairy is sufficient care exercised. The poultry of Wexford are in high repute, and many turkeys and other domestic fowl are reared for sending to Dublin and Liverpool. Many pigeons are supplied from this county; and rabbits, from the sandy warrens near the shore, are sold in great numbers. Bees are also kept, and in some places attention is paid to means of removing the honey without destroying them. Much of the improvement manifested of late years in the agriculture of the county is attributed to the formation of agricultural associations, in the success of which the resident gentry have taken an active interest.

In the account of this county in Hall's 'Ireland' it is observed that itis highly privileged in having few absentee landlords. 'There are,' we are informed, 'no huge estates, over which several agents must, of necessity, be placed.' In the work referred to it is observed that the great feature of the county is its peculiarly English character: 'This,' to quote the language of Mr. and Mrs. Hall, 'is apparent not only in its external aspect—the skilfully farmed fields, the comparatively comfortable cottages, the barns attached to every farm-yard, the well-trimmed hedge-rows, the neat "gardens" stocked with other vegetables than potatoes, and the "acres of beans"—the peasantry are better clad than we have seen them in any other part of Ireland, and have an air of sturdy independence, an independence which they really feel, and to which they are justly entitled.' 'A peasant is never seen without shoes and stockings; and a young woman very rarely without a bonnet. Both are always decently clad, rags being as rare in Wexford as they are in Kent.' 'The interior of their cottages is in corresponding order. The most fastidious guest may not hesitate to dine under the thatched roof of a labourer of the southern baronies. They are, in general, proud of their English descent—of their antient names, and their advanced civilization.'

The great extent of sea-coast and the numerous banks in the vicinity render the fisheries of Wexford very important to its population, many of whom are engaged in them. The coast presents very numerous creeks capable of accommodating open boats, and at most of these some fishermen are resident, but the want of harbours suitable for larger vessels prevents the fishery from being followed to such an extent as it otherwise might be.

The manufactures of the county are of little importance. Woollen cloths, checks, and coarse linens are made, but on a small scale, and chiefly for consumption in the district. A cotton factory was established several years ago at St. John's, near Enniscorthy, but it was soon relinquished; and the weaving and spinning business was formerly carried on to so considerable an extent at Tintern that a yarn-market was established and a market-house built for the buyers and sellers; but, though many weavers remain in the neighbourhood, the market has fallen into decay. There were 67 power-looms in use in the county of Wexford in the year 1836. The manufacture of straw-plat is much attended to by the female cottagers.

The principal external commerce of the county is in agricultural produce, especially barley, of which great quantities are sent to England. The chief corn-markets are at Wexford, Enniscorthy, and Castlebridge, Wexford being the port through which the trade of the other two passes. New Ross also exports the like produce to a considerable extent. Butter is sent through Gorey to Dublin, and through Wexford and Waterford to Bristol, Liverpool, &c.; and cattle, pigs, and poultry are sent to England by steam-boats from the same ports. For statistics of the port of WEXFORD see the next article.

Divisions, Towns, &c.—With the exception of parts of two parishes which belong to the diocese of Dublin, the whole of the county of Wexford is in the diocese of Ferns, and the ecclesiastical province of Dublin. It is divided, for civil purposes, into eight baronies, one of which is subdivided into two portions; their names, positions, respective areas, and population according to the returns of 1831, are as follows:—

Name and Situation.		Area.			Population.
		Land.	Water.	Total.	
		a. r. p.	a. r. p.	a. r. p.	
Gorey	N.E.	81,925 3 37	5 3 8	[illegible]	31,168
Scarawalsh	N.W.	106,429 2 0	229 2 16	[illegible]	41,629
Balaghkeen	E.	86,358 3 33	180 0 39	[illegible]	27,867
Bantry	W.	101,598 2 7	289 0 16	[illegible]	29,945
Shelmalier, East	Central	16,263 3 30	307 [illegible]	[illegible]	28,782
Shelmalier, West		50,299 2 22	469 [illegible]	[illegible]	
Shelburne	S.W.	51,163 1 30	1,900 [illegible]	[illegible]	17,667
Bargy	S.	40,002 0 8	[illegible]	[illegible]	12,113
Forth	S.E.	38,837 3 39	[illegible]	[illegible]	[illegible]
Totals		572,919 3 [illegible]	[illegible]	[illegible]	[illegible]

The county contains the antient episcopal town of Ferns; the county-town of Wexford; the market and post towns of New Ross, Gorey, Enniscorthy, Newtownbarry, and the disfranchised borough of Fethard; and the post-towns of Arthurstown, Broadway, Clonegal, Camolin, and Taghmon, the last of which was antiently a borough, as were also Clonmines and Bannow. Of the above places FERNS, WEXFORD, ENNISCORTHY, and CLONMINES are noticed elsewhere.

New Ross is situate upon the eastern bank of the river Barrow, or River of Ross, about 11 miles in a straight line, or 14 or 15 measured along the windings of the river, from the point where it enters Waterford harbour. At high tides the river is navigable up to this town for vessels of 500 or 600 tons, and at low water there is sufficient depth for vessels of 200 tons; and above the town the river is navigable for barges as far as Athy, where it communicates with a branch of the Grand Canal. The parish lies chiefly in the barony of Bantry, but partly in that of Shelburne, and the town lies about 19¾ miles west by north of Wexford, on the road between that town and Waterford, and about 71 miles south-south-west of Dublin. The living is a vicarage, in the diocese of Ferns, forming, with several adjacent rectories, the union of New Ross, which is in the patronage of the bishop. The population of the borough and town, in 1831, was 5011, and that of the whole parish of St. Mary, New Ross, was 7991. The number of houses in the town was 766, inhabited by 1128 families, which gives an average of rather less than a family and a half, or rather more than 6·5 persons, to each house. The inland traffic of the town was estimated, in 1838, by the Irish Railway Commissioners, to amount to 44,650 tons annually, of which 17,350 tons were carried to, and 27,300 tons from the town; the exports from the port, in 1835, were of the estimated value of 59,074*l*., and the imports 28,007*l*. On the 25th of March, 1842, the port had ten registered vessels above 50 tons burthen, their aggregate burthen being 1861 tons. The chief articles exported were corn, meal, and flour, various other provisions, beer, and a few live cattle, sheep, and pigs; and the principal imports were of coal, culm, and cinders; fish, and wines. Markets are held on Wednesday and Saturday, and there are several fairs in the course of the year. A charter granted to the town by Roger Bigod, in the reign of Edward I., shows that it was in existence previous to that time. From the circumstance of a bridge being built over the Barrow at this town, it acquired the name of Rossponte, or Rosspontum. About 1269 it was so populous and wealthy as to prove attractive to the predatory excursions of the neighbouring chieftains, for protection from which a wall was then erected round the town, some remains of which yet exist. Its growing trade excited the jealousy of the inhabitants of Waterford, who long endeavoured to deprive it of the privileges of a trading port, but the controversy was finally determined in its favour by a decree of the English Court of Chancery in the reign of Edward III. In 1469 the town was partially burned by the MacMurroughs, or Kavanaghs, and the town appears to have suffered much for some time afterwards from similar acts of aggression, and to have been reduced to such poverty and misery as to be nearly depopulated. The town was besieged by the duke of Ormond in 1641, but though he effected a breach, he was repulsed and forced to raise the siege. The battle of Kilrush, in which the duke's army was victorious, was shortly afterwards fought in the neighbourhood, and the Irish, in their flight, broke down the bridge of Ross to impede his pursuit. In 1649 the duke of Ormond threw himself into the town, and endeavoured, but unsuccessfully, to defend it against the forces of Cromwell. The town surrendered upon articles, without resistance, and the fortifications were immediately dismantled. A severe engagement took place here during the disturbances of 1798, on the 5th of June, between the royal troops and the insurgents, who, after ten hours' fighting, were defeated with great slaughter.

The town is agreeably situated on the slope of a precipitous hill falling towards the river, and is well supplied with water, and partially paved, but not lighted. After the destruction of the bridge during the civil war of the time of Charles I., communication across the river was main[illegible]ined by a ferry until the latter part of the eighteenth [illegible] when a bridge 508 feet long and 40 feet broad, of [illegible] oak, was constructed by a joint-stock company. [illegible] has a drawbridge for the passage of vessels. The bridge was greatly injured by severe frost in 1814, after which the footpaths were removed. It connects New Ross with the village of Rossbercon, which was formerly an independent borough, but is now united for electoral purposes with New Ross; and the traffic produces tolls to the amount of about 800*l*. per annum. There is a large quay upon the eastern side of the river. The town contains a court-house, in which the business of the corporation was formerly transacted, and beneath which is a leather-market; a sessions-house, completed in 1832, where sessions are held for the district at Easter and Michaelmas, and petty sessions once a fortnight; a bridewell; a small cavalry barrack; a constabulary police-station; a corn-market, erected in 1818; a meat-market, founded in 1749, but rebuilt in 1831; and a bonded store for tea and other imports. There are three considerable breweries, besides a distillery at Rossbercon, and a boat-building establishment. Ross was formerly an independent port, but is now considered a branch port to Waterford; but it was closed against foreign produce from 1786 to 1832. There was formerly a profitable fishery, especially for salmon, but it has declined of late years. The church, a light and commodious edifice, was rebuilt in 1813, and a neat chapel-of-ease has been recently erected by subscription. The Wesleyan Methodists and some other dissenting bodies have places of worship in the town, which also contains a convent of Carmelite nuns and a small community of Augustinian friars, each of which has a chapel. A grammar-school was founded in 1713, by Sir John Ivory, and the school-house, a handsome and commodious building, with offices, was rebuilt in 1791. The school of the 'Friends of Education' was erected in 1799, and is partially supported by endowments; it comprises separate school-rooms for boys and girls, and apartments for the teachers; and an infant-school has been recently established in connection with it. There is also a large school connected with the Roman Catholic chapel, and several other day and Sunday schools. The Trinity hospital is an establishment for the support of fourteen poor women; and there is a fever hospital, with a dispensary connected with it, and an infirmary for chronic diseases, the whole being managed by a committee, one half of which consists of Protestants and the other half of Catholics, the Protestant vicar of St. Mary's and the parish priest being trustees *ex officio*. The expenditure of the whole, which amounts to 700*l*. or 800*l*. per annum, is supplied by bequests, subscriptions, and grand-jury presentments. There are likewise the Vicar's almshouses for three poor widows, a lying-in hospital, and several other charitable institutions. A Temperance Society, said to be the first established in Europe, was founded in 1829. There are at least two lending-libraries in the town. The town formerly sent two members to the Irish parliament, and now sends one to that of Great Britain; the number of voters on the register, in 1839-40, was 329. The corporation was dissolved by the Act 3 & 4 Vict., c. 108, for the regulation of municipal corporations in Ireland. Immediately east of the parish of New Ross lies that of Old Ross, or St. Mary's, Old Ross, where stood formerly the castle founded by Strongbow, of which the only trace now remaining is an artificial mount upon which part of the building stood.

Gorey, or *Newborough*, is a market-town situated in the barony of the same name, about 26¼ miles (by road) north of Wexford, and 48 south from Dublin. It sent two members to the Irish parliament, but was disfranchised at the Union, when the sum of 15,000*l*. was awarded to Stephen Ram, Esq. as compensation; and it was incorporated in the 17th year of James I., but the corporation was dissolved by the recent act of the 3 & 4 Vict. The name of Newborough was conferred by the charter of James I., but never came into general use. The town contained, in 1831, 526 inhabited houses, 611 families, and 3044 persons. The parish, which is also called Christ Church, Newborough, and Killmakilloge, or Kilmichaelogue, contains 4387 inhabitants, and is a rectory, which, together with some adjacent rectories, constitutes the corps of the deanery of Ferns, in the patronage of the crown. The bishop of Ferns formerly resided in an episcopal palace at this place, but it was attacked, and the library burned, in 1641, by the parliamentarians, and after being converted into an inn, and subsequently into a barrack, it was at length pulled down. During the disturbances of 1798, Gorey suffered much from the insurgents, who destroyed several gentlemen's seats in the neighbourhood, forced many of the inhabitants of Gorey to take refuge in the adjoining county of Wicklow, and killed several on their return home after the battle of Vinegar Hill. Gorey is within two miles of the coast, on the mail-road from Dublin to Wexford, and the town consists chiefly of one long street. It is partially paved, and well supplied with water. The market is held on Saturday, and is well supplied with provisions and poultry, for which, especially for chickens, the place is noted. There are also several fairs. The present church was erected in 1819. Gorey is the head of a union or district in the Roman Catholic division of the county, and there is a spacious Roman Catholic chapel in the town, and several others in the district. There is also a meeting-house for Wesleyan Methodists. The market-house is a commodious building, the upper part of which, formerly used as a court-house, has been converted into a parish school. A new court-house was built in 1819, and the town has a fever hospital and dispensary, a savings'-bank (in which there were 319 depositors in November, 1842), a constabulary police force, a bridewell, two public schools (including the parochial school), and a Sunday-school. The North Wexford Agricultural Association, which has aided the improvement of agriculture and cottage economy in the northern part of the county, holds its meetings at Gorey, and there are periodical cattle-shows and ploughing-matches. The town contains various small manufacturing establishments. Epiphany and Midsummer quarter-sessions for the county are held here, and petty sessions every fortnight, the latter being said to be the first of the kind regularly held in Ireland. The neighbourhood is picturesque, and contains many elegant villas.

Newtownbarry, or *St. Mary's*, is situated on the south bank of the river Clody, close to its confluence with the Slaney, in the barony of Scarawalsh, close to the north-western boundary of the county, about 22 miles north-west from Wexford, and 50 miles south of Dublin. The parish contained 3592 inhabitants in 1831, of which 1430 were in the town, which had at the time 233 inhabited houses and 264 families. The living is a rectory and vicarage, separated from the parish of Templeshanbo, which joins it on the south, in 1776, and in the patronage of the bishop of Ferns. Newtownbarry owes its origin and present name to James Barry, Esq., who was sheriff of Dublin in 1577; but it was formerly called Bunclоady, from its situation at the junction of the Clody and Slaney. It was attacked by the insurgents in 1798, but though they obtained possession of the town, they were speedily defeated. A western suburb extends into the county of Carlow, with which Newtownbarry is connected by a wooden bridge over the Clody. There is also a stone bridge of seven arches over the Slaney. The market, which is remarkably well attended, being the only one within ten miles, is on Saturday, and there are several fairs. The church is a neat structure, with a square tower surmounted by a spire. The town also contains a handsome Roman Catholic chapel, and there are several chapels-of-ease in the neighbourhood. The beauty of the surrounding scenery has led to the erection of many elegant gentlemen's seats near Newtownbarry. The town has three public schools, a Sunday-school, a dispensary, a fever hospital, a constabulary police force, a detachment of the revenue police, and petty sessions every alternate week. Some remains of an antient castle exist near Clohamon bridge, and at Kilmashall is a ruined church and a holy well formerly much resorted to by pilgrims. Near the town is a very strong chalybeate spring, but it has fallen into disuse. Slate of excellent quality, building-stone, and granite, as well as limestone, and marl for manure, are found in the vicinity of the town.

Fethard is a small fishing-port, situated on Fethard Bay, in the barony of Shelburne, 15¾ miles south of New Ross, and 81 miles south-west of Dublin. The parish contained, in 1831, 2153 inhabitants, of whom only 320 resided in the town, or rather village, in 50 houses. A branch of the coast-guard department is stationed here, and a small trade is carried on from the port. The harbour was constructed by government in 1798, and is capable of receiving four small sloops. The town was incorporated by James I., but the corporation is now extinct. It sent two members to the Irish parliament, and 15,000*l.* was paid as compensation upon its disfranchisement at the Union. There are a Protestant church, a Roman Catholic chapel, and public schools for about 70 children, as well as a Sunday-school. At Baginbun Bay, about a mile south of Fethard, Robert Fitz-Stephen landed his forces on his first invasion of the country, and burnt his ships Bagg and Bunn (whence, according to tradition, the place takes its name), to convince his soldiers that they must either conquer or perish in the attempt. There was formerly a market at Fethard, and cattle-fairs are still held four times in the year.

Taghmon is in the barony of Shelmalier (West), 7 miles from Wexford, on the old road from that place to New Ross. The town contained 232 inhabited houses, 253 families, and 1109 inhabitants, in 1831, and the population of the whole parish was 2803. Its trade has been much injured by the diversion of the traffic between Wexford and New Ross to a new line of road; and it is now chiefly dependent upon its fairs, of which there are 23 in the course of the year. A market for salt butter is held every Tuesday and Friday during the season. It once had a corporation, but that has been extinct for a long time, and though Taghmon sent two members to the Irish parliament, it was disfranchised at the Union. The living is a rectory, which, united with that of Ballyconnick, forms the corps of the prebend of Taghmon, in the diocese of Ferns. The church, which is small, but handsome, was erected in 1818. There are also a Roman Catholic chapel and two public schools; a dispensary; a constabulary police-force; and fortnightly petty-sessions. The place derived its name, which was originally Theagh Munno, or 'The House of Munno,' from St. Munno, who founded an Augustinian monastery here, in the sixth century, to which the origin of the town is attributed.

Bannow was also formerly a corporate town and parliamentary borough, although its corporation has long been extinct, and it was disfranchised at the Union, when 15,000*l.* was paid by way of compensation. The town had however previously fallen into total decay. The parish, which contained 1481 persons in 1831, lies on the east side of Bannow Bay, a little north-east of Fethard, in the barony of Bargy. Inequalities in the surface of the ground, which is covered to a considerable depth with sand drifted from the sea, are supposed to be occasioned by the ruins of the town, which is so completely buried that it has been called the Irish Herculaneum. A lead-mine was formerly worked in this parish, and silver is said to have been raised there.

The mere post-towns in the county of Wexford are:—*Arthurstown*, or *King's Bay*, in the parish of St. James, and barony of Shelburne, 9½ miles south-east by south from New Ross, and 80 miles south by west from Dublin, containing about 170 inhabitants. It lies upon the coast of Waterford Harbour, near the æstuary of the Suir, and has a small trade. In this village James II. is said to have spent his last night in Ireland, after the battle of the Boyne. In the immediate vicinity is Duncannon fort, from a rock to the north of which he embarked on his flight to France. *Broadway*, in the parish of St. Iberius, and barony of Forth, 8 miles south-south-east from Wexford, at the northern extremity of Lady's Island lake, containing 160 inhabitants. *Clonegal* lies chiefly, if not entirely, in the county of Carlow, in the parish of Moyacomb, which extends into Wexford, in the barony of Scarawalsh. It is a place of little importance, containing 446 inhabitants. *Camolin* is in the parish of Tomb, and barony of Scarawalsh, situate on the river Bann, and in the road from Gorey to Enniscorthy, and contains 639 inhabitants.

The county of Wexford sent eighteen members to the Irish parliament—two for the county, and two each for the boroughs of Wexford, New Ross, Gorey, Enniscorthy, Taghmon, Fethard, Clonmines, and Bannow: and since the Union with England, it has sent four members to the British parliament—two for the county, which are elected at Wexford, and one for each of the boroughs of Wexford and New Ross. The number of county voters on the register in 1839-40, was 3604, of whom 3346 were freeholders and 258 leaseholders. For legal purposes the county [illegible] town; Leinster circuit; the assizes are held at the [illegible] at general sessions of the peace are held [illegible] Ennis- each of the following towns, viz. Gorey [illegible] held at [illegible] corthy, and New Ross; and petty [illegible] Newtownbarry [illegible] rious intervals at the same places, and [illegible] Burkestown, Clonroche, Duncannon, [illegible] and Taghmon. The county gaol [illegible] Enniscorthy [illegible] are bridewells at New Ross, [illegible] local government is vested in a lieutenant, 16 deputy-lieutenants, and subordinate magistrates. In military arrangements the county is in the Eastern district, and it contains barracks at Wexford, New Ross, and Duncannon.

The effective strength of the constabulary force of the county, on the 1st of January, 1841, was as follows:—1 county inspector (second-rate); 7 sub-inspectors (3 first-rate, 1 second-rate, and 3 third-rate); 8 head-constables (1 first-rate and 7 second-rate); 38 constables; 189 sub-constables (166 first-rate and 23 second-rate); and 6 horses. The total expenditure upon the constabulary force of the county, in the year 1840, was 12,590*l.* 12*s.* 8*d.*

The county of Wexford is included in the Carlow district Lunatic Asylum, and the number of patients from it in the year ending March 31, 1840, was 50, their expenses being 821*l.* 6*s.* 8½*d.* There is a county infirmary at Wexford, and also a county fever-hospital; other fever-hospitals are established at Arthurstown, Enniscorthy, Gorey, Newtownbarry, Oulart, and Ross; and there are dispensaries at Arthurstown, Bridgetown, Broadway, Camolin, Coolgreny, Clongeen and Newbawn, Cornwall, Enniscorthy, Ferns, Fethard, Gorey, Kilkevan and Bannow, Killenagh, Newtownbarry, Ross, Oulart, Skreen, and Taghmon and Horetown. The total number of patients attended to in the year 1837 was 50,092; the number of patients in the hospitals at the end of that year was 112, but beds were provided for 265. The total income of all the establishments, in 1837, was 5659*l.* 15*s.* 1½*d.*, of which 2945*l.* 3*s.* 5½*d.* was provided by county presentments, 1975*l.* 18*s.* 1*d.* by subscriptions and donations, and the remainder by Treasury grants, fines, &c.

The grand-jury presentments of the year 1840 amounted to 42,396*l.* 0*s.* 6*d.*, distributed as follows:—

	£.	s.	d.
New roads, bridges, &c., . . .	4,515	11	10
Repairs of roads, bridges, &c. . .	12,829	4	2
Repairs and erection of court and sessions houses	282	1	1
Ditto of gaols, bridewells, &c. . .	26	10	0
Other prison and bridewell expenses .	2,529	8	4
Police, and payments to witnesses .	5,898	1	3
Salaries of county officers . . .	3,203	11	3
Public charities	4,544	8	6
Repayment of advance to government	7,350	14	1
Miscellaneous	1,216	10	0
Total . . .	£42,396	0	6

The total amount of county cess levied in Wexford in the fourteen years from 1825 to 1838 was 420,768*l.* 15*s.* 2½*d.*; the amount for the last year of that period being 37,547*l.* 17*s.* 0*d.*

Population, Statistics of Crime, &c.—The population of the county of Wexford has been calculated, at various times, to be as follows:—

1760	Estimated by De Burgo . .	66,804
1792	Estimated by Dr. Beaufort . .	115,000
1812	Parliamentary census. . .	160,000
1821	Ditto	170,806
1831	Ditto	182,713
1841	Ditto	202,033

The proportion of population in each barony is given in a preceding column; the classification of the population of 1831, of which 87,995 were males and 94,718 females, 45,414 of the males being 20 years of age and upwards, is given beneath:—

Families chiefly employed in agriculture	21,465
Families chiefly employed in trade, manufactures, and handicraft . . .	6,155
All other families	5,236
Total of families . . .	32,856

Of the persons engaged in agriculture, 3878 were occupiers employing labourers, 10,683 occupiers not employing labourers, and 15,321 labourers. The number of labourers employed in manufactures and in making manufacturing machinery was only 169; the persons employed in retail trades or handicraft, as masters or workmen, 7994; other labourers, employed in labour not agricultural, 2176; capitalists, bankers, professional and other educated men, 1306; male servants 20 years of age and upwards, 693; male servants under 20 years of age, 638; and female servants, 7347. Of the returns of 1841 no more than a mere abstract has yet been published; from this it appears that there were in that year 97,918 males and 104,115 females. The number of families was 34,718; the number of inhabited houses 33,507; of uninhabited houses 1108; and of houses in progress of erection 103.

From the returns of the Commissioners of Public Instruction in 1834, which, being arranged in dioceses, and not in counties, do not afford exact information on the subject, it would appear that the county contained about 21,602 members of the Established Church, and 317 Protestant Dissenters, all the rest of the population being Roman Catholics. In the return relating to National Schools, by the Rev. James Carlile, appended to the Report of a Select Committee on Education in Ireland, in 1837, it is stated that there were 3763 children enrolled in 29 national schools in the county, of whom only 69 were Protestants, and the remainder Roman Catholics. A singular fact was noticed in evidence before the above Committee, relative to the general use of the English language in Wexford, and in other parts of Ireland also. The Rev. C. R. Elrington, one of the witnesses examined, stated that he should think there was not then a man in the county of Wexford who knew Irish, 'except in the immediate neighbourhood of Ross, where,' he says, 'they learn to speak it for the purpose of keeping up communication with the county of Kilkenny.'

The criminal returns of 1841 show a total of 292 offences tried at the assizes and quarter-sessions of this county, and of 230 summary convictions at petty sessions; the committals for drunkenness were 55 to the county gaol, and 165 to the various bridewells. Of the assize and quarter-sessions cases 63 were offences against the person, 53 being simple assaults; 16 offences against property, committed with violence; 157 offences against property committed without violence; 3 forgery of stamps and uttering base coin; 14 for riots and various breaches of the peace; 7 for vagrancy; and 31 for various misdemeanours. The number of convictions was only 146, or exactly one-half the number of offences; and of the offenders convicted 10 were sentenced to transportation for 7 years, 121 to various terms of imprisonment, 13 were fined, and 2 respited. Of the 292 persons tried, 190 were males and 102 females; 2 were under 12 years of age; 17 under 16; 55 under 21; 72 under 30; and the remainder of various ages. Of the males 73 were able to read and write, 21 to read only, 62 could neither read nor write, and the state of instruction of the remainder was not ascertained. Of the females, so far as the facts could be ascertained, 8 could both read and write, 81 were able to read only, and 67 could neither read nor write.

History and Antiquities.—In the time of Ptolemy the greater part of the present county of Wexford was inhabited by the Menapii, whose chief town, Menapia, supposed to have occupied the site of the present town of Wexford, was situated on the river Modonus, now the Slaney; some however consider Ferns to be the site of the antient Menapia. The antient inhabitants are supposed to have derived their origin from the Menapii of Belgic Gaul, possibly through the Belgæ of Britain, and to be the people called by the Irish annalists *Fir-bolgs*, which means Viri Belgici, or Belgians. The Brigantes are also supposed to have occupied part of this county, towards the south-west, as well as a portion of the adjacent county of Waterford. By some antiquaries it is supposed that the Hieron Promontorium, or Sacred Promontory, of the antient Greek geographer, was the peninsula now called Hook. The country was anciently styled Corteigh, (a name which appears to be preserved in that of the town of Enniscorthy), Moragh (whence some say the Mac Murroughs took their title), and Laighion, a name bearing some resemblance to Leinster, which latter term, though now applied to a much larger portion of Ireland, was chiefly applied to Wexford by Irish, Danish, and Latin writers towards the close of the middle ages. Dalmachsevel, which means 'the maritime counties,' was another name given to this county, in common with Wicklow. The present name appears to come from Weisford, a name given by the Danes to the chief town in the county, when, after predatory incursions in the country, during which they burnt the previous capital, Ferns, they chose that as the centre of a permanent settlement. Camden mentions another popular designation of the county, as 'the rough county,' or County Reogh; and the northern portion of it was included in Hy Kinselagh, afterwards called Kavanagh, the territory of the MacMurroughs, who had a favourite residence at Ferns. Wexford is distinguished as containing the first landing-place used by the English, when, in 1170, or according to other authorities, 1169, they invaded Ireland under the command of Robert FitzStephen, under the circumstances mentioned in the article Ireland, vol. xiii., p. 21. The English armament landed at Baginbun, near Fethard, and shortly afterwards attacked the Danes at Wexford, of which place, after a contest of four days, they obtained possession. MacMurrough then confirmed a grant which he had previously made of Wexford and some adjoining parts to the English adventurers, whose settlement in the country so alarmed the other native princes, that they formed a confederacy for driving out MacMurrough and his English allies. A treaty was made between the contending parties at Ferns, in which a secret article for the expulsion of the English was inserted; but the invaders had obtained too firm a footing to be thus got rid of, and their conquests were soon greatly extended by the prowess of Richard de Clare, surnamed Strongbow, who married Eva, the daughter of MacMurrough, after whose death, in 1172, he became Lord of Leinster, a title which was confirmed to him as a palatinate by Henry II. of England, when he visited Ireland shortly after. The English king retained the town of Wexford for a time in his own possession but soon conferred it upon Strongbow. Wexford was formed into a county by King John in 1210, and it formed part of the possessions inherited by William le Marischal through his marriage with the daughter of Strongbow. On the extinction of his male line, his possessions were divided among his daughters, and, owing to frequent changes of proprietorship and the non-residence of its English lords, Wexford fell into a state of great confusion, and consequently a considerable part of the county was seized by one of the Kavanaghs, who, early in the fourteenth century, assumed the title of MacMurrough, and declared himself king of Leinster. Further disturbances were occasioned by John Esmond, bishop of Ferns, who had been deprived of his episcopal dignity by the pope in 1349, maintaining himself by force of arms in his castle at Ferns. He was at length, with considerable difficulty, compelled to enter into articles to keep the peace. From the year 1474 to 1537, when the Irish possessions of the great absentee lords were vested in the crown, the county was divided into two separate jurisdictions: the Liberty, which was governed by the family of Talbot, earl of Shrewsbury, into whose possession the lands formerly belonging to William le Marischal had descended; and the Cross, or Church lands in the county, over which a sheriff was appointed by the king. During this period two members of parliament were elected for the Liberty, and two for the Cross. In 1641 the royal forces, under Ormond, were defeated in an attempt upon New Ross in the early part of the war, and subsequently Duncannon fort was taken by the Catholics. In 1649 the whole county was reduced to subjection by Cromwell, who put the garrison of Wexford to the sword. From that time until the rebellion of 1798 the county enjoyed almost uninterrupted tranquillity, but it became the chief seat of that insurrection, and the scene of many severe conflicts. The county was placed under martial law in the month of April in that year, but no military force was actually sent there until hostilities had broken out elsewhere. It was suspected that the secret organization called the Society of United Irishmen had extended into Wexford, and the harsh conduct of the military in endeavouring to force the suspected parties into a confession of guilt, together with the burning of a chapel at Boulavogue, in the parish of Kilcormuck, exasperated the people, and led them to assemble in arms at Oulart and Kilmacthomas. They were soon dislodged from the latter position, but at the former place they defeated the detachment of military sent against them; and, rapidly increasing in number and boldness, they attacked Enniscorthy, and forced the garrison to retire towards Wexford. Having cut off a party of infantry and artillery sent from Duncannon fort to strengthen the garrison at Wexford, they marched upon that town, the garrison of which retired to Waterford. The head-quarters of the rebel army were formed at Vinegar-hill, near Enniscorthy. Great atrocities were perpetrated by the insurgents during their possession of the town of Wexford, but they appear to have been not without parallel among the loyalist soldiery. The rebels at length, having chosen for their general Beauchamp Bagnal Harvey, Esq., a Protestant gentleman who had distinguished himself as a friend of the people and an opponent of the despotic measures of government, attacked New Ross, but were repulsed with much loss after ten hours' fighting. Harvey was soon afterwards superseded by a Roman Catholic priest named Roche. The royal forces, having collected their strength from various quarters, then made a simultaneous attack upon Vinegar-hill, and forced the insurgents to retreat. Wexford was afterwards retaken, and many of the insurgents suffered capital punishment; and this complete defeat of the main body of rebels put an end to the insurrection in this district, excepting in the case of a few small detached parties.

The county of Wexford, especially the southern part, abounds with antiquities of Danish, Saxon, and Norman origin, though comparatively few can be assigned to a period prior to the arrival of the English in the country. Two tumuli, or raths, remain in the neighbourhood of Enniscorthy, at Salville or Montabeg, and Donamore; two others, of considerable size, near Dunbrody; and one near New Ross. Of smaller raths, which are numerous in the southern baronies, one of the most perfect is at Ballytrent, and is now laid out as a pleasure-ground. There are remains of monasteries at Wexford, Enniscorthy, St. John's, south of Enniscorthy, Ferns, Dunbrody, near the confluence of the Suir and the Barrow, Ross, and Clonmines. Of other ecclesiastical edifices, Tintern Abbey, near the Bannow, has been converted into a dwelling for the family of Colclough; Ballyhack, Carnsore, and Clonmore are turned into parish churches; and the ruins of Glascarrig are partly used as a farm. There are ruins of an antient chapel, called St. Vaugh's, near Carnsore. Religious houses were also formerly existing at many other places where no traces now remain. Ruins of castellated buildings are numerous. At Wexford are the remains of White Castle, near the entrance of the harbour. Carrig Castle, on a rock by the Slaney, lies two miles north-west of Wexford; and about the same distance in a more southerly direction is that of Barntown. There are also ruins of castles at Ferns, Enniscorthy, Mackmine, Black castle, on the Slaney a few miles below Enniscorthy, Cuislan-na-Blahie, or 'Buttermilk Castle,' near Dunbrody abbey, and Killesk, Knockagh, and Kilhile castles, in the same neighbourhood. At Ballykeroge are considerable remains of a castle founded by Roger de Sutton, and near the same place are ruins of castles at Stokestown, Alderstown, Priest's Haggard, and the Great Island. At Mountgarrett, a hill overlooking New Ross, are the remains of a castle; on the Hook peninsula are ruins of Slade and Houseland castles and, on its extreme point, of an old fort called Hook tower, now converted into a light-house; and on the Bannow inlet is Duncormuck or Crosscormuck castle. So very numerous indeed are the remains of this character, that it is observed, in the work of Mr. and Mrs. S. C. Hall, referred to above, that as evidences of the power of the Anglo-Norman intruders, as well as of their peril in the midst of brave though unskilful enemies, 'we may count no fewer than six score of their castles and towers, now in ruins, in the four southern baronies alone—in Forth thirty-one, in Bargy twenty-seven, in Shelburne thirty-seven, in Shelmalier twenty-five.' Among the military remains not mentioned above is Strongbow's fort or camp, near Duncormuck castle, on Baginbun Head, where intrenchments are yet visible. Of more recent objects of interest in the county may be mentioned a great pile of stones at Wicklow Gap, near its northern extremity, marking the spot where those who fell in a sanguinary conflict between the insurgents and the royal troops, in 1798, were buried. It is the custom for every passenger to add a stone to the heap, and offer a prayer for the souls of the deceased.

(*Ordnance Survey of Wexford*; Lewis's *Topographical Dictionary of Ireland*; Hall's *Ireland*, vol. ii., pp. 137-184; *Parliamentary Papers*, &c. &c.)

WEXFORD, the capital town of the county of the same name in Ireland, is situate upon the south-western shore of Wexford Harbour, at the embouchure of the river Slaney. It lies at the northern extremity of the barony of Forth, near the boundary of that of Shelmalier (West), in about 52° 20′ N. lat. and about 6° 27′ W. long. from Greenwich, about 74 miles south of Dublin (by road), and rather more than 30 miles east by north-east from Waterford. The general direction of the town is from north-west to south-east, in which direction, including the suburb of Faythe (a corruption of Feagh, from St. Michael of Feagh, the name of the parish), to the south, is about a mile; but it [illegible] extend more than about a third of a mile in a south-western direction from the harbour. There are six parishes in the town, the aggregate area of which, according to the Ordnance Survey, is 68 acres, 1 rood, 27 poles. The population of the entire town and borough, in 1831, was 10,673, and the number of houses about 1820. The town is generally well built; but the streets are narrow, partially and but indifferently paved; supplied with water partly by pipes, partly by wells, and partly by a public conduit in the corn-market. Until recently it was not lighted. Spacious quays extend along the harbour the whole length of the town, towards the centre of which the otherwise nearly straight line is broken by the Crescent Quay, which is indented in a semicircular form. Nearly opposite to the Crescent, at some distance from the quay-line, is a kind of breakwater, called the ballast quay or bank, formed by the ballast deposited there by ships which frequent the port. The haven contracts abruptly opposite to the northern end of the town; and at the narrowest point a timber bridge, constructed entirely of American oak, at a cost of 17,000*l*., by Emanuel Cox, an engineer from the United States, who erected several other extensive bridges in Ireland, was built in 1794-95. The width of the opening crossed is about 1571 feet, and the original bridge was of that length; but as it had fallen much into decay, it was some years since repaired, or rather reconstructed, at an expense of 6000*l*. In its present state it consists of two causeways, projecting 650 feet and 188 feet from the north-eastern and south-western banks respectively, united by a timber bridge of 733 feet, supported by 23 piers of the same material, and having a drawbridge for the passage of masted vessels into the inner haven, which expands considerably a little above the bridge. The tolls of Wexford Bridge let, in 1832, for about 700*l*. per annum. This port is considered a good nursery for seamen, and has many apprentices in the merchant-service. It possessed, on the 25th of March, 1842, 69 registered vessels of upwards of 50 tons, their aggregate tonnage being 7114 tons; and the customs duties taken in the port in 1840 amounted to 9357*l*. 1*s*. 11*d*.: in the previous year they were 8433*l*. 3*s*. 4*d*. The export trade was estimated, according to the returns published by the Irish Railway Commissioners, to amount, in 1835, to 312,136*l*., and the imports in the same year to 621,417*l*. More than one-half (in value) of the exports consisted of corn, meal, and flour: butter was estimated at 54,000*l*.; oxen at 36,000*l*.; sheep at 15,000*l*.; and swine at 12,000*l*. Of the imports, 120,000*l*. is set down for woollen manufactures; 29,535*l*. for sugar (exclusive of 6300*l*. for British refined sugar); 26,100*l*. for coal, culm, and cinders; 19,800*l*. for cast-iron; and 19,000*l*. for wrought-iron and hardwares: the remaining items comprised chiefly manufactured goods, and various articles of domestic consumption. Steam-vessels form the medium of regular communication with Liverpool and other places, and the Slaney affords navigable communication with Enniscorthy and the interior of the county. The shipping interests of Wexford have been promoted by the formation, within a few years, of a ship-building establishment; the vessels of this port having previously been built either at Milford or at Liverpool. The fisheries of the neighbourhood have declined, though those of herrings and oysters are of some importance during the winter. Malt is manufactured to a considerable extent in the town, and much is sent to Dublin. There are also a distillery, breweries, rope-yards, and tan-yards in the suburbs. The coasting trade has diminished since Wexford was made a bonding-port, but that to Great Britain has increased in proportion. The chief market is on Saturday; but there is also one for poultry, butter, and eggs every Wednesday. Fairs are held eight times in the year.

The town of Wexford is inclosed towards the land by a wall, which was thoroughly repaired in 1804, at the expense of the corporation. Wexford forms, with several adjoining parishes, an ecclesiastical union. There are now but two churches within the town, although it appears to have contained twenty in the year 1615. There are several places of worship for Roman Catholics, Wesleyan Methodists, and other denominations of Protestant dissenters. The relative numbers of Protestants and Catholics in 1834 were about as 1 to 6. The diocesan school for the see of Ferns is situated to the north of the town; it was built in 1800, at the expense of the county. There is also a large parochial school for boys and girls, supported partly by endowment and partly by voluntary contributions. St. Peter's College, at Summer Hill, west of the town, is a large educational establishment in connection with the Roman Catholic Church, where the course of studies ranges from the mere rudiments of knowledge to the highest departments. Students for the priesthood are educated there; and the establishment is not confined to Catholics, Protestant children also being admitted, and educated without interference with their religious principles. The Wexford poor-school, founded in 1809 by Mr. W. Doran, gives instruction to about 300 boys; and there is an infant-school, founded in 1830. At Wexford are the county infirmary, with a dispensary attached; the county fever-hospital; the county gaol and house of correction; a court-house; a house of industry and a lunatic asylum, both in the old gaol; and the Redmond female orphan-house, erected in 1829, chiefly from funds bequeathed by a gentleman of the name of Redmond, by which it is supported. It is situated upon part of the lands of St. Peter's College, and is under the superintendence of the Roman Catholic bishop and five other trustees. Among the other public buildings are spacious barracks; assembly-rooms, where balls are held on public occasions; a building belonging to the Wexford Union Club; a small theatre, which, not proving profitable, was converted into a sale-room; branches of the Bank of Ireland and of the Provincial Bank, &c. There are also reading-rooms, and a Chamber of Commerce, established in 1831. There is a savings' bank, in which, at the date of the last return, in November, 1842, there were 1202 depositors.

The town of Wexford was a maritime settlement of the Danes, and is supposed to have derived its name, formerly written Weisford, from the term Waesfiord (Washford), which implies a bay overflowed by the tide, but left dry, or nearly so, at low-water. It was besieged for three days by Fitz-Stephen, soon after he landed at Baginbun, and then surrendered on condition of recognising the sovereignty of Dermod MacMurrough, king of Leinster. The town partook of the changes and disturbances mentioned in the history of the county (see the preceding article); and during the contention between the houses of York and Lancaster it was seized by Sir John Butler, brother to the earl of Ormond, who had just been beheaded by the partisans of the duke of York. He was soon afterwards defeated by the earl of Desmond, who, in the following year, held a parliament in the town. Wexford was one of the first places which fell into the hands of the insurgents in 1641, and formed the port from which they received their principal supplies from other countries. In 1649, on the approach of Cromwell, the inhabitants reluctantly consented to receive a detachment of royal troops from Ormond for the defence of the town; but they were of no avail: Cromwell obtained possession of the place, and gave it up to military execution. After the battle of the Boyne the town took part with William III., and was garrisoned by his troops. In 1793 a collision took place between the military and a body of peasantry assembled for the rescue of some Whiteboy prisoners, on which occasion Captain Valloton was killed. A monumental obelisk on the Windmill Hill commemorates this event. During the insurrection of 1798 the town was evacuated by the garrison, in a panic occasioned by the defeat of a detachment of royal troops marching to their assistance, and the rebels immediately made it their head-quarters. They retained possession from the 30th of May to the 21st of June, during which time they beheaded ninety-one prisoners on the bridge; but after the defeat of the insurgents at Vinegar-hill, the rebels fled precipitately from the town.

The first charter granted to Wexford, as far as records show, was that of Adomar de Valence, in 1318. It was confirmed and extended by Henry IV. and Elizabeth. Another charter, under which, until the recent alterations, the town was governed, was granted by James I. in 1608. James II. gave one at a later period, but it was annulled after the Revolution. Wexford is one of the towns whose corporations were dissolved by the act of the 3rd and 4th of Victoria. The town sent two members to the Irish parliament, and now sends one to that of Great Britain. The number of registered voters in 1839-40 was 405.

(*Ordnance Survey of Wexford*; Lewis's *Topographical Dictionary of Ireland*; *Parliamentary Papers*; &c.)

WEXIO. [Sweden.]

WEY. [Weights and Measures.]

WEYERMAN, JACOB KAMPO, a Dutch fruit and flower painter, born at Breda, in 1679, notorious for his bad character and scandalous writings. He wrote a set of lives of Dutch painters, which, according to Van Gool, are full of calumnies; and Descamps says of him, 'Il a rempli ses écrits d'ordures, d'impiétés, et de calomnies.' His work is entitled 'Levensbeschryvingen der Nederlantsche Konstschilders en Schilderessen,' 'Sgravenhage, 1729, 4to. In one of his scandalous writings he attacked the Dutch East India Company; and in 1739 he was condemned to perpetual imprisonment at his own cost, in which he died in 1747.

He learnt painting of Ferdinand van Kessel, and had great skill in his style and great facility in writing; he however neglected his art and abused his abilities, and, according to all accounts, appears to have been a thoroughly bad man in every respect.

(Van Gool, *Schouburg der Nederlantsche Schilders*, &c.; Descamps, *La Vie des Peintres Flamands*, &c.)

WEYMOUTH and MELCOMBE REGIS, in the Dorchester division of Dorsetshire, in 50° 37′ N. lat. and 2° 27′ W. long., were formerly distinct municipal and parliamentary boroughs, but were united into one parliamentary and municipal borough in 1571, and Weymouth is now the general name for both places. The two towns form a seaport on the shore of Weymouth Bay, where it communicates by an arm of the sea with a small internal bay, about two miles long, called the Backwater, which may be regarded as the æstuary of the small river Wey. The harbour is in the arm of the sea which connects the Backwater with Weymouth Bay, Weymouth being on the south side of the harbour, and Melcombe Regis on the north side: the two towns are connected by a handsome stone bridge. In Leland's time the communication was by a ferry: 'the trajectus is by a bote, with a rope bent over the haven, so that in the ferry-bote they use no oars.' The harbour has eight feet of water on the bar at ebb-tide. The united borough comprises the chapelry of Weymouth and the parish of Melcombe Regis, together with the harbour and Backwater, the latter being included in the parish of Melcombe.

Weymouth Proper is described as having the appearance of an old fishing-town, with mean-looking houses and narrow streets. Melcombe is situated on a tongue of land between Weymouth Bay and the Backwater, very narrow on the north-east, but becoming wider towards the harbour, where the width is about a third of a mile; the ground on which it stands is low, a considerable part of it having been reclaimed from the Backwater by embankment. In front of Weymouth Bay a broad terrace, called the Esplanade, extends nearly a mile, with a gradual slope towards the shore; the ranges of houses which face this Esplanade are handsome, and many of them large; most of them are occupied by those who resort to the town as a bathing-place, for which the beach is excellently adapted, the sand being smooth and firm, and the slope very gradual. The houses in the back part of the town are inferior and the streets narrow.

Weymouth had been a declining place for many years from various causes, but chiefly perhaps in consequence of the rivalry of Poole, till it was brought into repute as a bathing-place, about 1763, by Ralph Allen, of Bath. The duke of Gloucester went there in 1780, and had a house built for his residence. George III. paid his first visit in 1789; he had a royal lodge erected, and went there frequently. The climate is very mild, Weymouth Bay being sheltered to the north by surrounding hills, which have a gradual slope to the south towards the beach. There are assembly-rooms, a theatre, two national schools, one of them Lancasterian, two churches, one of which is in Weymouth, which is a curacy attached to the rectory of Wyke Regis, and there are places of worship for Independents, Baptists, Quakers, and Methodists. In the savings'-bank the number of depositors, November 20, 1842, was 514: the smallest sum on which interest is allowed is 14*s.* 8½*d.* Ship-building is carried on, and rope-making; but little is done in any other trade.

The number of vessels above 50 tons burthen belonging to the port of Weymouth, in 1840, was 56, the aggregate burthen of which was 6037 tons. The gross receipt at the custom-house, in 1839, was 12,907*l.* 7*s.* 7*d.*; in 1840 it was 14,727*l.* 11*s.* 4*d.* The trade of the port of Weymouth, in 1833, was—

Foreign vessels, with cargoes, inwards .	37
Foreign vessels, with cargoes, outwards .	25
Coasting-vessels, with cargoes, inwards .	355
Coasting-vessels, with cargoes, outwards .	319
Post-office packets, inwards . . .	101
Post-office packets, outwards . . .	101
Registered vessels belonging to the port .	79

Previous to the Municipal Reform Act, the corporation consisted of a mayor, an indefinite number of aldermen, two bailiffs, and twenty-four principal burgesses. The Municipal Reform Act divided the borough into two wards, with six aldermen, and a council of eighteen. The number of burgesses, or municipal electors, in 1837, was 631. The total expenditure of the borough in 1840-41 was 2163*l.* 3*s.* 10*d.*

Weymouth and Melcombe Regis, before the Reform Act, returned four members to the House of Commons. The right of voting was in the corporation, the possessors of freehold property, and fee-farm renters. There were no freemen. The number of voters was reckoned to be about 2000, but the largest number of electors who polled at any election, for thirty years previous to 1831, was 745. The borough now returns two members to the House of Commons. The number of electors on the register in 1835-6 was 617, of whom 536 were 10*l.* householders; the number on the register in 1839-40 was 660, of whom 597 were 10*l.* householders.

The population of the borough, in 1831, was—

Chapelry of Weymouth . .	2529
Parish of Melcombe Regis .	5126
	7655

In 1821 the population was 6622. The number of houses, in 1821, was 1213; in 1831 the number of houses was 1465. The population within the limits of the parliamentary borough in 1831 was 8095.

Weymouth is 128 miles from London by road. There is no direct mail from London, but a cross-mail from Dorchester, which is eight miles north from Weymouth.

Weymouth is an antient place: it is mentioned in the 'Domesday Book,' and was afterwards a place of some naval importance. In 1347 it furnished 20 ships and 264 men towards the armament destined to attack Calais. In 1588, when the Spanish Armada sailed to attack England, six ships of the English fleet belonged to Weymouth. During the civil war under Charles I., Weymouth was alternately garrisoned by the royalists and the parliamentarians till 1644, when the parliamentarians obtained possession which they held till the termination of the war. In the reign of Charles II. Weymouth was greatly injured by a fire, and 3000*l.* was collected in 1673 by a brief, towards repairing the damage which it had sustained.

The earliest charter known to have been granted to Weymouth was one in 1252, by the prior and monks of St. Swithin, Winchester, to whom the manors of Weymouth and Melcombe had been granted by Henry I., a grant which was confirmed and extended by Henry II. A grant of certain liberties and privileges was made to Melcombe Regis by a charter dated 27 May, 8 Edw. I., and followed by another, dated 22 Jan., 11 Edw. II.; by one dated 3 Nov., 2 Edw. III.; and by one dated 15 May, 2 Eliz. The union of the two boroughs was by an act of parliament, dated 2 April, 13th Eliz. July 1, 14 James I., another charter of incorporation was granted; and to remedy certain defects in this charter, an amending and explanatory charter was obtained, 19 August, 21 Geo. II. In 1802, in consequence of the diminution of the number of principal burgesses, it was apprehended that the corporation might be legally dissolved, to avoid which a new charter was obtained, 25 May, 44 Geo. III., which was the governing charter of the borough till the Municipal Reform Act in 1835.

(*Municipal Corporations' Reports*, 1835; *Boundary Reports*, 1832; Hutchins's *History and Antiquities of the County of Dorset*; *Parliamentary Documents*.)

WHALE FISHERY. [FISHERIES.]

WHALES—*Cetacea*—an order of aquatic mammals with fin-like anterior extremities, the posterior extremities being absent, or rather, having their place supplied by a large horizontal caudal fin or tail, without an external ear, without hair on their external integument, and the cervical bones so compressed as to leave the animal without any outward appearance of a neck. This order comprises the largest animated forms in existence: some of the genera composing it are phytophagous, or plant-eaters; others are zoophagous, or animal-eaters.

Systematic Arrangement.

The cetaceous mammals, whose abode is either in the sea or the great rivers, resemble the Fishes so closely in external appearance, that it is hardly to be wondered at that not only the vulgar, but even some of the earlier zoologists looked upon them as belonging to that class. This notion is kept alive to the present day in the announcements of the comparative success of those ships which are employed in the *Whale Fishery*; for not only is it conveyed by that general term for the capture of whales, but by statements that one ship has arrived with three *fish*, another with four *fish*, a third with one *fish*, &c.

If we turn to the sacred scriptures, we find the Hebrew words *Than* and *Thannin*, which have been translated by the words κῆτος (the word used by Æneas Gazæus to designate the fish out of whose belly Hercules is said to have escaped after having been swallowed) and 'whale.' Lycophron terms the marine animal that so disposed of Hercules when he was shipwrecked, *κάρχαρος κύων*, a shark.

The Septuagint translates the Hebrew words above noticed, *τὰ κήτη τὰ μέγαλα*, in the 21st verse of the first chapter of Genesis. The same Greek word is used in the seventeenth verse of the first chapter of Jonah. In the book of Job (vii. 12), and in that of Ezekiel (xxxii. 2), the translation uses the term δράκων (*dracon*). In Matthew (xii. 40), where the swallowing up of Jonah is alluded to, κῆτος is employed.

In Barker's Bible (1615) the passage in Genesis is translated, 'Then God created the great whales,' much the same as it stands in the version now read in our churches, 'And God created great whales.'

The other passages are translated in Barker's Bible as follows:—Jonah (i. 17), 'Now the Lord had prepared a great fish to swallow up Jonah: and Jonah was in the belly of the fish three days and three nights:'—Job (vii. 12), 'Am I a sea or a whale fish, that thou keepest me in ward?'—Ezekiel (xxxii. 2), 'Thou art like a lyon of the nations, and art as a dragon in the sea;' in a note, '*or whale*' is added:—Matthew (xii. 40), 'For as Jonas was three days and three nights in the whale's belly,' &c.

In the version now used in our churches the passage in Jonah is *verbatim* the same as in Barker; that in Job is thus rendered, 'Am I sea, or a whale, that thou settest a watch over me?'—that in Ezekiel, 'Thou art like a young lion of the nations, and thou art as a whale in the seas:'—that in Matthew is identical with the passage in Barker.

These are merely cited as examples: there are other passages in the Old Testament in which the words whale and κῆτος occur in the English and Greek versions. It would be beside the present question to enter into the discussion whether the whale was meant, or a crocodile, as some will have it, in the verses above quoted; it is sufficient for our purpose to show the commonly received opinion that a whale was a fish.

In the index to Pliny's 'Natural History' we find the whales treated as fishes, 'Balænarum piscium consideratio,' 'Balæna piscis,' &c., but in the work itself the *Balæna* and *Physeter* are noticed as *Beluæ*, and a fair account is given of their spouting and general habits. The seventh chapter of his ninth book, indeed, is headed 'An spirent pisces, an dormiant,' but in that chapter he expressly states that neither whales nor dolphins (balænis nec delphinis) have gills, but breathe by means of fistulæ, or blow-holes, which appertain to the lungs.

Aristotle, whose great zoological work Pliny had closely studied, was certainly aware of the broad distinction between the whales and dolphins (the position of whose blow-holes he mentions) and fishes.

Gesner separated the whales from the fishes, including them in a distinct order of marine animals. Aldrovandi separated them also, though they appear in the same volume, the title of which is 'De Piscibus, Libri V.: De Cetis, Liber Unus.' Jonston gives them a separate chapter at the head of his book 'De Piscibus.'

Ray, in his Synopsis *Methodica Piscium* (1713), observes that the term 'fish' is extended, even by the learned of our country, to the bloodless aquatics, as they were then termed, *Exanguia aquatica*, such as *Crustacea*, *Testacea*, and *Mollia*, or shell-less mollusks. On the other hand, some, he remarks, not only exclude those *Exanguia aquatica*, but also the Cetaceans ('Cetaceum genus, seu Belluæ marinæ'), contending that no other animals can justly be termed fishes except those which breathe by means of gills and have but one ventricle to the heart. With these last Ray agrees, and expresses his own opinion that, if we speak properly and philosophically, the name of fish should be restricted to such last-mentioned animals only, and points out the absence of any relationship of the '*Pisces Cetacei* dicti' with the true fishes, adding, that with the exception of the place where they spend their lives, the external figure of their body, their hairless skin, and their natatory progression, the *Cetacea* have hardly anything in common with the true fishes, but in other respects agree with the viviparous quadrupeds.

Nevertheless, that he may avoid dissent from received opinions and the appearance of paradox, Ray declares that he will not innovate, but consider the Cetaceous animals as fishes; and he proceeds to define what a fish is, thus: An aquatic animal having blood, wanting feet, swimming with fins, covered either with scales or with a naked, smooth, hairless skin, passing its life in the waters, and never voluntarily leaving it for the dry land.

The Cetaceous fishes, or *Belluæ marinæ*, form his first section, and are immediately followed by the Cartilaginous fishes, called Sélache (Σελάχη) by Aristotle. Of the Cetaceans he says that they breathe, like quadrupeds, by means of lungs, copulate, bring forth their young alive, and nourish them with their milk, and in the structure and use of all their internal parts agree with those animals.

The following are the genera enumerated by Ray:—

Balæna (2 species); *Cete* (1); *Orca* (2, but one not clearly defined); *Albus*; *Monoceros*; *Delphinus*; *Phocæna*. and he divides the *Cetacei generis Pisces, seu Balænæ*, into two great groups—the toothed and toothless; the latter having horny laminæ in the upper jaw.

The Toothed Whales are subdivided into those which have teeth in both jaws and those which have teeth in the lower jaw; and there are further subdivisions dependent on the absence or presence of the back-fin and the shape of the teeth.

The Toothless or Whalebone Whales are subdivided also with reference to the absence or presence of the back-fin, the presence of a blow-hole, or the employment of nostrils in respiration, the presence of plaits on the belly, and the width of the lower jaw.

Linnæus, in his last edition of the 'Systema Naturæ' (1766), defines the *Fulcra* or props of his Mammalia to be four feet, with the exception of those mammals which are merely aquatic, *in quibus pedes posteriores in caudæ pinnam compedes*; in other words, in which the posterior limbs are manacled or conjoined, so as to form a tail-fin.

The seven orders of *Mammalia* in this system are divided into three sections:—1, Unguiculata; 2, Ungulata; 3, *Mutica*. The seventh and last order, *Cete*, is the only one belonging to the section *Mutica*.

The following is the Linnæan definition of the last-named order:—

Pectoral fins in lieu of feet, and feet conjoined into a horizontal flattened fin in lieu of a tail. No claws. Teeth cartilaginous. Nose often a frontal pipe. Food, mollusks, fishes.

Locality, the Ocean.

Linnæus then declares that he has separated these cetaceans from the fishes, and associated them with the mammals, on account of their warm bilocular heart, their lungs, their moveable eyelids, their hollow ears, *penem intrantem feminam mammis lactantem*, and this, to use his own expressive words, *ex lege naturæ jure meritoque*.

Here then we find the decisive step taken, with the unflinching firmness of a master mind, relying upon the philosophical principles that demanded the separation, and no longer yielding to popular prejudice by calling that a fish which he knew to be a mammiferous animal. Some parts of his definition—not much of it—may be open to criticism, as where he designates the teeth as cartilaginous, a term probably used to comprehend both the horny laminæ of the whalebone whales and the true teeth of the other cetaceans; but the broad line of distinction is unassailable, and will ever remain so.

The order *Cete* is thus summarily defined by its great founder:—

Spiracles upon the head. Pectoral fins and horizontal caudal fin without claws.

Genera :—*Monodon*, *Balæna*, *Physeter*, *Delphinus*.

This, the last order of the Linnæan *Mammalia*, is immediately preceded by the *Belluæ*.

For Lacépède's arrangement, see his *Histoire Naturelle*, *&c. des Cétacés*, 4to., Paris, 1804.

The *Cétacés* form Cuvier's ninth and last order of *Mammifères*, the Ruminants (*Pecora*, Linn.) being the eighth.

Cuvier defines the Cetaceans to be mammiferous animals without posterior feet. Their trunk, he states, continues itself with a thick tail, which a cartilaginous horizontal fin terminates, and their head is joined to the trunk by a neck so short and thick that no narrowing or constriction of the part is perceptible, and composed of cervical vertebræ, which are very delicate, and in part conjoined or soldered together. Their anterior extremities have the first bones shortened and the succeeding bones flattened and enveloped in a tendinous membrane, which reduces them to true fins. This gives nearly entirely the external form of the fishes, except that these last have the tail-fin vertical. The cetaceans therefore remain constantly in the water; but as they respire by means of lungs, they are obliged to come frequently to the surface for air. Their warm blood; their ears open externally, although with very small apertures; their viviparous generation, the teats by means of which they suckle their young, and all the details of their anatomy, sufficiently distinguish them, Cuvier observes, from the fishes.

The same great zoologist remarks that their brain is large and its hemispheres well developed; the petrous bone, or that portion of the cranium which contains the internal ear, is separated from the rest of the head, and only adheres thereto by ligaments. There is no external ear, nor are there any hairs upon their bodies. The form of their tail obliges them to move it from above downwards for their progressive motion, and aids them greatly in raising themselves in the water.

To the genera which, up to Cuvier's time, naturalists had reckoned among the *Cetacea*, he adds those which had formerly been confounded with the Walruses, and which form his first family, viz. :—

The Herbivorous Cetaceans.

The teeth of these have a flat crown, which, Cuvier remarks, determines their mode of life, leading them often to leave the water to creep and feed on the bank: these have two teats on the breast, and hairy moustaches; two circumstances, he observes, which, when they have been seen from a distance with their heads raised vertically out of the water, have given them some resemblance to women or men, and have probably given origin to the stories of some travellers who pretend that they have seen Tritons and Syrens. Although in the cranium the bony nostrils open upwards, they are only pierced in the skin at the end of the muzzle. Their stomach is divided into four pouches, two of which are lateral; and they have a great cæcum.

Cuvier divides the Herbivorous Cetacea into—

1st, The *Lamantins*, or rather *Manatees* (*Manatus*, Cuv.); 2nd, the *Dugongs*, Lacép. (*Halicore*, Ill.); 3rd, the *Stelres*, Cuv. (*Rytina*, Ill.).

Cuvier's second family of this order consists of

The Ordinary Cetaceans.

These are distinguished from the preceding by the singular apparatus which has procured for them the French name of *Souffleurs*, or Blowers. As they take, together with their prey, says Cuvier, large volumes of water into their very spacious mouth, there was a necessity of some outlet to get rid of it; it passes across the nostrils by means of a particular disposition of the *velum palati*, and is collected in a sac placed at the external orifice of the cavity of the nose, whence it is driven out with violence by the compression of powerful muscles by a narrow aperture pierced at the top of the head. Thus it is, adds Cuvier, that they produce those *jets d'eau* which cause them to be seen from afar by voyagers.

Mr. Bennett, it is true, in a paper read some time since before the Zoological Society of London, on the habits of the Cachalot, denies that it ejects water from the blow-hole, and asserts that the spouting consists only of the accumulated mucus and condensed vapour of expiration; but Mr. Bell well observes, in answer to this, that we have not only the positive attestation of M. Lesson, who declares that he has seen them spout water when he was within a few yards of them, but the admission of Mr. Bennett himself, who says that the blow-holes serve to carry off the water received into the mouth when feeding. Mr. Bell remarks, in conclusion, that the discrepancy may probably have arisen from the fact that some species spout more than others.

But to return to Cuvier. He further observes that their nostrils, incessantly traversed by floods of salt water, could not be lined with a membrane sufficiently delicate for the perception of odours. The whales therefore are without those projecting laminæ which are to be found in other animals; the olfactory nerve is wanting in many, and if any of them enjoy the sense of smelling, they must have it very much obliterated. Their larynx, of pyramidal form, penetrates into the back nostrils for the reception of the air and for the purpose of conducting it to the lungs, without any necessity on the part of the animal to lift its head and mouth out of the water: there are no projecting laminæ in their glottis, and their voice must be reduced to simple bellowings. They have no vestige of hair, but their body is covered with a smooth skin, under which lies the thick blubber abounding in oil, and the principal object for which they are sought. Their teats are near the anus, and they are unable to seize anything with their fins. Their stomach has five, and, sometimes, as many as seven distinct pouches; in lieu of a single spleen they have many small and globular ones; those which have teeth have them conical and similar to each other; they do not masticate their food, but swallow it rapidly. Two small bones suspended in the flesh near the anus are the only vestiges of posterior extremities. Many have on the back a vertical fin of a tendinous substance, but not sustained by bone. Their flattened eyes have a thick and solid sclerotic; their tongue has only smooth and soft integuments.

Cuvier divides this group into two small tribes: 1. Those whose head bears the ordinary proportion to the body; and 2. Those which have the head disproportionately great.

1st Tribe.

Genera: 1. *Delphinus*, Linn.: with the subgenera *Delphinus*, Cuv.; *Phocæna*, Cuv.; *Delphinapterus*, Lacép.; and *Hyperoodon*, Lacép.

2. *Monodon*, Linn.

2nd Tribe.

These cetaceans have the head so large, that it is either a third or one-half of the length of the body; but neither the cranium nor the brain participates in this disproportion, which is entirely due to an enormous development of the bones of the face.

Genera: 1. *Physeter*, Linn. (the true Cachalots); with the subgenus *Physeter*, Lacép. (Cachalots with a dorsal fin).

2. *Balæna*, Linn. (Whalebone Whales): with the subgenera containing the *Balænopteræ* of Lacépède, viz. the *Balænopteræ* with a smooth belly; and the *Balænopteræ* with a plaited belly, commonly termed *Rorquals*. (*Règne Animal*.)

M. Lesson divides the Mammiferous animals into three sections: 1. Those with unguiculated toes (*Unguiculata* of authors). 2. Those with ungulated toes (*Ungulata* of authors). 3. Those with toes impasted into fins.

Of the third section there is but one order, the eighth and last in M. Lesson's system, thus defined :—

Teeth variable in number, often replaced by horny laminæ; body organized for living in the water; two teats.—*Cetacea*.

These are separated into two divisions :—

1.

The Herbivorous Cetaceans.

2.

The Cetaceans properly so called.

These M. Lesson subdivides into two groups: 1st. Those with a small head; 2nd. Those with a large head.

Mr. Swainson makes the '*Cetacea*: Aquatic Mammalia.' the third order of *Mammalia*, placing it between the *Feræ*, the last family of which is formed by the *Phocidæ*, or Seals, and the *Ungulata*, the 1st tribe of which consists of the 'Pachydermes.'

The *Cetacea* are thus defined by Mr. Swainson :—

Body pisciform; pectoral fins two; caudal fin one, horizontal; ears with a very small exterior opening.

Family 1. Sirenia. Herbivorous Cetacea.

Grinding-teeth with flat crowns; whiskers hairy; nostrils placed at the end of the muzzle in the skin; body very large; mammæ two, on the breast.

Genera: *Manatus*, L.; *Halicore*, Ill.; *Rytina*, Ill.

Family 2. ‘Cete.’

Teeth conical or wanting; nostrils assuming the form of spiracles; skin smooth, shining, and destitute of hairs in every part; mammæ placed near the vent.

Subfam.? *Delphinæ*. Dolphins.

Small-headed *Cetacea*: head moderate; canine teeth, or none; carnivorous.

Genera: *Ceratodon*, B.; *Phocæna*, C.; *Delphinus*, Linn.; *Delphinapterus*, Lacép.; and *Uranodon*, Ill.

Subfam.? *Balæninæ*. Whales.

Head disproportionably large: of these the two first genera are furnished with teeth in the lower jaw, which are wanting in the two last groups.

Genera: *Physeter*, Lacép.; *Catodon*, Lacép.; *Balæna*, Linn.; *Balænoptera*, Lacép. (*Classification of Quadrupeds.*)

M. F. Cuvier thus arranges the order *Cetacea*:—

Tribe 1.

Phytophaga.

Char.—*Teeth* of different kinds; *molars* with flattened crowns, corresponding to the vegetable nature of their food. *Mammæ* two, pectoral. *Lips* provided with stiff bristles. External nostrils always two, situated at the extremity or upper part of the rostrum, which is obtuse.

Genera: *Manatus*, Cuv.; *Halicore*, Cuv.; *Rytina*, Ill.

Tribe 2.

Zoophaga.

Char.—*Teeth* of one kind or wanting, not adapted for mastication. *Mammæ* two, pudendal. *External nostrils* double or single, situated on the top of the head.

A. *With the head of moderate size.*

Family Delphinidæ.

Char.—*Teeth* in both jaws, all of simple structure, and, generally, conical form. No cæcum.

Genera: *Delphinorhynchus*; *Delphinus*; *Inia*; *Phocæna*.

M. F. Cuvier is of opinion that the following genera seem to form the types of as many distinct families of Zoophagous Cetaceans.

Genera: *Monodon*; *Hyperoodon*; *Platanista*.

B. *With the head of immoderate size, equalling one-third the length of the body.*

Family 1. Catodontidæ.

Char.—*Teeth* numerous, conical, but developed only in the lower jaw. *External nostrils* or blow-holes confluent; no cæcum.

Genera: *Catodon*; *Physeter*.

Family 2. Balænidæ.

Char.—No teeth; their place supplied by the plates of baleen or whalebone attached to the upper jaw. Blow-holes distinct; a cæcum.

Genera: *Balænoptera*; *Balæna*. (*Histoire Naturelle des Cétacés, &c.*)

Mr. J. E. Gray makes the whales (*Cete*) the third order of *Mammalia*, stating that they are peculiar for their fish-shaped, nearly bald body; that their hinder limbs are united, forming an horizontal tail; and that they have simply conical rootless teeth or whalebone in the jaws.

The family of the whales (*Balænidæ*), he observes, have a very large head, at least one-third the length of the body, as the tribe of whales (*Balænina*), which have whalebones in the jaws, and the Catodons or *Physeterina*, which have simple conical teeth, as the Spermaceti Whale (*Catodonta* (Catodon), and Cachalot (*Physeter*).

The family of porpoises (*Delphinidæ*), which have a moderate or small head and an elongated or smooth body, as the Dolphins (*Delphinus*), which have conical jaws and teeth, the Porpoises (*Phocæna*), which have a shorter head and compressed teeth, the *Hyperoodons*, which only have a few teeth,—all these, Mr. Gray observes, have tapering front limbs, while the Susuk (*Platanista*) has triangular truncated limbs, an elongated beak with compressed teeth, and the bones of the skull bent over the forehead, so as to form an arched cavity.

In the other families, Mr. Gray remarks, the skin is more or less horny, and the lips always furnished with rigid whiskers; the teeth are flat-topped. The Manatees (*Manatidæ*) have eight grinders in each jaw, and the tail rounded at the end. The Dugongs (*Halicoridæ*) have only three or five grinders in each jaw, and the end of the tail truncated or two-lobed.

* *Cete.*

Family 1. Balænidæ.

Genera: *Balæna*, *Balænophora*,[*] *Catodon*, *Physalus*,[†] *Physeter*, *Catodon*.

Family 2. Delphinidæ.

Genera: *Delphinus*, *Delphinorhynchus*, *Phocæna*, *Delphinapterus*, *Heterodon*, *Monodon*, *Hyperodon*, *Platanista*.

* * *Sirenia.*

Family 3. Manatidæ.

Genus *Manatus*.

Family 4. Halicoridæ.

Genus *Halicore*.

Family 5. Rytinidæ.

Genus *Rytina*. (*Synopsis Brit. Mus.*)

ORGANIZATION.

Phytophagous Cetaceans.

Skeleton.

Lamantin or Manatee.—The nasal bones in the *skull* of the Manatee are very small, almond-shaped, separated from each other, and let in on each side in a notch of the frontal bone. The result of this conformation is a very large aperture of the *bony* nostrils. The rest of the bones of the nose are nevertheless replaced by cartilages, so that in the living animal the opening of the nostrils is, as ordinarily, at the end of the muzzle. The intermaxillary bones carry no teeth in the adult, nor at any period of life, except during the first days of embryonic existence; they are notwithstanding very much extended longitudinally, and they re-ascend along the edge of the nostrils to above the region of the eye. The orbits are very much advanced, and very projecting. The suborbital hole is pierced in the re-entering angle formed by the projecting frame of the orbit with the anterior part of the maxillary bone, so that it is not perceptible when the cranium is seen in profile. This projection of the orbit causes the distance between the lower external border of the zygomatic portion of the intermaxillary bone and the teeth to be greater than the width of the palate. The frontal bones, whose anterior branches are much separated, in order that they may embrace the aperture of the nostrils and form the walls of the orbits, each give off an obtuse postorbital apophysis. The cheek-bone extends throughout the lower half of the orbit on the orbital apophysis of the maxillary bone, and thus borders the whole of the orbit anteriorly; it gives off a postorbital inferior apophysis. A very small lachrymal bone is let in at the anterior angle between the frontal, the jugal, and the maxillary, which intervenes at this point between the lachrymal and the jugal bones. A little lower down, in a depression, is pierced the large suborbital hole, which is thus carried farther backward than the edge of the orbit, and cannot give place to any canal. The dental part of the maxillary is more inward than the orbit, so that the interior part of the wall of this cavity is formed by a flat advancement of that bone. The zygomatic apophysis of the temporal bone is thicker than in any other animal, but the rest of the bone is moderate; it contributes to form the sides of the occipital crest, and leaves above, between it and the superior and lateral occipitals, a space which permits the petrous bone to be seen. The two crests which limit the temporal fossa above run in a nearly parallel direction, and do not unite in a single line, as in the greater part of the *Carnivora*. In the adult there is only a single unequal parietal bone, which enters largely into the temple; but in the fœtus there are two, completely separated by a double interparietal; these four bones however speedily unite, not only with each other, but, what is singular, with the upper occipital, even before the other parts of the occipital are united. The plane of the occipital is inclined from before backwards, and from above downwards, and the occipital crest makes an obtuse angle; there is no vestige of a mastoid apophysis. Below, the intermaxillaries form the point of the muzzle, occupying nearly the fourth of the palate, and surrounding a large incisive hole, which is single, because they have no internal apophysis. Very young *Manatees* have a small tooth in each of their intermaxillaries, thus completing, Cuvier observes, their analogy with the *Dugongs*. He observed this in the fœtus, but he remarks that the tooth disappears at a very early period. The jaws commence a little behind the sub-orbital hole, which, from the disposition of the orbits, is found nearly at their level. The palatine bones advance in a narrow and obtuse point, occupy nearly a fourth of the palate, and contribute to the formation of two large pterygoid wings, whose body is in other respects almost entirely sphenoidal, and does not separate itself from the body of the posterior sphenoid even in the fœtus. The temporal alæ of the sphenoid remain distinct much longer. The palatine bone shows itself in the temple by a narrow tongue-shaped process, between the maxillary on one side and the anterior sphenoid and the frontal on the other; but its continuity is partially hidden by the dental portion of the maxillary bone, which is continued backwards to the wing of the sphenoid, which it touches without articulation. The anterior sphenoid also only shows itself in the temple by a narrow tongue-shaped process, but much shorter than that of the palatine. It does not reach the parietal bone, and the orbital wing of the sphenoid touches the frontal. The body of the basilary bone and of the two sphenoids are conjoined with each other and with the cribriform plate of the ethmoidal bone, considerably before the basilary unites with the lateral occipitals. The area of the section of the cranium is nearly half of that of the face; it is singularly high, especially before, in proportion to its length. The frontal bones are there nearly vertical; the cribriform plates are found below the anterior surface; they are small, not much pierced with holes, and scarcely sunk. The crista galli is prolonged more backwards than they are. There is no sella; the whole base is united; the median fossæ hardly depressed. The analogous hole of the spheno-palatine is large, and entirely in the palatine bone. The optical foramen is small and in the form of a canal; the spheno-orbital, which comprises also the rotundum, is rather large and of oval form; the foramen ovale is a notch of the border of the posterior sphenoid, completed by the tympanic bone; the condyloidean is very small, and in the form of a notch of the lateral occipital. The articulation of the lower jaw is formed by nearly flat surfaces, as in all the *Herbivora*. The ascending ramus is very wide, and its posterior angle rounded. The coronoid apophysis is directed forwards, and truncated nearly into a hatchet-shape. The region of the symphysis is thick and elongated anteriorly. The whole portion that supports the gum is perforated with small holes. The holes for the exit of the lower maxillary are very large. The lateral and dental portions of the lower jaw are very large and rounded.

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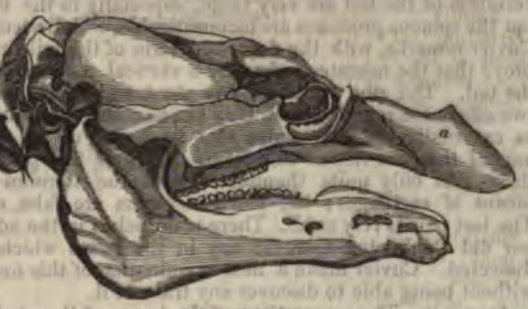
[*] *Balænoptera?*

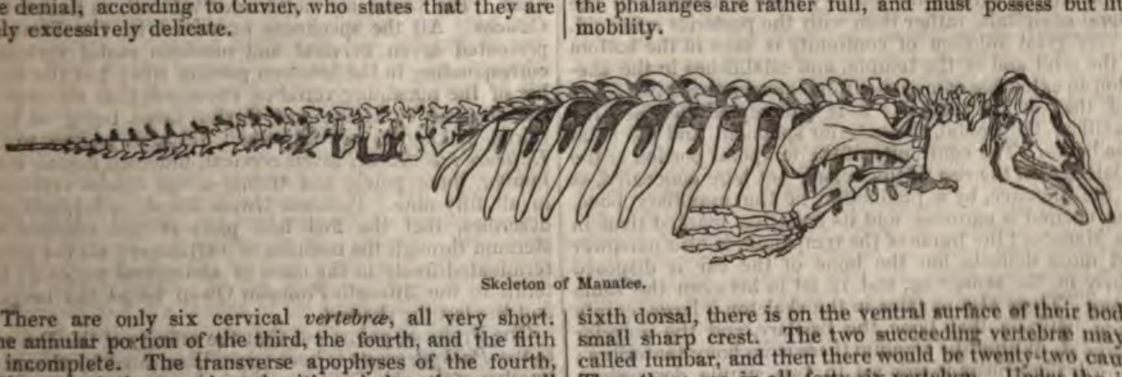
[†] Too near to *Physalis*.

Cuvier then points out the modifications necessary to convert the cranium of an ordinary quadruped, a ruminant for example, into that of a manatee; and gives an elaborate description of the complicated ear-bone of the latter, which our limits do not permit us to follow, but which will be found in the *Ossemens Fossiles*. This is the bone which was formerly considered a specific against diseases of the urinary passages and against hæmorrhages. It will be necessary here to observe that Camper denied the existence of the semicircular canals in the manatee, as well as in the whales generally, but with very small ground for the denial, according to Cuvier, who states that they are only excessively delicate.



Skull of Manatee.

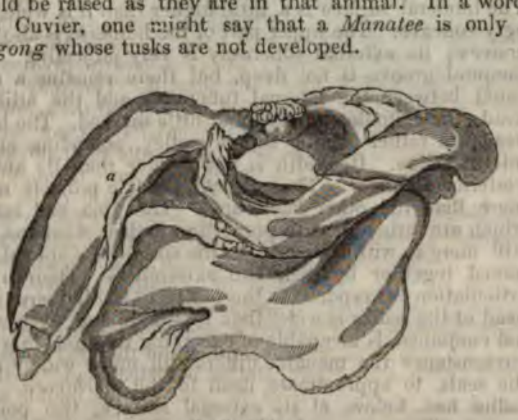
The *shoulder-blade* is nearly semi-elliptical; its lower line being almost straight, and answering to the great axis of the ellipse: the spine occupies only the anterior half of the bone. Its greatest projection is near its root; it is prolonged forwards into a pointed acromion which ascends a little obliquely, and which has the air of terminating by an articular facet. There are no clavicles. A strong blunt tubercle occupies the place of the coracoid process. The humeral surface is a little higher than it is wide, and very concave. The upper part of the humerus is also very convex; its external tuberosity is very projecting. The bicipital groove is not deep, but there remains a deep canal between the internal tuberosity and the articular head; the deltoidean crest is but little marked. The lower head is a rather oblique simple pulley, ascending at the internal edge. Its width is not greater than its antero-posterior diameter. The internal condyle projects much more than the other backwards. The ulna and radius, which are rather short in proportion to their stoutness, and still more so with reference to the size of the animal, are joined together by their two extremities. Their upper articulation corresponds to the pulley of the humerus; the head of the radius is wider than it is high, and, even when not conjoined, is incapable of executing rotation; in which circumstance the manatee differs still more widely from the seals, to approximate itself to the *Herbivora*. The radius has, below, at its external surface, two pointed crests. There are only six carpal bones; the pisiform bone is wanting, and the trapezium and trapezoid are united into a single bone, which is articulated at once with the metacarpal bone of the thumb and of the fore-finger. The analogue of the os magnum responds to those of the fore and middle fingers. The unciform bone responds to the middle, ring, and little fingers, which last articulates itself at the same time with the cuneiform bone of the first row. Each of these bones has also in the manatee its particular character. The pisiform bone, Cuvier observes, is also wanting in the Dolphins and is very small in the Seals and Sloths, whilst it is very long in the animals which make much use of their fore-feet for seizing or progression. The metacarpal bones are flat above, and carinated below; that of the thumb, which has no phalanges to support, terminates in a point; the others are enlarged at their lower extremity. That of the little finger is longer and the most enlarged of all. The ring finger, on the contrary, is that which has the longest phalanges, but those of the little finger are flatter and wider. All the articular surfaces of the phalanges are rather full, and must possess but little mobility.



Skeleton of Manatee.

There are only six cervical *vertebræ*, all very short. The annular portion of the third, the fourth, and the fifth is incomplete. The transverse apophyses of the fourth, fifth, and sixth are pierced with a hole; they are all simple. There are sixteen ribs and sixteen dorsal vertebræ; the spinous apophyses of which last are moderately elevated and inclined backwards. Counting from the sixth dorsal, there is on the ventral surface of their body a small sharp crest. The two succeeding vertebræ may be called lumbar, and then there would be twenty-two caudal. Thus there are in all forty-six vertebræ. Under the joint of the eleven first caudal vertebræ are articulated small chevron bones, as in the greater part of quadrupeds which have a powerful tail. The transverse apophyses of the vertebræ of the tail are very large, especially in the first, but the spinous processes are inconsiderable, which accords, Cuvier remarks, with the depressed form of the tail-fin to prove that the manatee swims by a vertical movement of the tail. The ribs are singularly stout and thick; their two edges are rounded, and they are as convex internally as externally. Cuvier states that he knows of no other animal that has ribs of this form. The two first pairs of these ribs only unite themselves with the sternum by means of cartilages; the fourteen others are false ribs. The last pair is very small. There is no pelvis in the adult, nor did Daubenton discover any in the fœtus which he dissected. Cuvier made a new examination of this fœtus, without being able to discover any trace of it.

Dugong.—The connections of the bones of the *skull* of the *Dugong*, &c. &c. are, Cuvier observes, nearly the same as in the *Manatee*. To change, he adds, the head of the latter to that of the *Dugong*, it would suffice to render more convex and elongate the intermaxillary bones to make room for the tusks, and to curve the symphysis of the lower jaw downwards, so as to make it conform to the inflexion of the upper jaw. The muzzle would then assume the form that it has in the *Dugong*, and the nostrils would be raised as they are in that animal. In a word, says Cuvier, one might say that a *Manatee* is only a *Dugong* whose tusks are not developed.



Skull of Dugong.

The enormous development of the intermaxillary bones of the *Dugong* carries up the aperture of the bony nostrils much higher than in the *Manatee*, and it is situated at the superior part of the head, in the middle of its length and directed upwards, its form being a large oval, as in the Manatee of Senegal. The whole skull, and particularly the frontal bones, are for the same reason much shorter in proportion than in the Manatee. The branches of the frontal bone which form the upper part of the orbit are more delicate and more rugose. The maxillary portion which serves as a floor for the orbit is narrower; the jugal bone, in turning to form the anterior and inferior edge of the orbit, is more compressed and directed more downwards. There is also a lachrymal bone in the anterior angle, more considerable than in the Manatee, but equally without any hole. The zygomatic apophysis of the temporal bone is more delicate and more compressed. The connections of the bones of the cranium are the same, but at the inferior surface the basilary bone is united with the lateral occipitals, rather than with the posterior sphenoid. A very great solution of continuity is seen in the bottom of the orbit and of the temple, and establishes in the skeleton an extensive communication between these two fossæ and that of the nostrils; it is intercepted between the maxillary, the frontal, the anterior sphenoid, and the palatine bones. The continuity of the temporal portion of the palatine with the rest of the bone is not here concealed, as in the Manatee, by a production of the maxillary bone. The occiput is narrower and its crest less marked than in the Manatee; the frame of the tympanum is also narrower and more delicate, but the bone of the ear is disposed nearly in the same way, and is let in between the same bones. There also remains in the skeleton a large empty space between that bone, the basilary, and the anterior sphenoid. Within the cranium there is no bony tentorium; the cribriform fossa is reduced to two simple depressions very much separated from each other, and which terminate anteriorly by two or three small holes. There is no sella Turcica. The optic aperture is a long narrow canal. The lower jaw is of a height corresponding with the curvature and length of the intermaxillary bones. This part shows in the adult the remains of three or four alveoli on each side.

The atlas is very similar to that of the Manatee; the axis the same. The five other cervical *vertebræ* are very delicate, but not conjoined. There are eighteen dorsal vertebræ, the spinous apophyses of which are arranged nearly in a straight line. Counting from the ninth, the ribs do not attach their head between two vertebræ, but only to the same vertebra, to the transverse apophysis of which they are articulated. The ribs are not nearly so stout as in the Manatee, but, notwithstanding, the first are still very thick, and have their edges blunt. After the eighteen dorsal vertebræ come twenty-seven, and perhaps more, whose spinous apophyses diminish progressively. In the lumbar vertebræ the transverse apophyses are very long; afterwards they diminish by degrees on the sides of the tail, and again become rather longer at its extremity, apparently for the support of the tail-fin. It would seem that the three first only belong to the loins. The fourth has towards its extremity a facet, which is probably destined for the attachment of the pelvic bones, which last are well marked in the Dugong. They are two long slender bones, which have some resemblance in form to the clavicles of man. There are V-shaped bones articulated under the interval of the vertebræ after that which comes beyond the pelvis. They diminish by degrees, and seem to terminate altogether under the last fourth of the tail.

The *shoulder-blade*, as in the Manatee, has its anterior angle rounded, the posterior angle sharp, and carried well backwards; the posterior border very oblique, and slightly concave. Its spine is projecting, its acromion pointed, but much less elongated than in the Manatee. The coracoid process is much more pointed than in that animal, and directed forwards and a little inwards. The humerus is much stouter and shorter than in the Manatee; its deltoid crest projects more, and it forms with the great tuberosity a rhomboidal protuberance. The bones of the fore-arm are rather longer in proportion than those of the Manatee, but their form is the same, and they are equally conjoined at their two extremities. There are only four carpal bones: two of which are in the first row, one for the radius, the other for the ulna; and two in the second, the first of which supports the metacarpals of the thumb and fore-finger, and the second those of the middle and ring finger. That of the little finger bears upon the second bone of the second row, and upon that of the first. The thumb, as in the Manatee, is reduced to a pointed metacarpal. The other fingers have the ordinary number of phalanges, the last of which are compressed and obtuse. (*Ossemens Fossiles.*)

Professor Owen, in his 'Anatomy of the Dugong' (*Zool. Proc.*, 1838), remarks, that after the excellent and elaborate descriptions of the osteology of that animal by Cuvier, Rüppell, and others, but little remains to be said on the subject. The bones, Professor Owen observes, are chiefly remarkable, as in the Manatee, for their dense texture and the non-development of medullary cavities in them. This reptile-like condition of the skeleton is, he adds, further exemplified in the loose connection of the bones of the head. The bones are not loaded with oil, as in the true *Cetacea*. All the specimens examined by the Professor presented seven cervical and nineteen costal vertebræ, corresponding to the nineteen pairs of ribs; but the number of the remaining vertebræ exceeded that ascribed to the Dugong by Home and Cuvier, there being at least thirty, making in all fifty-five. Rüppell assigns to the *Halicore tabernaculi* seven cervical, nineteen dorsal, three lumbar, three pelvic, and twenty-seven caudal vertebræ; in all fifty-nine. Professor Owen found, as Rüppell also describes, that the first four pairs of ribs reached the sternum through the medium of cartilages; all the others terminated freely in the mass of abdominal muscles: the tenth to the fifteenth Professor Owen found the longest, and the last the shortest.

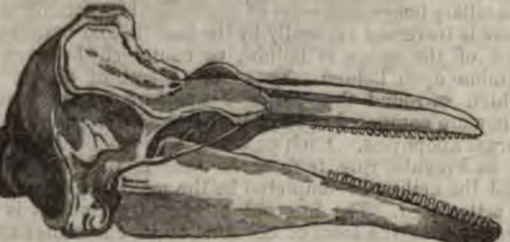
The Professor points out that the affinity of the Dugong to the *Pachydermata* is here again illustrated by the great number of the ribs. The lower jaw is, he observes, articulated to the cranium by a true synovial capsule, reflected over cartilaginous surfaces, and not, as in the carnivorous *Cetacea*, by a coarse and oily ligamentous substance.

passage to the nerves of the ear to go to the petrous bone. In front of it, and very near, is the carotidean hole. In the basilary bone, and in a notch of the borders of this vault of the ear, is the condyloidean hole, which is very small. It is the posterior border of this vault which occupies the place of the mastoid apophysis.

Internally the cerebral cavity is very remarkable, inasmuch as its height surpasses its length. The floor is very compact. The sella is but slightly marked. The cerebellar fossæ are the most hollowed; there is often a very projecting bony tentorium in its middle; the falx is always bony backward, but it has no crest, and some small holes are scarcely perceptible in the cribriform plate. The petrous and tympanic bones are not joined to the cranium by any suture, and are not even enclosed, but only suspended by ligaments under the sort of vault above noticed. They unite at an early period into a single bone of the ear. The occipital condyles are large, but project little. The hole, directed entirely in the line of the head, is nearly circular.

Cuvier remarks that complete symmetry is never found in the skulls of dolphins; the two nostrils, the two nasal bones, and the adjacent parts, never appeared to him equal, as in other mammiferous animals; and this, he observes, conducts us to the extreme inequality of those parts in the *Cachalots*.

The various species of dolphins differ from each other in the relative length and width of the muzzle, the number of teeth, and the divers convexities or concavities of their parts, the palate, &c. Cuvier points out these variations in the species, and particularly notices the Dolphin of the Ganges (Susuk) as the most extraordinary in the structure of its cranium.



Skull of Porpesse.

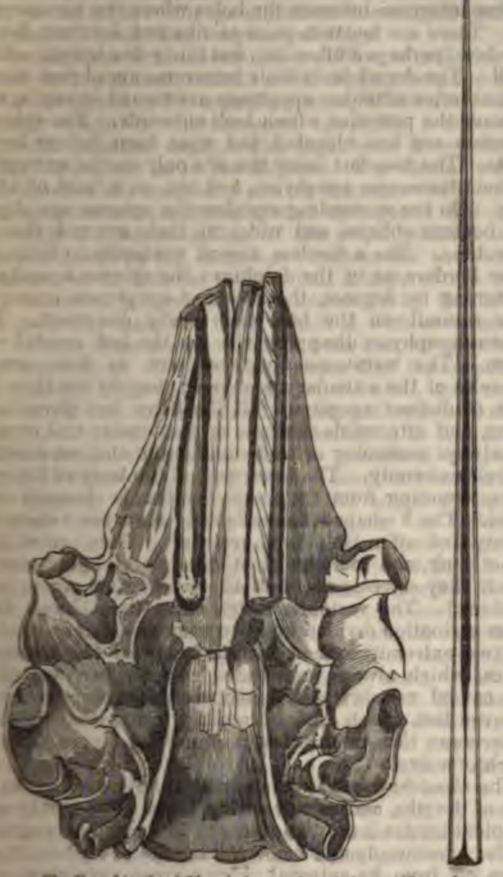
In the common Dolphin the seven cervical vertebræ are united in a single body, and so they are in the Porpesse; but this is not universally the case, for in the Dolphin of the Ganges, for instance, the cervical vertebræ are as distinct as in any quadruped. But where they are anchylosed, as in the common Dolphin, the atlas is fully developed, and has sufficiently strong, transverse, conic apophyses. The body of the axis is very delicate; but its spinous apophysis, anchylosed to the atlas, is also well marked. The four succeeding vertebræ are, to use Cuvier's expression, as thin as paper, and their annular part unites above to the lower surface of the spine of the axis. The seventh cervical has some volume and rather strong distinct apophyses. The dorsal vertebræ are thirteen in number, and there are thirteen ribs. The three first ribs only have a head and a tubercle, and are articulated on the body of two vertebræ and on the extremity of the transverse apophysis of one of them. The ten succeeding ribs are only articulated to the extremity of the transverse apophysis. The last cervical and the six first dorsal have their articular apophyses united to each other by horizontal surfaces, the anterior of which is above. At the sixth they begin to become oblique; at the seventh they are nearly vertical. Commencing with the fourth, the transverse apophysis gives off a small point from its anterior border. This point approaches the anterior articular apophysis, and becomes blended with it at the seventh: afterwards these points form the only articular apophysis; those of one vertebra embracing the lower part of the spinous apophysis of the preceding vertebra. Towards the twenty-second vertebra or the second lumbar they no longer reach it; but they remain irregularly marked far upon the tail. The transverse apophyses of the lumbar region are very long, and the spinous very high. On the tail they are shortened; the spinous are widened; and the transverse are directed rather forward. They disappear at the forty-ninth vertebra, and the spinous at the fifty-first or fifty-second. The V-shaped bones (hæmapophyses of Prof. Owen) of the under part of the tail commence under the thirty-eighth. The body of the vertebræ are round, rather angular below; more compressed and thicker in the region of the back; shorter in the lumbar region and in that of the tail, where they present a kind of carination below. The anterior and posterior epiphyses remain a long time distinct. The sternum is composed of three bones: the first, very wide, is notched in front, and gives off on each side between the first and second rib a sharp point directed backwards. There is a hole in the middle. The second is simply rectangular. Between the first and it, the second rib is articulated; the third rib is attached between the second and third bone, which receives on its sides the fourth, and towards its point the fifth and sixth, which is the last true rib. The sternal parts of the ribs are all ossified.

The *shoulder-blade* is fan-shaped, with the external surface slightly concave, and its spinal border forming the segment of a circle: the two other borders are slightly concave and nearly equal; the anterior is bifurcated, and thus presents two edges,—one external, the other nearer the ribs. The external gives off a flat apophysis directed forwards, and enlarged at its extremity, which represents the acromion. The other border, which is the true anterior border, gives off also, but close to the articular surface, a flat apophysis, less than the acromion, descending a little and equally enlarged at the end: this is the coracoid process. The humerus is very short and stout. On the anterior part of its upper extremity or head is a tuberosity as large as itself: the lower head is enlarged and compressed from before backwards; and does not terminate in a facet that may be termed articular, but unites by synchondrosis with the radius and ulna: these two bones are short and compressed. The radius is in front and the largest, and its form is nearly rectangular: the ulna is behind and narrower. Its posterior border is concave, and it forms at its upper extremity a projecting angle, which is the only vestige of the olecranon. The carpal bones are flat, angular, and, together, form a sort of pavement. There are three in the first row, the anterior of which responds to the radius, the posterior to the ulna, and the intermediate one to both radius and ulna. In the second row there are four, the anterior of which is the smallest. Under this anterior bone, which may be also taken for a metacarpal, is a pointed bone which is the sole vestige of a thumb. The next bone, which is the forefinger, is composed of nine joints, which must represent its metacarpal, its phalanges and their epiphyses: there are seven in the third finger and four in the fourth; the fifth is reduced to a single, very small tubercle.

Narwhals.

The skull of the *Narwhal* resembles that of the dolphins and especially the head of the *Beluga* in structure: but instead of the numerous teeth ranged along the maxillaries presented by the dolphins generally, there is but one on each side, directed forwards and implanted in an alveolus common to the maxillary and intermaxillary bones. Very rarely indeed are these teeth symmetrical; and nearly always one of the two remains enclosed in its alveolus, whilst the other grows to a length of ten or twelve feet. The muzzle, and, more especially, the intermaxillary bones, are more widened than in the dolphins. The intermaxillaries ascend near to the bones of the nose. The holes with which the maxillaries are pierced in their widened part, and which occupy the place of the suborbital holes, are large and numerous. The notch which separates this widened part from the muzzle is small, and the upper part of the orbit projects but little. The nasal are very small, and the left nostril is smaller than the other.

The number of vertebræ, according to Scoresby, are seven cervical, twelve dorsal, and thirty-five lumbar or caudal; fifty-four in all. The spinal canal is said to cease at the forty-first. The spinous apophyses begin to diminish at the thirty-fourth, and disappear at the thirty-eighth. The V-shaped bones commence between the thirtieth and the thirty-first, and terminate between the forty-second and forty-third. There are six pairs of true ribs and six false, all rather slender. The bones of the anterior extremity appear to bear a close resemblance to those of the porpesse, except that the bones are more equal, as might be expected from the roundness of the narwhal's flipper.



Skull and teeth of Narwhal, seen from below. (Owen.)

Hyperoodons.

The *skull* in this genus differs almost entirely in form from those belonging to the dolphins. From the maxillaries, which are pointed in front and widened towards the base of the muzzle, rises on each of their lateral borders a large vertical crest, rounded above, descending obliquely forwards and more rapidly backwards, where it falls again nearly above the postorbital apophysis. Still more backwards, the maxillary bone, continuing to cover the frontal bone, ascends vertically with it and with the occipital, to form on the back part of the head a transverse occipital crest, which is very elevated and very thick: so that on the skull of the animal there are three of these great crests; the occipital crest behind, and the two maxillary crests on the sides, which are separated from the first by a wide and deep notch. They do not approximate above nor do they form a vault, as in the Dolphin of the Ganges, but simply a sort of lateral walls. The intermaxillaries, placed as ordinarily between the maxillaries, ascend with them to the nostrils, and passing by the side of them, raise themselves above so that they take part in the formation of the posterior crest elevated upon the occiput. The two nasal bones, which, as well as the nostrils, are very unequal, are placed at the anterior surface of this occipital crest, and are raised to its summit. In other respects the connections of the bones are nearly the same as in the dolphins.

The zygomatic apophysis of the temporal bone is thick, without being as long as in the Dolphin of the Ganges; the orbit is as wide as in the ordinary dolphins, and bounded in like manner below by a slender stem given off by the jugal bone. The parietal bones show themseves but very little in the temporal fossa, which is itself not much extended in height. Below, the palate is slightly carinated, indicating an approximation to the *Balænæ*. The lateral furrows observable in the common dolphin are absent. The pterygoideans occupy a very great length in the back-nostrils and much diminish the portion which the palatine bones fill in front. The vomer shows itself at two points of the lower surface, between the pterygoideans and the palatines, and between the maxillaries and intermaxillaries. The occiput is higher than it is wide. The lower jaw has not the symphysis longer than in the ordinary species of the dolphins.

The seven cervical *vertebræ* are all anchylosed together; there are thirty-eight other vertebræ, nine of which carry the ribs. At the twenty-second the V-shaped bones which characterise the first caudal commence, so that seventeen caudal vertebræ may be counted. There are six of these V-shaped bones; and the superior spinous apophyses cease on the ninth caudal. The five first ribs only are articulated to the sternum, and there are only four false ribs on each side. The sternum is composed of three bones: the first square, notched in front and behind; the second square also, and notched in front; the third oblong and notched behind.

The *shoulder-blade* has the spinal border more extended in proportion and more rectilinear than in the dolphins, the anterior angle more pointed, the acromion directed rather downwards, and the coracoid process a little in the opposite direction. The bones of the arm and fore-arm are a little less shortened than in the dolphins. (*Ossemens Fossiles.*)

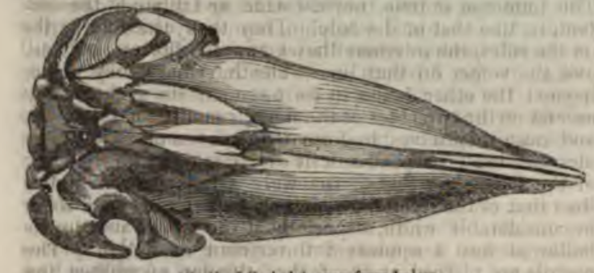
Cachalots.

The *skull* of a *Cachalot* bears a nearer resemblance to that of the Dolphins than to that of any other cetaceans. The immense muzzle, notwithstanding its prodigious extent, is, like that of the dolphin, formed by the maxillaries on the sides, the intermaxillaries towards the mesial line, and the vomer on that line. The intermaxillaries reach beyond the other bones to form the anterior point; they ascend on the two sides of the nostrils and the nasal bones, and raise themselves to form that species of wall which elevates itself perpendicularly and circularly on the back of the head, but that of the right side is carried higher than that of the left; the vomer shows itself between them in considerable width, especially at the upper part; it is hollowed into a semicanal throughout its length. The nostrils are pierced at the foot of this sort of wall at the root of the vomer, and between the raised and ascending parts of the two intermaxillaries. Their direction is oblique from below upwards, and from behind forwards. They are excessively unequal, and that on the right side is not a fourth of the size of that on the left. The nasal bones are also very unequal: both ascend between the intermaxillaries against the foot of the semicircular wall which is raised upon the cranium, but they only rise to the level of the left intermaxillary. The right nasal bone is not only larger than the other, but it also descends lower between the two nostrils, articulating itself upon the root of the vomer, and giving to that part an irregular crest which reposes a little obliquely on the left nostril, which, as before observed, is the longest.

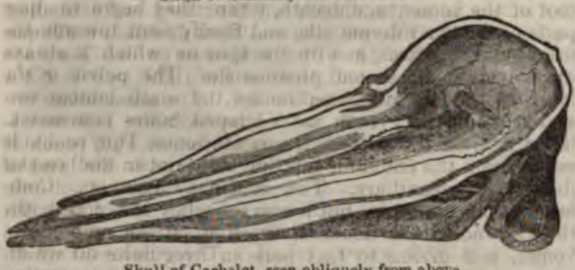
The direction of the vomer and amplitude of the left nostril indicate a direction of the membranous canal of the nostrils and the whole spouting apparatus towards the same side, and explain, Cuvier observes, the fact observed by mariners, namely, that the cachalots throw their spoutings towards the left side.

The maxillaries do not join each other in front of the semicircular wall; and leave exposed between them an irregular and considerable part of the frontal bone, which goes behind them, and, directing itself laterally, proceeds to form, as in the dolphins, the principal part of the ceiling of the orbit; the maxillary makes its anterior angle, in front o which the border of the maxillary has a deep notch, and at its upper surface, opposite to that notch, is the grea hole which occupies the place of the suborbital, but which Cuvier remarks, should here be called supra-orbital. Th posterior angle of the orbit is occupied by the point of th zygomatic apophysis of the temporal bone, but it does no quite join the postorbital apophysis of the frontal bone, s that the edge of the orbit is open at this point. The lowe part of the orbit is formed by a stout and cylindrical jug bone, whose anterior part dilates itself into an oblon lamina which partially closes the orbit in front. Th temporal fossa is very deep, rounded, but not distinguish by a crest from the rest of the occiput: a little of t parietal bone is perceptible between the temporal and t frontal bones. The squamous portion of the temporal bo is not extensive, its zygomatic portion is in the shape o stout and short cone; proceeding to the orbit, it alo forms the arch, as in the dolphins. The occipital bone vertical and forms the whole posterior surface of the sem circular wall which surrounds the skull behind. The pital hole is nearly at the lower third of its height. The lower border of the occipital bone is divided on each side by a notch into two lobes, the external of which represents the mastoid apophysis.

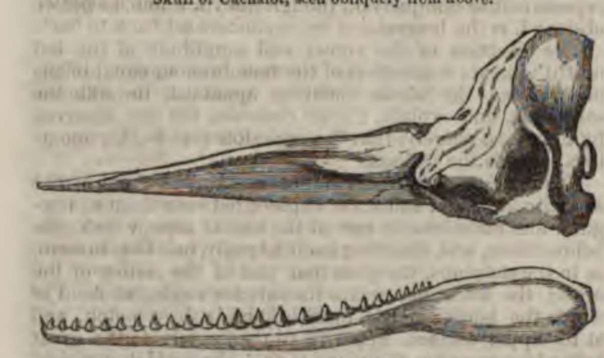
The lower part of the skull, allowing for the difference of proportion of the parts, much resembles the lower portion of that of the dolphins. The region behind the nostrils is very much shortened in comparison of that which is anterior to them, and of which the enormous muzzle forms the greatest portion. The result of this conformation is that the basilary and posterior sphenoid are very short; that the anterior sphenoid, as in the large-muzzled dolphins, only shows itself below in a notch of the vomer, and appears very little towards the temple between the palatine, the pterygoidean, and the temporal ala of the posterior sphenoid; and that the pterygoideans extend on their lateral and posterior part, nearly to the posterior portion of the basilary bone. The jugal bone on its anterior part lines below a great portion of the vault of the orbit, and proceeds to touch, behind, the points of the two sphenoids. Their anterior border is not double, as in the dolphins. The bone of the ear bears a great resemblance to that of the dolphins, but the tympanic bone is less elongated and less lobated backwards.



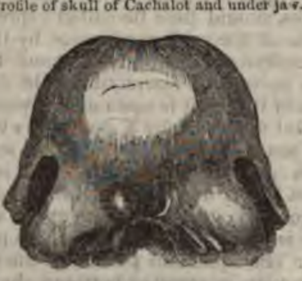
Skull of Cachalot, seen from below



Skull of Cachalot, seen obliquely from above.



Profile of skull of Cachalot and under jaw.



Skull of Cachalot, seen from behind.

Of the cervical *vertebræ* of the Cachalot, the atlas alone is distinct: the six others are anchylosed into a single mass by the bodies and spinous apophyses; but the number may be made out by the sides, where very delicate laminæ interpose between the holes where the nerves pass out. There are fourteen pairs of ribs and fourteen dorsal vertebræ (perhaps a fifteenth), and thirty-five others—sixty in all. The dorsal have their transverse apophyses short; their anterior articular apophyses are turned inwards, and embrace the posterior, which look outwards. The spinous processes are less elevated and wide from before backwards. The two last carry the ribs only on the extremity of their transverse apophyses, and not on a facet of their body. On the succeeding vertebræ the spinous apophyses rise, become oblique, and wider at their summit than at their base. The articulars ascend gradually to their anterior borders, as in the dolphins: the spinous apophyses shortening by degrees, the articular apophyses arrive at their summit on the tail, and finally disappear. The spinous apophyses disappear also on the last caudal vertebræ. The transverse apophyses are, at first, simple tubercles of the articular apophyses: they do not take the form of distinct apophyses till the three last dorsal vertebræ, and afterwards continue on the lumbar and caudal, but always remaining of moderate length, and not dilating at their extremity. The lower part of the body of the vertebræ, counting from the fourth lumbar, is strongly carinated. The V-shaped bones do not commence before the twenty-first after the dorsal vertebræ. They are at first rather long, and more so than the spinous apophyses to which they correspond; but afterwards they are a little shortened. The vertebræ which carry them have their lower carination divided into two truncated ridges, each at the two extremities, so as to form facets for the V-shaped bones, which always articulate between two vertebræ. The caudal vertebræ still remain very large up to the six or seven last, which diminish rapidly, losing their different eminences: thus the greatest portion of the spine is nearly much of a size.

The *shoulder-blade* is concave externally, convex on the side of the ribs, and narrower than in the other cetaceans: its spinal border is not two-thirds of its height. Its anterior border becomes double below the middle of its height, and gives off from its external ridge a great acromion, more projecting anteriorly than the shoulder-blade is at this point, and enlarged at its extremity. The internal border gives off near the articular head a coracoid apophysis, which projects less than the acromion, and terminates in a point. The humerus is very short and stout, and has at its anterior border a crest, terminated towards the lower part by a hook which represents the deltoidal crest. The ulna is anchylosed early to the humerus, even before the epiphysis of this last is united. The olecranian apophysis projects very much, and curves towards the wrist. (*Ossemens Fossiles.*)

Balænidæ, or Whalebone Whales.

Rorqual (*Balænoptera*).—The *skull* of the *Rorqual* is more approximated to that of the dolphins than the skull of the *Balænæ* properly so called. The immense maxillary bones are disposed below, in form of a reversed roof or a keel, to the two sides of which the baleen, or whalebone, is attached. The vomer is shown between them in nearly the mesial line of the keel. Above, the two intermaxillaries, placed parallelly between the two maxillaries, leave between them a vacant space, which is continued above, or rather backwards, with the very large aperture of the nostrils, which is in the form of an elongated oval, and, contrary to the other cetaceans, preserves, as in the whole of the *Balænæ*, a symmetrical form. The nasal bones, which are short, but notched or festooned anteriorly, and not in form of tubercles, form the upper border of this aperture. The maxillary does not cover the frontal bone, except by a narrow apophysis on the two sides of the nasal bones. The whole portion of the frontal bone which goes on each side to form the orbit is exposed, but the parietal bones cover the upper part of the temporal fossa to the sides of the apophysis of the maxillary bone, which shows itself between the frontal and the bones of the nose. The occipital bone advances between them, and covers the middle of the frontal to near the bones of the nose; so that at the base of the nose the frontal does not show itself externally. There are two temporal crests projecting greatly outwards, commencing at the sides of the nose, and between which the skull is flat, or even slightly concave, and descends slowly towards the occipital hole, which is at the extremity of this plane. The occipital crest comes near the base of the nasal bones, traversing from one temporal crest to the other. On the middle of this occipital surface is a slightly projecting longitudinal ridge.

The jugal bone is curved into a portion of a circle, and forms the lower border of the orbit, coming from the zygomatic apophysis of the maxillary bone, which abuts at the anterior angle on the temporal apophysis, which abuts upon the posterior angle. The jugal bone is not dilated at its extremity, as in the dolphin. The frontal on one side touches the maxillary, and on the other the temporal bones, by its ante- and post-orbital apophyses, and forms by itself the whole ceiling of the orbit, without being doubled above by the maxillary; but, on the contrary, it is below, on its anterior portion, that in front of the orbit, and moreover is bordered there anteriorly by the lateral lamina of the maxillary bone, which is, with reference to the frontal, in an inverse position from that which it holds in the dolphins. It is by this lamina that the maxillary bone abuts on the anterior angle of the orbit, and articulates itself with the anterior and enlarged extremity of the jugal bone; but, what is very remarkable, is that at this point, between the frontal and the maxillary, and, so to speak, at their very articulation, a peculiar bone, in form of a lamina, occupies nearly half the length of that suture, and which perhaps is the analogue of the lachrymal bone. The whole of the zygomatic arch properly so called, which is very large, belongs to the temporal bone. The frame of the orbit is closed on all sides; its ceiling is very large and concave above. The palatine bones are prolonged below the keel of the maxillaries. The posterior nostrils are very near the occipital hole. They have at each angle a tuberosity formed by the pterygoidean bone, which has little longitudinal extent, and only surrounds the nostrils on the external side and a little above and below, but without forming a sinus or double border there, as in the dolphins. The basilary region, which is very short, is also hollowed into a canal, as in them, and has on each side the bones of the ear, which are very small in proportion, and of oval form, and equally convex in their inferior surface. In front of the basilary bone, and between the pterygoidean bones, may be seen the body of the posterior sphenoid. The glenoid face of the temporal bone is nearly vertical, and looks forward; that which makes the articular surface of the lower jaw is, in some sort, the truncature of the extremity of the bone. This jaw is an arch externally convex, compressed, slightly trenchant above and below. It has a coronoid apophysis in form of an obtuse angle, and a tuberosity a little more backward.

Cuvier points out certain differences between the skulls of the Rorquals of the Cape, the Mediterranean, and the North Sea, for which we must refer the reader to his *Ossemens Fossiles*.

Balæna.—To form the idea of a *Balæna* properly so called, Cuvier states that we must figure to ourselves the muzzle of the Rorqual narrowed, elongated, compressed laterally, and arched from before backwards, nearly in a quarter of a circle. It is, he observes, in the space which this curvature leaves, that the plates of baleen, or whalebone, which adhere by their upper and wide extremity to the sides of the keel which the muzzle forms below, and descend obliquely outwards by their lower and pointed extremity towards the lower jaw, are lodged. It is precisely because this curvature gives them more space in the *Balænæ* properly so called, that they are longer in those whales than in the *Rorquals*, in which last the nearly straight muzzle leaves them little room.

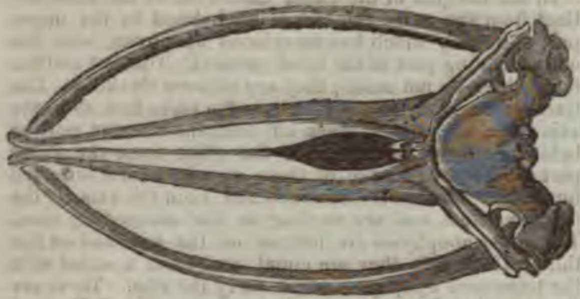
It results from this lateral compression of the muzzle that the intermaxillary bones are not horizontally between but vertically upon the maxillaries; the upper plane of these last is itself nearly vertical, except in the lateral branch, which borders the frontal before to proceed with it upon the orbit. This transverse portion of the frontal bone is narrower from before backwards than in the *Rorqual*. The occipital bone is convex throughout its upper portion, less oblique than in the Rorqual, and semi-oval. The temporal bone remains transverse, and its zygomatic portion hardly curves forward at all. The nasal bones are rhomboidal, and not triangular as in the Rorqual. Below, the palatine and pterygoidean bones are thrown still more back, and are shorter, and the sphenoid bone is more concealed than in the Rorqual. The maxillary bone has a deep notch at its lower and posterior border. The glenoid surface of the temporal bone is much less vertical than in the Rorqual, so that the lower jawbone rises a little to offer its articular convex surface. This disposition, joined to the absence of a coronoid apophysis, may serve to distinguish it from the lower jaw of the *Rorqual*.

In the Rorqual of the Cape, Cuvier found the *atlas* distinct from the axis; this last is anchylosed by the upper part of its ring which has no spinous apophysis, with the corresponding part of the third cervical. This last and the four others do not unite; they are of some thickness. The transverse apophyses are double in the three first, as in the axis; one, superior, is given off from the annular portion below the articular apophysis, the other from the lower part of the body; none of these apophyses are directed forwards. The lower are shortened from the axis to the fourth vertical, and are wanting in the succeeding ones. The upper apophyses are longest on the axis and on the third; afterwards they are equal, and form a series with the transverse apophyses which carry the ribs. There are fourteen dorsal vertebræ and as many pairs of ribs, and thirty-one other vertebræ to the end of the tail—fifty-two in all. The second, third, and fourth ribs only have heads, and seem hardly able to reach the body of the vertebræ. The others only reach the extremities of the transverse apophyses, which go on lengthening to the lumbar region. They are longer than they are wide, and dilate at the end, as in the Greenland whale. They thus continue to the thirteenth lumbar, where they begin to shorten, but still widen to the fifteenth or sixteenth, where they disappear. The spinous apophyses begin to show themselves on the thirteenth cervical. They remain small on the neck, and begin to be elongated and compressed on the first dorsals. They form a nearly equal series; wider on the middle of the back, narrower, but always moderately elevated, on the lumbar region, and shortening by degrees on the tail. They vanish on the twelve last, and the annular portion disappears two vertebræ after the spinous apophyses. The facets of the articular apophyses look inwards as far as the eleventh, where they begin to open outwards. They do not rise, and finally form, towards the fourteenth or fifteenth, with the spinous (which is always shortened), a trilobated prominence. The pelvis in the French skeleton is attached under the ninth lumbar vertebra. At the eleventh the V-shaped bones commence. The first is still formed of two separate bones. They re-divide anew behind. The lower part of the lumbar and caudal vertebræ is hardly marked by a slight carination. Commencing from the fifteenth vertebra after the dorsal, the body of each is pierced on both sides, above and below, with a large hole for the vessels. These holes do not diminish on the last caudal, though they are much smaller, so that they each represent two cylinders set back to back, pierced in their axis.

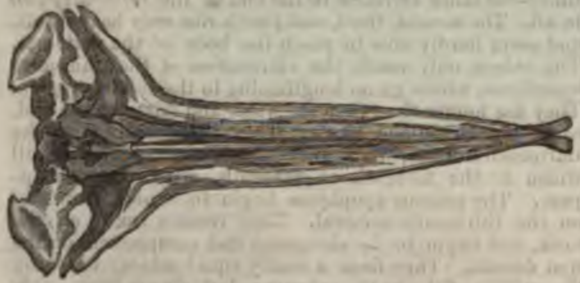
The single bone of the *sternum* was square, deeply forked posteriorly, and with a point at its external border.

The *shoulder-blade* of the Cape Rorqual is, Cuvier remarks, entirely different from that of the *Balæna;* it is wider than it is long, semicircular on the spinal side, with a single anterior border, a single prominence (the acromion) towards the lower third, and a tubercle near the articulation, which is the coracoid apophysis. The humerus is still stouter in proportion than that of the *Balæna*, but the bones of the fore-arm are much more elongated. The fin is also much more pointed. There are only four well marked fingers, which, not counting the metatarsals, have the following joints:—the index two, the middle and ring finger seven each, and the little finger three; all the fingers are terminated by a cartilaginous dilatation.

The bone of the ear in the *Balænæ* differs from that of the dolphins in the enormous thickness of the tympanic bone, especially on the internal side. The tympanic bone is a little more closed in front, but leaves between it and the petrous bone on the internal side a solution of continuity wider and longer in proportion. It is not bilobated backwards. The petrous bone is of very irregular form, and very rugged; it gives off two great and stout apophyses, also very rugged, one of which, posterior and a little superior, articulated to a corresponding apophysis of the tympanic bone, is inserted between the temporal and lateral occipital; and the other, anterior and inferior, is articulated by squamous suture with the temporal portion, which descends to furnish articulation with the lower jaw. The ear-bones in all the cetaceans are four in number, as in the quadrupeds, and the malleus is anchylosed to the frame of the tympanum, which, Cuvier observes, is the more singular, inasmuch as it is not deprived of its muscles.



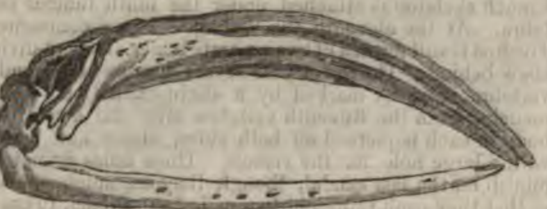
Skull of Greenland Whale, with lower jaw, seen from above.



Skull of Greenland Whale, seen from below.

Cuvier remarks that the skull of the Greenland whale differs more from the *Balæna* of the Cape than the skulls of the Rorquals differ from each other. He points out these differences, which extend, although slightly, to the bones of the ear; and expresses his opinion that they are different species.

In the great Cape *Balæna*, according to Cuvier, the *atlas*, the axis, and the five other cervical vertebræ are united together by their bodies. All their spinous apophyses are anchylosed into a single crest. The atlas and axis unite besides by their upper transverse apophyses, which are wide and strong: their lower transverse apophyses, which are equally long and strong, are anchylosed to each other and to that of the third, which is more slender. The four next cervicals have only delicate transverse apophyses, of which the third, fourth, and fifth are anchylosed together. The last also has only one upper transverse apophysis, but longer, stronger, free, and directed forwards. Cuvier remarks that this division of the apophyses into upper and lower responds to the two branches separated by a canal, which are seen in those of ordinary mammals. The transverse apophyses of the first dorsal are directed also forwards, and are long and a little stronger than at the last cervical; they commence increasing in bulk, and shortening at the fourth dorsal. The succeeding take a more transverse direction, and are enlarged at the end, to the tenth inclusive. Counting from the eleventh, they again begin to elongate to the seventeenth; they then diminish insensibly to the thirty-fourth, where they disappear. They are throughout longer than in the Cachalot, and enlarged towards the end, the contrary of which is manifested in that genus. There are fifteen pairs of ribs; the four last pairs and the two first do not reach the body of the vertebra, and are only attached to its transverse apophysis. The first pair is flattened and extremely wide, especially at the sternal extremity. The three last are slender and short. After the fifteen dorsal vertebræ come twenty-seven others. The V-shaped bones commence between the eleventh and twelfth; they are small compared with those of the Cachalot, and disappear after the twenty-sixth. The eleven or twelve last vertebræ have no longer any eminences. The last of all are nearly quadrangular, and are each pierced with two vertical holes. The spinous apophyses form a tolerably uniform series of moderate height, all inclined forward; they begin diminishing on the tail. The anterior articular apophyses are not elevated, remain at the same height, and preserve the same dimensions. They widen on the tail where they have no articulation to furnish, and the five or six last, nearly equal to the corresponding spinous apophyses, form with them on their vertebræ a trilobated prominence.



Skull of Greenland Whale with lower jaw (profile).

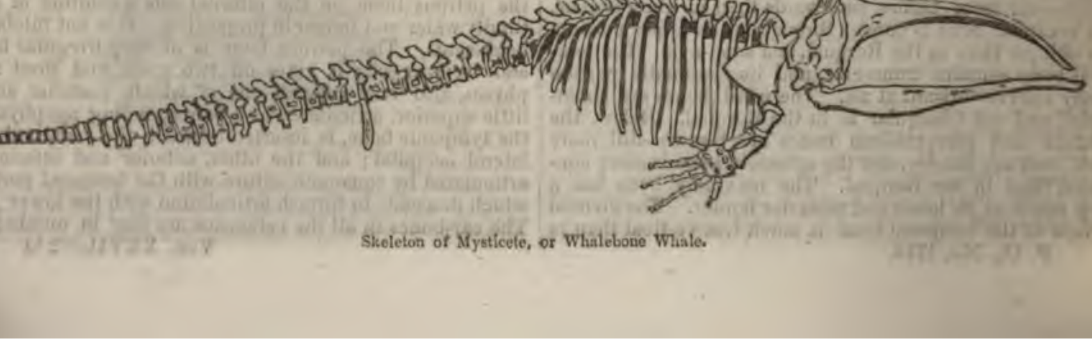
The single bone of the *sternum* was oblong, widest in front, and carried on each side an articular facet for a rib.

The *shoulder-blade* is nearly flat; one can scarcely perceive a slight concave curvature: it is nearly fan-shaped, and less wide than high. Its anterior border is simple, and has only a single projecting apophysis, which, from its position, is probably the acromion. Its articular head is much wider in proportion than in the Cachalot. The humerus is stout and short, scarcely twice as long as it is thick. Its tuberosity does not reach beyond the head in front; this last is hemispherical, and nearly parallel to the axis. The lower head is divided into two slightly inclined planes for the ulna and radius, which two bones are compressed; the ulna is the narrowest, especially in its middle. Its upper head is slightly oblique at its axis, and the olecranon ascends a little, instead of recurving into a hook, as in the Cachalot. The radius enlarges below, so as to be there two-thirds of its length; above, it is not more than a third. There are four carpal bones in the first row, of which the ulnar bone, which responds to the pisiform, forms a projection externally: there are only three in the second. The metatarsals are in length only double their width. The thumb has two phalanges, the ring-finger four, the little finger three; and all are terminated by a cartilaginous dilatation. A wide and short fin obliquely rounded is the result. (*Ossemens Fossiles.*)

The pelvis in the Cetaceans is, as we have seen, only rudimentary; but it may be necessary here to give a summary of the modification of the bones and their connection with the skeleton in the different groups.

In the Dugong it consists of two pairs of bones joined two and two, and end to end by a cartilage: to the vertebræ this apparatus is attached by a cartilage also.

The construction of this part varies in the true Zoophagous Cetaceans. Two small long bones lodged in the flesh, one on each side of the anus, form the pelvic rudiments in the Dolphins. In the great Whales, the Mysticete, or Whalebone Whale, for example, at the extremity of each of the bones regarded by comparative anatomists as ilia, a second, which is smaller and curved, is articulated. The convexity of this last bone is external, and may be considered as a pubis or ischium.



Skeleton of Mysticete, or Whalebone Whale.

Digestive Organs.

Phytophagous Cetaceans.—The teeth (molars) of the *Manatees* are ridged doubly or trebly, the root distinct from the crown: here the resemblance to the pachyderms (Tapir and Hippopotamus, for instance) is very strong. The molars of the *Dugongs* are elliptical without true fangs, and with two slight furrows on the unworn crown, which disappear with age. In the upper jaw are two tusks. In the *Rytinæ* there are no molars; but there is in lieu of them a horny plate in the middle of each jaw. The tongue is short, and can hardly be endowed with much motion. The form of the os hyoides is simple: anchylosis between the body and posterior cornua soon supervenes; but the latter send no ligament to the thyroid cartilage. The anterior cornua remain generally cartilaginous, and are the medium of union between the body or basi-hyal, and the large and long styloid processes.

Professor Owen states that the opening of the *larynx* is chiefly defended, during the submarine mastication of the vegetable food of the *Dugong*, by the extreme contraction of the faucial aperture, which resembles that of the *Capybara*. No pyramidal larynx traverses it, as in the true *Cetacea*. Two large parotid glands are situated immediately behind the large ascending ramus of the lower jaw. A thick layer of simple follicular glands is developed above the membrane of the palate, and a glandular stratum is situated between the mucous and muscular coats of the lower part of the *æsophagus*. Professor Owen states that a similar but more developed glandular structure is present in the œsophagus of the Ray. He then observes, that the stomach of the Dugong presents, as Sir Everard Hume had justly observed, some of the peculiarities met with in the whale tribe, the Peccari and Hippopotamus, and the Beaver: like that of the first, it is divided into distinct compartments; like the second and third, it has pouches superadded to and communicating with it; and, like the last, it is provided with a remarkable glandular apparatus near the *cardia*. These modifications, the Professor remarks, obviously harmonize with the difficult digestibility and low-organized matter of the food of the Dugong. 'Yet,' says he, 'it is a fact that would not have been *à priori* expected, that in the carnivorous *Cetacea* the stomach is even more complicated than in the herbivorous species, and presents a closer resemblance to the ruminant stomach; it is divided, for example, into a greater number of receptacles, and has the first cavity, like the rumen, lined with cuticle; while in the Dugong, on the contrary, the stomach is properly divided into two parts only (of which the second much more resembles intestine), and both are lined with a mucous membrane. After a luminous detailed account of the stomach, Professor Owen observes, that it would seem that a *cæcum*—and he minutely describes that of the Dugong—is present in all the herbivorous *Cetacea:* for Steller notices it as of large size and sacculated in the Northern Manatee (*Stellerus*); and Daubenton has given a figure of the bifid cæcum in the Southern Manatee (*Manatus Americanus*). It is interesting, he adds, to find that a *caput coli* (the situation and structure of which in the Dugong he describes) is present in the true *Cetacea*, as the *Balænidæ*, which subsist on animal food of the lowest organized kind. The whole of the alimentary canal and the individual differences presented by the three specimens having been elaborately detailed, Professor Owen proceeds to point out that the Dugong, with respect to the biliary organs, deviates in a marked degree from the ordinary *Cetacea* in the presence of a well developed gall-bladder, an organ which Daubenton also found in the Manatee; but the presence of the gall-bladder is not, the Professor observes, constant in the herbivorous *Cetacea*, for in the Northern Manatee, according to Steller, it is wanting, and its absence seems to be compensated by the enormous width of the *ductus communis choledochus*, which would admit the five fingers united. The secretion of the *pancreas* was carried by from twenty to thirty ducts, each about two lines in diameter, to a very wide common excretory canal, which terminates below, but on the same prominence with the cystic duct; at a much greater relative distance from the *pylorus* than in the true *Cetacea*. In one of the Dugongs dissected by Professor Owen were two small accessory spleens in addition to the larger rounded one, but in the other specimens the last alone was present. (*Zool. Proc.*, 1838.)

Zoophagous Cetaceans. The *teeth* of the *Dolphins* are, generally, simple and conical or compressed. They are present in both jaws; their number varies, and they not unfrequently lie hid in the gums in a rudimentary state. Those of the *Cachalots* are simple, of a long ovoid recurved shape, and placed in the lower jaw only. The *Mysticetes*, or *Whalebone* Whales, are without true teeth; in lieu of which, transverse horny plates of baleen, or whalebone, as it is commonly termed, grow from the palate. These plates on their internal edges are fringed with loose beards, and among these the small marine animals which form their food are entangled as in the meshes of a net.

The stomachs of the Zoophagous Cetaceans are very complicated: the number of these in various species, and in different individuals of the same species, has been variously given by different authors. Some have stated the number in the common Dolphin and Porpesse at three, others at four, others at five, others at six. M. F. Cuvier considers it as certain that these numerical differences proceed simply from the manner in which the organ is viewed. Professor Owen was unable to distinguish more than four compartments in the stomach of the Porpesse. In general the spouting whales have no *cæcum;* but a trace of it has been found in the Platanist, and it actually exists in the Piked and Whalebone Whales.

John Hunter pointed out the considerable degree of uniformity present in the liver of this tribe, observing that in shape it resembles that of man, but that it is not so thick at the base nor so sharp at the lower edge, and, probably, not so firm in the texture. The right lobe is the largest and thickest. There is no gall-bladder. The same distinguished comparative anatomist describes the pancreas as a very long flat body, having its left end attached to the right side of the first cavity of the stomach: it passes, he adds, across the spine at the foot of the mesentery, and near to the pylorus joins the hollow curve of the duodenum, along which it is continued and adheres to the intestine, its duct entering that of the liver near the termination of the gut. In the Piked Whale the *spleen* is single and small; in the Porpesse it is subdivided into several distinct portions.

The following preparations, illustrative of the teeth and other digestive organs of the *Cetacea*, will be found in the Physiological Series of the Museum of the Royal College of Surgeons in London: Nos. 319, 320, 321, are transverse and perpendicular sections of plates of whalebone, with the vascular basis or gum, &c. of the Piked Whale (*Balæna boops*, Linn.). No. 322 is a perpendicular section of a single plate of whalebone, near the root, showing the outer and inner layers, &c. No. 323 is a perpendicular section of several plates of whalebone, with the intermediate substance and vascular nidus, from the upper jaw of a young specimen of the Great Whale (*Balæna mysticetus*, Linn.). The disposition and relative proportions of the plates of whalebone are here shown, from which disposition it results that only the fringed extremity of the whalebone plates are visible from the inside of the mouth of the whale; the whole concavity of the palate appearing to be beset with coarse rigid hairs or bristles, which explains the passage in Aristotle (*Hist. Anim.*, iii., 12), who, speaking of the Great Whale (μυστίκητος, or, as Bekker reads it, ὁ μῦς τὸ κῆτος), says, 'The Mysticete has no teeth in its mouth, but hairs like hog's bristles.' Nos. 324, 325, 325 A, and 326, are sections of the jaws of the Porpesse, showing the teeth, their roots, gums, &c. Nos. 327, 328, are sections of the lower jaw, with teeth and sections of them, of *Delphinus tursio*, Fabr. (small Bottle-nose Whale of J. Hunter). Nos. 570 and 571 are portions of the first cavity of the stomach of the Piked Whale. No. 573 is a portion of the cavity of the stomach of some cetaceous animal. Nos. 574 and 575 are portions of the first and second cavities of the stomach of a Porpesse. Nos. 576, 577, 578, are portions of the second, fourth, and fifth cavities of the stomach of a Piked Whale. No. 579 is the injected stomach of a Porpesse, showing its various cavities, &c. No. 739 is a portion of the rectum of a Porpesse injected. Nos. 740 and 741 are longitudinal sections of the termination of the intestinal canal of a Dolphin (*Delphinus Tursio*, Fabr.), the last showing the large longitudinal and small transverse rugæ of the lining membrane. No. 742 is a longitudinal section of the commencement of the rectum of *Delphinus Dalei*, Cuv., and No. 743 is a longitudinal section of the rectum and anus of the Piked Whale (*Balæna boops*, Linn.), showing the zigzag rugæ, &c. No.

823 is a portion of the pancreas, of the duodenum, and of the hepatic duct of the same species; and No. 824 is a portion of the lining membrane of the hepatic duct of the same whale.

Circulating System.

Phytophagous Cetaceans.—The three *Dugongs* dissected by Professor Owen presented the same remarkable extent of separation of the two ventricles of the heart described by Sir Everard Home and Sir Stamford Raffles in the individuals examined by them, and observed by Rüppell in the Dugong of the Red Sea (*Halicore tabernaculi*). Daubenton appears to be the first who noticed this condition of the heart, in his dissection of the fœtus of the *Manatee.* Steller also described it in the genus which bears his name; but in that animal the apical cleft of the heart extended upwards only one-third of the way towards the base, whereas in the *Dugong* it reaches half-way towards the base.

Professor Owen found the *foramen ovale* completely closed, and the *ductus arteriosus* reduced to a thick ligamentous chord, permeable for a short distance by an eye-probe from the *aorta*, where a crescentic slit still represented the original communication. He states that in the smoothness and evenness of their exterior and their general form the auricles of the Dugong resemble those of the turtle (*Chelone*), and that the *appendix* can hardly be said to exist in either. The right auricle is larger than the left. The primary branches from the arches of the *aorta* corresponded in each specimen with Sir Everard Home's figure and description. There was only one superior *cava*, not two, as in the elephant; and the pulmonary veins terminated in the left auricle by a common trunk an inch in length.

As no mention had been made in the anatomical descriptions of the herbivorous cetaceans by Daubenton, Steller, Cuvier, Raffles, and Home, respecting the existence or otherwise of the extraordinary intercostal and intervertebral arterial plexuses present in the true *Cetacea*, Professor Owen carefully followed out this part of the dissection, but could detect no trace of this very striking modification. Here again, he observes, in enunciating a general anatomical proposition regarding Cuvier's *Cetacea*, the herbivorous species must be exceptionally cited apart.

Zoophagous Cetaceans.—Professor Owen remarks that the Carnivorous Cetaceans do not participate in the structure of the heart above described with the Herbivorous section.

The following is John Hunter's description of the heart of the Whale:—

‘The heart is inclosed in its pericardium, which is attached by a broad surface to the diaphragm, as in the human body. It is composed of four cavities—two auricles and two ventricles: it is more flat than in the quadruped, and adapted to the shape of the chest. The auricles have more fasciculi, and then pass more across the cavity from side to side than in many other animals; besides, being very muscular, they are very elastic, for being stretched they contract again very considerably. There is nothing uncommon or particular in the structure of the ventricles, in the valves of the ventricles, or in that of the arteries. The general structure of the arteries resembles that of other animals; and where parts are nearly similar, the distribution is likewise similar. The aorta forms its usual curve, and sends off the carotid and subclavian arteries. The veins, I believe, have nothing particular in their structure, excepting in parts requiring a peculiarity, as in the folds of the skin on the breast in the Piked Whale, where their elasticity was to be increased.’

This assertion respecting the veins is not stated very positively, and we shall presently see that there is a peculiarity in their structure.

The same great physiologist well observes, that in our examination of particular parts, the size of which is generally regulated by that of the whole animal, if we have only been accustomed to see them in those which are small or middle sized, we behold them with astonishment in animals so far exceeding the common bulk as the Whale. ‘Thus,’ says Hunter, ‘the heart and aorta of the Spermaceti Whale appeared prodigious, being too large to be contained in a wide tub, the aorta measuring a foot in diameter. When we consider these as applied to the circulation, and figure to ourselves that probably ten or fifteen gallons of blood are thrown out at one stroke, and moved with an immense velocity through a tube of a foot diameter, the whole idea fills the mind with wonder.’

But the most remarkable modification of the arterial system in the whales remains to be noticed. This consists in an almost infinite circumvolution of arteries, forming a plexus of vessels filled with oxygenated blood, situated under the pleura and between the ribs, on each side of the spine. This intercostal plexus, or *rete mirabile*, is the apparatus which enables the whale to remain under water for more than an hour.

M. Breschet's paper, admirably illustrating and following out this complicated reservoir from which the brain and nervous system derive their stimulus, was read to the French Academy of Sciences in 1834, and bears the following title: ‘Histoire Anatomique et Physiologique d'un Organe de nature vasculaire *découvert* dans les Cétacés, etc.’ Now let us see what claims M. Breschet has to the discovery. The organ was indicated and described long ago by Tyson, in his ‘Anatomy of a Porpesse,’ but he was not aware of the use of it, and considered it as a glandulous body. Hunter was the first who determined its exact nature, and showed that it was a reservoir of arterial or aerated blood.

After noticing the general structure of the arteries as above mentioned, and stating that the aorta forms its usual curve, sending off the carotid and subclavian arteries, Hunter proceeds as follows:—

‘Animals of this tribe, as has been observed, have a greater proportion of blood than any other known, and there are many arteries apparently intended as reservoirs, where a large quantity of arterial blood seemed to be required in a part, and vascularity could not be the only object. Thus we find that the intercostal arteries divide into a vast number of branches, which run in a serpentine course between the pleura, ribs, and their muscles, making a thick substance, somewhat similar to the spermatic artery in the Bull. These vessels, everywhere lining the sides of the thorax, pass in between the ribs near their articulation, and also behind the ligamentous attachment of the ribs, and anastomose with each other. The medulla spinalis is surrounded with a net-work of arteries in the same manner, more especially where it comes out from the brain, where a thick substance is formed by their ramifications and convolutions; and these vessels most probably anastomose with those of the thorax. The subclavian artery in the Piked Whale, before it passes over the first rib, sends down into the chest arteries which assist in forming the plexus on the inside of the ribs; I am not certain but the internal mammary arteries contribute to form the anterior part of this plexus. The motion of the blood in such cases must be very slow; the use of which we do not readily see. The descending aorta sends off the intercostals, which are very large, and gives branches to this plexus; and when it has reached the abdomen it sends off, as in the quadruped, the different branches to the viscera and the lumbar arteries, which are likewise very large, for the supply of that vast mass of muscles which moves the tail.’

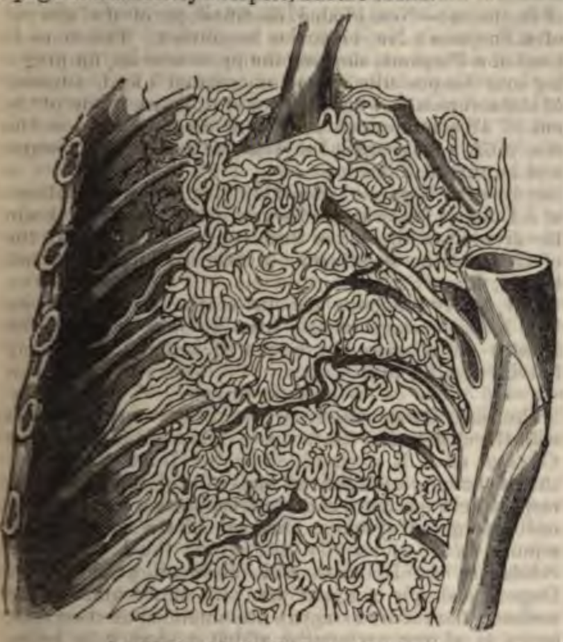
Moreover, Hunter prepared with his own hands the two instructive specimens of the arterial plexiform reservoirs in the Porpesse noticed below.

Hunter's description was published in ‘Phil. Trans.’ 1787, and Professor Owen well observes that M. Breschet could only have known it by extract or reference, or he would not have stated that the structure in question had been ‘observed by J. Hunter, but indicated too summarily “pour pouvoir être dès lors comptés au nombre des faits acquis à la science,”’ for the Professor remarks that he does not find in M. Breschet's paper any essential addition to Hunter's original account, either with respect to the observation of additional facts, to their clearer description, or to the physiological inferences deduced from them. M. von Baer, in his valuable observations on the subdivision of the brachial arteries and on other parts of the vascular system of the porpesse, does not consider it necessary to depreciate the labours of our great anatomist.

The arterial plexus of the whales has also been noticed by M. Desmoulins, and by Dr. Barclay, Dr. Knox, and Sir Wm. Jardine.

Dr. Sharpey's ‘Observations on the Anatomy of the Blood-vessels of the Porpoise,’ were read to the British Association for the Advancement of Science, in the same year and one month later than M. Breschet's paper was read to the

French Academy. They only occupy the greatest part of a page in the Society's Report, but are sound.



Arterial plexus in the Dolphins. (Breschet.)

With regard to the *veins*, Professor Owen points out that they are remarkable not only for their great capacity, which Hunter noticed, but also for their number and the immense plexuses which they form indifferent parts of the body, and above all for the almost total absence of valves. Tyson, he observes, has given a figure of the extensive venous plexus situated on the membrane investing the psoas muscles, and these have recently occupied the attention of Breschet and Von Baer. The inferior and superior venæ cavæ are not brought into communication by the vena azygos, as in other Mammalia; such veins in the usual situation in the chest would have been subject to compression between the arterial plexuses and the lungs. The venæ azygos are therefore represented by two venous trunks situated in the interior of the vertebral canal, where they receive the intercostal and lumbar veins, and finally communicate with the superior cava by means of a short single large trunk, which penetrates the parietes of the posterior and right side of the chest. Professor Owen concludes this interesting note to Hunter's 'Animal Œconomy' by clearing up the difficulty, which must have occurred to most, of accounting for the fact of so enormous an animal as the great whale being killed by such puny instruments as the harpoon and lance. 'The non-valvular structure of the veins in the *Cetacea*,' says the Professor, 'and the pressure of the sea-water at the depths to which they retreat when harpooned, explain the profuse and deadly hæmorrhage which follows a wound that in other Mammalia would be by no means fatal.'

The following preparations in the Physiological Series of the Museum of the Royal College of Surgeons illustrate the circulating system in the whales:—No. 925, the appendix of one of the auricles of the Bottlenose Whale (*Delphinus Dalei*, Cuv.), showing on a large scale the fleshy bundles, *musculi pectinati*, which assist in propelling the blood from the auricle into the ventricle. No. 926, a large portion of the right auricle of the same whale. No. 927, a portion of the left ventricle of the same whale, showing the mitral valve, auriculo-ventricular orifice, and *chordæ tendineæ*, which last are seen attached to the ventricular surface of the valves, as well as to their margin. No. 927 A, the heart of a Porpesse (*Phocæna communis*), showing the completely closed *foramen ovale*, absence of any trace of an Eustachian valve in the right auricle, and *ductus arteriosus* so obliterated as to admit only the passage of a small bristle. Nos. 132 and 133 (dry preparations), two instructive specimens, injected by Hunter, of the peculiar arterial plexiform reservoirs in the Porpesse.

Respiratory System.

Phytophagous Cetaceans.—Professor Owen states that the peculiar form, structure, and position of the lungs have been so accurately described and figured by Raffles, Home, and Rüppell, that he has only to observe the close agreement with these accounts which the structure of the parts presented in the three Dugongs dissected by him. Daubenton and Humboldt, he remarks, describe and figure a precisely similar condition of the respiratory apparatus in the Manatee. Steller, he adds, describes the same extension of the lungs in the *Rytina*, and compares it with the lungs in the bird, but without their fixation in the parietes of the chest, so characteristic of that class. Professor Owen is of opinion that the Chelonian reptiles, perhaps, offer a closer resemblance to the herbivorous *Cetacea* in this respect, and he notices it as worthy of remark, that the air-cells of the lungs are larger in the Dugong than in any other mammals. In the carnivorous *Cetacea*, the air-cells, he observes, are remarkably minute, and the lungs more compactly shaped and lodged in a shorter thorax.

'Existing,' continues Professor Owen, 'as both the herbivorous and carnivorous *Cetacea* do, under such peculiar circumstances—as air-breathing animals constantly dwelling in an element the access of which to the lungs would be immediately fatal—it might be supposed that the mechanism of the *larynx*, or entry to the air-passage, would be similarly modified in all the species, in order to meet the contingencies of their aquatic existence. But we can as little predicate a community of organization in the structure of this part, as of the circulating or digestive system in the *Cetacea* of Cuvier. The Dugong and the Dolphin present, in fact, the two extremes in the Mammiferous class, in the development of the *epiglottis*, which is one of the chief internal characteristics of that class. In the true *Cetacea* and the *Delphinidæ* in particular, it is remarkable for its great length, and in the Dugong it can hardly be said to exist all.'

Professor Owen, after giving a minute and accurate account of the *larynx*, thus proceeds:—

'Amongst the true *Cetacea*, we have observed that it is those which subsist on the lowest organized animal substance, as the *Balænidæ*, which approach the nearest to the herbivorous species, in having the additional complexity of the *cæcum*; and it is interesting to find that the same affinity is manifested in the structure of the *larynx*. The *epiglottis* and *arytenoid cartilages*, for example, are relatively shorter in the *Balænoptera* than in *Delphinus*; and, as Mr. Hunter has observed, they are connected together by the membranes of the *larynx* only at their base; and not wrapped together or surrounded by that membrane as far as the *apices*, as in the Dolphins. In the *Balænoptera* also, the apices of these cartilages are not expanded, as in the Dolphins, but diminished to an obtuse extremity. These points of resemblance to the condition of the larynx in the Dugong and Manatee are carried still further in the Mysticete Whale, at least in the fœtus dissected by me, and in which both the *epiglottis* and *arytenoid cartilages* were relatively much shorter, and the thyroid cartilage larger and more convex than in the Piked Whale (*Balænoptera*). The *thyroid cartilage* is however a single piece in both genera of *Balænidæ*, though deeply notched above and below; and the *larynx* presents several interesting individual peculiarities, which however the minute and accurate descriptions and illustrations of this organ, in both the *Balænopteræ* and *Balænæ*, published by Professor G. Sandifort,* preclude the necessity of further dwelling upon.'

The diaphragm, lungs, bronchi, and trachea present in the *Zoophagous Cetacea* secondary modifications only, but important differences are exhibited in the nostrils, which serve to conduct the air from the atmosphere to the lungs. The necessity for the act of spouting seems to have led to the obliteration of the organ of smelling, and to the formation of a new organ especially destined to fulfil that act. Although this organ has only been studied thoroughly in the Dolphins, the probability is that the apparatus in all the Zoophagous cetaceans is the same.

If, says Baron Cuvier, we trace the œsophagus upwards, we find that when it arrives opposite the pharynx it appears to divide into two passages, one of which is continued onwards to the mouth, while the other ascends to the nose: mucous glands and fleshy fibres, which constitute several muscles, surround the last-mentioned passage. Some of these are longitudinal, and arise from the circumference of the posterior orifice of the bony nostrils, and descend along that canal to the pharynx and its sides; the others, which are annular, appear to be a continuation of the proper muscles of the pharynx. The larynx rises into this passage in a pyramidal form, and the annular fibres have the power of constricting it. Mucous follicles, which pour out their secretion by conspicuous excretory orifices, prevail in this part. When the lining of the nasal passage has reached the vomer, it becomes of a peculiar texture, thin, smooth, and black, is apparently destitute of vessels and nerves, and very dry. A fleshy valve closes the two bony nasal canals at the upper or external orifice. It is formed of two semicircles attached to the anterior edge of that orifice, which it shuts by the agency of a very strong muscle lodged above the intermaxillary bones. To open it, there is a necessity for some foreign body to press against it from below; and when it is closed, it debars all communication between the nasal passages and the cavities above them, which cavities are two large membranous pouches formed by dark mucous skin, and very much wrinkled when empty; but when distended, they become of an oval shape, which in the Porpesse is about as large as a common wine-glass. These two pouches lie beneath the integument in front of the nostrils, and communicate with an intermediate space immediately above those nasal organs, whose external orifice is a transverse semilunar slit. Strong fleshy fibres expand and cover the whole upper surface of this apparatus, radiating from the entire circumference of the cranium, uniting above the two pouches, and adapted for compressing them forcibly. Now we will suppose that the cetacean has taken into its mouth water which it wishes to eject: it first sets the tongue and jaws in motion as if it were about to swallow the water; but, shutting its pharynx, it forces the water to ascend into the nasal passages, where the annular fibres above mentioned accelerate its progress till it raises the valves and distends the membranous pouches above. The water, when once in the pouches, can be there retained till the animal wishes to spout. When that wish is present, the cetacean closes the valve, and so prevents the descent of the water into the nasal passages, and forcibly compresses the pouches by means of the muscular expansion which overspreads them. The water, compelled then to escape by the narrow semilunar aperture, is projected to a height which corresponds to the amount of the pressure applied.

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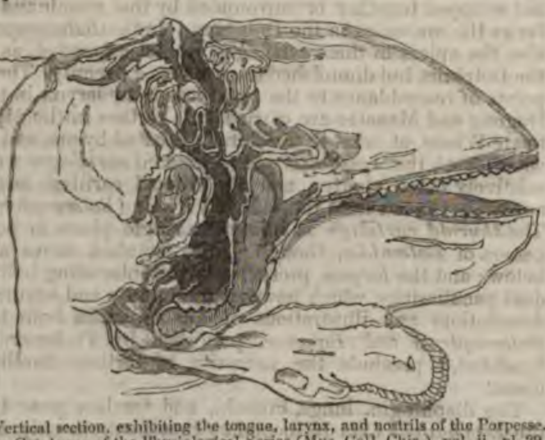
* 'Nieuwe Verhandelingen der Koninkl. Nederland. Instituut,' Deel iii., p. 224, pl. i.—v.



Vertical section, exhibiting the tongue, larynx, and nostrils of the Porpesse. (See Catalogue of the Physiological Series (Mus. Coll. Chir.), vol. ii., pl. 29, p. 163.)

In the case of the Spermaceti Whale, it appears that the animal occupies about a seventh of its time in breathing; and when it rises after long intervals, an enormous column of air must rush into the lungs and aerate a vast quantity of blood for the reservoir described by Hunter. In ordinary mammals, man and the quadrupeds for instance, respiration is momentarily going on, and enough air only is inhaled to oxygenate the blood requisite for a few pulsations.

The spout-hole is simple in the Dolphins, and situated, as seen in the cut, towards the top of the head: the same simplicity exists in that of the Cachalots, but it is situated at the upper extremity of the snout: in the Whalebone Whales it is double, opening towards the summit of the head, as in the Dolphins, in a crescentic form whose convexity is sometimes anterior and sometimes posterior.

The following preparations illustrate the respiratory system of the Whales, in the Museum of the Royal College of Surgeons:—Nos. 1132, 1133, small portions of the lung of a Porpesse; No. 1166, the longitudinal section of the head of a Porpesse, showing the pyramidal larynx projecting into the posterior nares and embraced by the muscles of the soft palate, which surround it like a sphincter and cut off all communication between the mouth and nostrils; No. 1167, a longitudinal section of the tongue, pharynx, and larynx of a Porpesse; No. 1168, the os hyoides and larynx of a Porpesse; No. 1169, the larynx and pharynx of a Dolphin (*Delphinus Tursio*, Fabr.); both these show the division of the fauces into two passages for the course of the food in deglutition on each side of the pyramidal larynx, &c.

For a very luminous account of the larynx and blowhole or air-passage in this tribe, see the paper of John Hunter on Whales, above quoted, in *Phil. Trans.* (vol. lxxvii., p. 416), 1787.

Uropoietic System.

Professor Owen observes, that if we were acquainted with the structure of the urinary organs of the *herbivorous Cetacea*, as it is exemplified in the Dugong alone, we should have to establish as marked a distinction in this respect between them and the true *Cetacea* as in the preceding organic systems. Instead of the numerous and minute *lobuli* or *renules* into which the kidney is subdivided in the Dolphins and Whales, it presents in the Dugong a simple compact form with an unbroken external surface; the *tubuli uriniferi* terminate upon two lateral series of eleven *mammillæ*, which project into a single elongated cavity or *pelvis*, from which the *ureter* is continued. In the Northern Manatee however, Steller, whose accuracy Professor Owen justly notices, describes the kidney as being subdivided like that of the Seal and Sea-Otter. A similar lobulated structure is also ascribed by John Hunter, in his paper on Whales, in *Phil. Trans.* (1787), to the Manatee, including it, with the Seal and White Bear, among the animals occasionally inhabiting the water. Daubenton, in his anatomical description of the *Manatus americanus*, merely notices the kidneys as oblong, and placed opposite to each other; nor does his figure give any indication of lobulated structure; neither does Sir Everard Home mention such structure in his Anatomy of the Manatee, in *Phil. Trans.* (1821). This want of uniformity in the structure of the kidney in the herbivorous *Cetacea* is however, Professor Owen adds, of less moment with reference to their natural affinities; since in the Pachyderms we find some species, as the *Rhinoceros*, and, though in a less degree, the Elephant, presenting a subdivided kidney; while others, as the Tapir and Hog, have it entire.

In the fœtus of the Dolphin, according to Müller, the lobules of the kidney consist principally of convoluted uriniferous ducts extending from the apex to the circumference of the lobule: the intertwinings of the tubuli are greatest in the intercortical portion. It is a curious fact, Professor Owen remarks, that the supra-renal gland in the Porpesse presents a certain resemblance to the kidney in its lobulated exterior; but, he adds, the analogy extends no farther, for on making a section of this part it was found to consist of the usual continuous compact substance.

In the Museum of the Royal College of Surgeons, No. 1266 is the right kidney of a young Porpesse injected, showing the component renules; Nos. 1267, 1268, are transverse and longitudinal sections of the kidney of the Piked Whale (*Balæna boops*, Linn.); No. 1290 is the supra-renal gland of *Delphinus tursio;* and 1291 shows the kidney and supra-renal gland of a Porpesse. (*Physiological Series.*)

Generative System.

The organs of generation, being those which are most remotely related to the habits and food of an animal, have always been regarded by Professor Owen, and most justly in our opinion, as affording very clear indications of its true affinities. We are the least likely, says he, in the modifications of these organs to mistake a merely adaptive for an essential character. He then notices the well-known fact that the true *Cetacea* have no trace of *vesiculæ seminales;* but he found these bags present, and of large size, in the Dugongs. The *vasa deferentia* were short and disposed in irregular convolutions. Each *crus penis* was attached to the lower expanded extremity of the ischia, which were anchylosed to the ilia on each side. In the true *Cetacea*, Professor Owen observes, the *retractores penis* run along the sides to the under surface of that organ; whereas in the Dugong the corresponding muscles are inserted into the *dorsum penis*, as in the elephant: they meet, he adds, and join in a strong tendon half-way between the *crus* and the *glans penis*. Proceeding in his inquiry, Professor Owen points out that in the true *Cetacea* the body of the *penis* consists of a single *corpus cavernosum*, grooved above for the passage of the *vena dorsalis*, and more deeply excavated below for the lodgment of the *urethra* and its vascular structure; but the Dugong presents a marked deviation from the cetaceous structure of the same part, which presents in a transverse section a division of the *corpus cavernosum* into two lateral portions, with a middle ligamentous *septum*, as in the Pachyderms; the vascular and erectile tissue also, he remarks, bears a greater proportion to the surrounding ligamentous structure than in the true *Cetacea*. The testes, observes the Professor in conclusion, are abdominal in the Dugong, as in the rest of the *Cetacea;* but, he adds, they also have a similar position in the Elephant.

John Hunter remarks that the organs of generation of this order of animals come in both sexes nearer in form to those of the Ruminants than of any others; and this similarity is particularly remarkable in the female: in the male their situation varies on account of the modification of the external form of the body.

The female organs in the *Rytina* have been described by Steller; and Sir Everard Home has given an account of those of the Dugong. (*Phil. Trans.*, 1820.)

Hunter, in his paper on Whales has entered particularly into the structure of those of the *Zoophagous cetaceans*. The copulation has been alleged to be carried on in an upright position with the heads of both sexes at the surface. The period of uterine gestation does not appear to be certainly known; the number of young is, generally, considered not to exceed one, there being but two nipples: the glands for the secretion of milk are two, one on each side of the mesial line of the belly at its lower part. The posterior ends, from which go out the nipples, are on each side of the opening of the vagina in small furrows. The milk is very rich, like that of a cow to which cream has been added.

Professor Owen remarks, that much stress has been recently laid on the supposed existence which the muscles surrounding the mammary gland afford in the act of suckling by compressing the gland and ejaculating the milk accumulated in the dilated receptacle or reservoir; but he observes that, considering how great the pressure of the surrounding water must be upon the extended surface of the mammary gland, it may readily be conceived that when the nipple is grasped by the mouth of the young and the pressure removed from it by the retraction of the tongue, the milk will be expelled in a copious stream by means of the surrounding pressure alone, independently of muscular aid. The Professor adds, that the intimate structure of the mammary gland in the *Zoophagous Cetacea* is essentially the same as in the ORNITHORHYNCHUS, being composed of an innumerable quantity of cæcal tubes; these are however shorter than in the *Ornithorhynchus*, and their glandular parietes are firmer; they are well shown in the figure of the mammary gland in a young Piked Whale (*Balænoptera rostrata*) given by Müller in his seventeenth plate, *fig.* 2, and, according to that author, present, after the Ornithorhynchus, the simplest structure of the mammary gland in the entire mammiferous series of animals.

The Physiological Series of the Museum of the Royal College of Surgeons has the following preparations illustrative of the male organs of the *Zoophagous Cetaceans:*—Nos. 2519 to 2527, both inclusive (penis, &c.).

No. 2527 A is the distal extremity of the penis of a *Dugong*, showing a marked deviation from the cetaceous structure of the same organ, and an approach to that which the Pachyderms and some other mammals exhibit.

Nos. 2785 to 2794, both inclusive, illustrate the female organs of the *Zoophagous Cetaceans*.

Brain, Nervous System, and Senses.

The brain is well formed. In the Porpesse and the Common Dolphin it has been stated to be as highly developed as in any mammiferous quadruped. In the greater whales there is reason for supposing that the ratio of the weight of the brain to that of the body is $\frac{1}{3000}$. In the smaller cetaceans it is not diminished to a proportionate size, as its extraordinary development in the Dolphin testifies.

Nos. 1332 to 1337, both inclusive, and Nos. 1359 to 1363, both inclusive, in the Physiological Series of the Museum of the Royal College of Surgeons, illustrate the brain, spinal chord, &c. of the zoophagous whales.

Smell.—Hunter observes that in many of the whale tribe there is no organ of smell at all; and in those which have such an organ, it is not that of a fish, therefore probably not calculated to smell water. It becomes difficult therefore, he remarks, to account for the manner in which such animals smell the water; and why the others should not have had such an organ, which seems to be peculiar to the large and small whalebone whales (*Balæna mysticetus* and *Balænoptera rostrata*); the organ, in those which have it, he adds, is extremely small, when compared with that of other animals, as well as the nerve which is to receive the impression.

Nos. 1541 to 1546, both inclusive, in the series above quoted, illustrate the nasal passages, &c. in the *Zoophagous Cetaceans*.

Taste.—The complicated and indeed delicate structure of the tongue in the *Phytophagous Cetaceans* indicates that they must enjoy the sense of taste, although the tongue is capable of but slight motion.

But it has been doubted whether the *Zoophagous Cetaceans* are endowed with a special organ for the enjoyment of this sense. No fossulate nor conical papillæ are present in the tongue of the Dolphin or of the Porpesse; slight elevations, the middle of which appears to be perforated, are only perceptible, and the fringed edges would seem to lead to the notion that their object is more intended for furthering the sensations of touch.

John Hunter states that the tongue, which is the organ of taste, is also endowed with the sense of touch. He found the tongue in the Porpesse and Grampus firm in texture, composed of muscle and fat; pointed and serrated on its edges, like that of a hog. In the Spermaceti Whale, he says, it was almost like a feather-bed. In the Piked Whale it was but gently raised, hardly having any lateral edges, and its tip projecting but little, yet, like every other tongue, composed of muscle and fat. He supposes that the tongue of the large Whalebone Whale rises in the mouth considerably; the two jaws in the middle being kept at such a distance on account of the whalebone, so that the space between, when the mouth is shut, must be filled with the tongue.

Nos. 1486 to 1488, both inclusive, illustrate the organization of the tongue in the Zoophagous Cetaceans (*Delphinus*, *Balæna*, and *Hyperoodon*), in the Physiological Series of the Museum of the Royal College of Surgeons.

Sight.—The eye in the *Herbivorous Cetaceans* only is provided with a nictitating membrane or lateral lid; that of the *Zoophagous* or *Spouting Cetaceans* has no lachrymal glands, but the lids are furnished with glands for a mucous secretion adapted for lubricating the sclerotic coat.

John Hunter states that the eye in this tribe is constructed upon nearly the same principle as that of quadrupeds, differing however in some circumstances; by which it is probably better adapted to see in the medium through which the light is to pass. It is upon the whole small for the size of the animal. The lids have but little motion, and consist not of loose cellular membrane, as in common quadrupeds, but rather of the common adipose membrane of the body; the connection however of their circumference with the common integuments is loose, the cellular membrane being less loaded with oil, which allows of a slight fold being made upon the surrounding parts in opening the eyelids. This is not to an equal degree, he adds, in them all, being less so in the Porpesse than in the Piked Whale. A detailed account of the anatomy of the eye in whales will be found in Hunter's paper.

In the Museum of the College, No. 1777 A exhibits the eyeball and characteristic nictitating membrane in the *Dugong*.

Nos. 1773 to 1777, both inclusive, illustrate the eyeball and its appendages in the Porpesse, Dolphin, and Piked Whale.

Hearing.—There is no external concha; but the ea
constructed much upon the same principle as in the qua

ped; there are however certain differences which the reader will find set forth in Hunter's paper. The sense seems to be fairly developed, and Whale-fishers experience no small difficulty from the warning given by both eye and ear. It has however been stated that the Greenland whale, though not without a nice sense of hearing, remains insensible to the report of a cannon.

In the Physiological Series of the Museum of the College, the following preparations illustrate the organ of hearing in the Whales:—No. 116, section of the tympanum of *Balæna mysticetus* steeped in acid; and Nos. 1582 to 1598 B, both inclusive, affording a striking example of the extent of John Hunter's researches relative to this organ in the *Zoophagous Cetaceans*.

Touch.—The sensation of touch must be lively, though it is a commonly received opinion that the common Dolphin, notwithstanding its delicate epidermis, is not very sensible to tactile impressions. M. Breschet and M. Roussel de Vauzème distinguish the following constituents in the skin of the Cetaceans:—1. Derm, or corium, a dense fibrous cellular texture, which contains and protects all the other parts of the skin. 2. The papillary bodies, consisting of papillæ, covered by the derm. 3. The sudorific apparatus, consisting of soft, elastic, spiral canals, which extend through the entire thickness of the derm, and open in the intervals of the papillæ by an orifice, closed, generally, by a small epidermic valve. 4. The inhalant apparatus. 5. The mucous apparatus. 6. The colorific apparatus.

According to Hunter, the reticular network containing the blubber, which is described by him as fine in the Porpesse, Spermaceti, and large Whalebone Whale (*Balæna*), and coarse in the Grampus and small Whale-bone Whale (*Balænoptera*), forms part of the skin. See above, p. 287. (*Taste*).

The preparations illustrative of the organs of touch, besides those noticed under the head of Taste, in the Physiological Series of the Museum of the College, are Nos. 1403, 1404, 1405, 1406, exhibiting a section of the tail of a Porpesse with the cuticle in part removed, to show the villi of the cutis, a portion of the true skin of a whale, a section of the same, and a portion of the plicated integument from the under part of the neck or thorax of the Piked Whale (*Balæna boops*, Linn.), showing the puckering of the softer skin in the interspaces of the longitudinal folds.

NATURAL HISTORY.

The natural history of the Phytophagous and Zoophagous Cetaceans, even moderately followed out, would of itself fill a large volume. Our limits will not permit us to give more than a mere descriptive sketch of some of the forms of this great and highly interesting order. The same reason has compelled us to omit much valuable information relative to their organization; but we have endeavoured in our compressed abridgment to touch on most of the leading points.

Phytophagous Cetaceans.

We have treated of this division under our present title, because the animals which it comprises would be looked for here, in consequence of the general position assigned to them by zoologists; but it is impossible to study their organization and habits without perceiving that they do not belong to the true Whales: they are, in short, *Aquatic Pachyderms*.

It is not indeed surprising that they should so long have been confounded with the Cetaceans; for their general appearance and horizontal tail, joined to the difficulty of associating them either with the *Seals* or the *Walrus*, notwithstanding their aquatic habits, led naturally to their being placed in the same order with the true zoophagous whales. But with external form almost all resemblance ceases; and when these phytophagous mammals are, as they ought to be, referred to a separate group, there will not be, so far as discovery has hitherto gone, any such animal as a phytophagous whale.

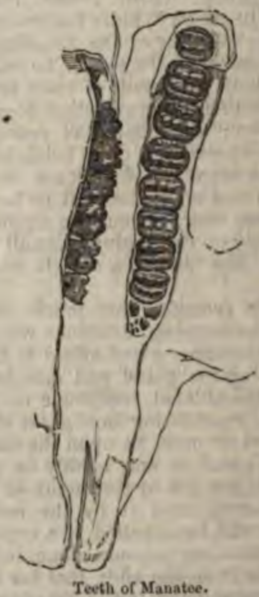
'The short and thick neck, fin-like fore-legs, want of hind-legs, caudal tegumentary fin, smooth, naked, and almost hairless integument, are all modifications of external form by which the Dugongs and Manatees are adapted to play their part in the water: but the *kind of part*,' says Professor Owen, 'which they are to play in that element depends on organic characters which mainly, if not exclusively, reveal their true affinities. Now we have seen that the whole of the internal structure in the herbivorous *Cetacea* differs as widely from that of the carnivorous *Cetacea* as do their habits: that the amount of variation is as great as well could be in animals of the same class existing in the same great deep. The junction of the Dugongs and Manatees with the true Whales cannot therefore be admitted in a distribution of animals according to their organization. With much superficial resemblance, they have little real or organic resemblance to the Walrus, which exhibits an extreme modification of the amphibious carnivorous type. I conclude therefore that the Dugong and its congeners must either form a group apart, or be joined, as in the classification of M. de Blainville, with the Pachyderms, with which the herbivorous *Cetacea* have the nearest affinities, and to which they seem to have been more immediately linked by the now lost genus DINOTHERIUM.'

These *Aquatic Pachyderms* consist of three genera, namely: the *Manatees* (*Manatus*, Cuv.); the *Dugongs*, *Halicore*, Ill. (*Dugungus*, Camper, &c.); and the *Maskaia* (*Stellerus*, Cuv., *Rytina*, Ill.).

Manatus.

Generic Character.—Body oblong; molar teeth marked with two transversal elevations on their crown; no canines in the adult; vestiges of nails on the edges of their anterior extremities or pectoral fins; pectoral mammæ; skin very thick and naked; whiskers very strong and close set; horizontal tail thick, tegumentary, and elongated oval.

Dental formula:—Incisors, $\frac{2}{0}$; molars, $\frac{8-8}{8-8} = 34$.



Teeth of Manatee.

Cuvier describes the *Manatees* as having an oblong body terminated by an elongated oval fin; eight molar teeth in each jaw, with a square crown marked by two transverse ridges; neither incisors nor canines in the adult; but in the very young ones two small pointed teeth are found in the intermaxillary bones, which disappear early. The vestiges of nails are observable on the edges of their flippers, which they use dexterously enough in creeping and carrying their young. This has caused these organs to be compared to hands, whence their name *Manati*, or *Manatee*.

Geographical Distribution of the Genus.—The warmer parts of America and its islands: Western Africa.

The *mammæ* of the Manatees and Dugongs are pectoral, and this conformation, joined to the adroit use of their flippers (whose five fingers can be easily distinguished through the investing membranes, four of them being terminated by nails) in progression, nursing their young, &c., have caused them, when seen at a distance with the anterior part of their body out of the water, to be taken for some creature approaching to human shape so nearly (especially as their muzzle is thick set with hairs, giving somewhat of the effect of human hair or a beard), that there can be little doubt that not a few of the tales of Mer-men and Mermaids have had their origin with these animals, as well as with Seals and Walruses. Thus the Portuguese and Spaniards give the *Manatee* a denomination which signifies Woman-fish; and the Dutch call the Dugong *Baardmannetje*, or Little Bearded Man. A very little imagination and a memory for only the marvellous portion of the appearance sufficed, doubtless, to complete the metamorphosis of this half woman or man, half-fish, into a Siren, a Mermaid, or a Merman, and the wild recital of the voyager was treasured up by such writers as Maillet, Lachesnaye-des-Bois, Sachs, Valentyn, and others, who, as Cuvier well observes, have displayed more learning than judgment.

Example, *Manatus americanus*.

Description.—The American Manatee is of rounded form, and has been compared to a leathern bottle or wine-skin. The head is conical, and no depression marks its junction with the body; the muzzle is stout and fleshy, semicircular at its upper part, where are the two semilunar apertures of the nostrils. The full upper lip is somewhat cleft in the middle, and two tufts of stiff bristles spring from its sides; the lower lip is shorter and straighter than the upper, and the internal lining of both consists of short hard very thick hairs. The mouth is not large, and the eyes are small. Two small fissures in the skin form the only appearance of external ears. The flippers or swimming paws have more freedom of motion than those of the true Whales; the articulations of the fingers may be felt through the skin, and are endowed with considerable power and motility. There is no nail on the thumb, but the four fingers are furnished with nails, that of the little finger being very small. The skin is greyish and coarse, like bull's hide, some say slightly shagreened, and having isolated hairs scattered here and there; these hairs are most numerous at the angle of the mouth and behind the paws. The *mammæ* are situated on the breast, and are not much developed, except during the period when they are called into action for the supply of the young.

This species reaches twenty feet in length, and is the *Bœuf* and *Vache Marine*, and *Femme Marine*, of the French; *Sea-Cow* of the English. Strange figures were given of it by the older naturalists; that in Hernandez has the fore-feet terminated with solid hoofs.

Geographical Distribution.—The warmer parts of America and the Antilles, about the mouths of rivers.

Habits, Food, &c.—The Manatees are gregarious, and generally go in troops. The young are usually placed in the centre of the herd for protection, and on the approach of danger, all unite for the common safety. It is alleged that, when one has been struck by a harpoon, its companions will tear out the weapon; and they are so attached to their young that if the calf be taken the captors are sure of the mother, from the recklessness with which her maternal affection leads her to the place of capture. If the mother be captured, the young follow her to the shore and fall an easy prey.

The shallow bays of the Antilles and the quiet creeks of the South American rivers, particularly in Guiana and the Brazils, are the favourite haunts of the Manatee. They were formerly abundant at the mouths of the Orinoco and Amazon, ascending many miles, even into their tributaries and the fresh water lakes. There their actions are recorded as being similar in some respects to the whales, such as *breaching* or leaping to a considerable height out of the water. The food is entirely vegetable, consisting of subaqueous plants and littoral herbs, principally. According to Hernandez, "Humano more coit, fœmina supina in littore ferè tota procumbente, acceleritate quadam superveniente mare." The same author adds, that only one young is produced at a birth. The milk is said to be agreeable to the taste.

Utility to Man.—The mild inoffensive manners of the Manatee, and the unsuspecting nature of the animal, make it an easy prey to the hunter, who pursues it for the sake of the flesh, which all pronounce to be excellent, both fresh and salted. Hernandez compares it to well fatted pork of pleasant flavour, but says that it is noxious to those labouring under lues venerea. Others compare it, when roasted, to beef or veal in flavour, and state that when salted it makes excellent sea provision.

It is alleged that formerly they were so plentiful within ten or twelve leagues of Cayenne, that a large boat might be filled with them in a single day, when their flesh was sold in the market at about threepence a pound. But the eagerness with which it was purchased soon reduced the numbers, and made them comparatively scarce.

The capture is generally effected by means of the harpoon. At St. Domingo the hunters approached them in a small boat, and struck them with a large harpoon to which a long stout cord was made fast. The stricken animal made violent efforts to escape, carrying with it the harpoon and cord, to the end of which a cork or piece of light wood to serve as a buoy was attached, and indicated the whereabout of the manatee. After a while the hunters took hold of the rope and at last drew the exhausted animal on shore, where it was killed. The sport of manatee-catching, thus conducted, is described as highly diverting, but the boat is sometimes upset by the struggles of the animal in the shoals.

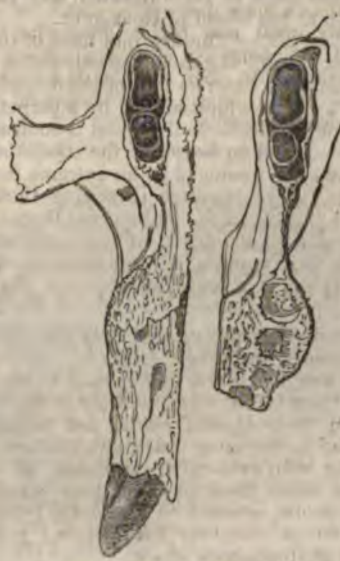
Manatees have reached Europe. The carcass of one which had been long dead, is recorded to have come on shore at Newhaven in the Frith of Forth, in the autumn of 1785; and Duhamel states that one with its cub was thrown on shore near Dieppe.

The Manatee.

Halicore.

Generic Character.—Body elongated, tail-fin in form of a crescent, molars each composed of two cones united by the side, small pointed tusks inserted in the incisive bones, skin very thick and without hairs.

Dental formula; incisors, $\frac{4}{6 \text{ or } 8}$; canines, 0; molars, $\frac{5-5}{5-5} = 30$ or 32.



Teeth of Dugong. (F. Cuv.)

The attention of Professor Owen was particularly directed to the state of the dentition of the Dugongs of different sexes which he examined, from which it appeared that, as in the Narwhal, the permanent tusks of the female are arrested in their growth, and remain throughout life concealed within the substance of the intermaxillary bones and the alveolar integument. The cavity of the tusks, he states, is in like manner filled up by the secretion of the pulp which retrogrades in the course of its absorption, and hence the tusks are solid, like the corresponding tusks in the female Narwhal, or at least, present only a shallow cavity at their expanded and distorted base. He found in one cranium of a male Dugong in the upper jaw, the deciduous incisors or tusks co-existing with the permanent ones. In the skull of a male which had $\frac{3-3}{2-3}$ molars, the sockets of the deciduous incisors were obliterated, and the points of the permanent ones projected from their sockets. Not more than twenty grinders, five on each side of the jaw, appear to be developed in this animal.

"It is obvious," says Professor Owen, "that the different form and condition of the tusks thus observed in the heads of Dugongs of the same size and age, might be regarded as indicating a specific instead of a sexual difference. Dr. Knox inclines to the former opinion; I have, however, adopted the latter view, not hastily or hypothetically, but as a result of the minute comparison of the forms and proportions of all the crania which have come under my observation."

Example, *Halicore Dugong*.

Description.—The head of this Dugong is small in proportion to the body, which in general form much resembles that of the Manatee. The large upper lip is thick and obliquely truncated, and the truncated surface, which forms the short and nearly vertical snout, is furnished with soft papillæ and a few bristles; a horny substance covers the lips, the upper of which is very moveable and tumid on the edge; the lower is much smaller, resembling a round or oblong chin. The inside of the cheeks is furnished with strong projecting bristles. The nostrils are situated on the summit of the upper jaw, where it curves downwards, and penetrate obliquely, so that the upper semilunar edge presses upon the lower surface to form a valve capable of being shut at the will of the animal. The eyes are small. The little aperture of the ear is hardly perceptible. The mammæ are placed on the chest, beneath the thick and fleshy flippers or paws, which are rather warty on their anterior edge; but there is no appearance of nails. The tail is broad, and lobated or crescent-shaped. The skin is three-quarters of an inch thick, of a uniform blueish colour, sometimes blotched with white below. Length from seven to eight feet.

Geographical Distribution.—Sumatra and all the warm seas of the Indian archipelago. It is said to have been observed at the north of New Holland, and to have once been common at the island of Rodriguez.

Habits, Food, &c.—'The external form of the Dugong,' says Professor Owen, 'is not so well calculated for moving rapidly through the water as that of the dolphin and other carnivorous *Cetacea*, which subsist by a perpetual pursuit of living animals. In these the snout is conical and peculiarly elongated, and in some, as the *Delphinus Gangeticus*, the jaws are produced to an extreme length, so as to give them every advantage in seizing their swift and slippery prey; whilst in the herbivorous Dugong the snout is as remarkable for its obtuse truncate character—a form however which is equally advantageous to it, and well adapted to its habits of browzing upon the *algæ* and *fuci* which grow upon the submarine rocks of the Indian seas. As, from the fixed nature of the Dugong's food, the motions of the animal during the time of feeding must relate more immediately to the necessity of coming to the surface to respire, its tail, the principal locomotive organ of ascent and descent, is proportionally greater than in the true *Cetacea*, its breadth being rather more than one-third the length of the whole body. But the most important external differences are seen in the presence of the *membrana nictitans*, in the anterior position of the nostrils, and in the situation of the mammæ, which are pectoral, or rather axillary, being situated just behind the roots of the flippers; in the female specimen examined their base was about the size of a shilling, and they projected about half an inch from the surface. A considerable ridge extends along the middle of the upper surface of the posterior part of the back, which is continued upon and terminates in the tail.'

The haunts of the Dugong, which does not appear ever to frequent the land or fresh-water, are generally in the sea-shallows, where the water is not more than two or three fathoms.

Sir Stamford Raffles states that during six months four of these animals were secured at Singapore, but that the greatest number is said to be taken during the northern monsoon, when the sea is most calm, near the mouth of the Johore River. They are usually caught by spearing, in which feat the natives are very expert, during the night, when the animals indicate their approach by a snuffling noise which they make at the surface of the water. The first object of the captor is to secure and elevate the tail, when the animal becomes perfectly powerless. Sir Stamford adds, that the Dugongs are seldom caught at Singapore above eight or nine feet in length; but how much larger they grow is not ascertained, as, when they exceed that size, their superior strength enables them to make their escape.

Leguat, who speaks of them as occurring at the Isle of France in great numbers about a hundred and twenty years ago, says that they were twenty feet long, but were very easily taken. They fed in flocks like sheep in three or four fathoms' water, and made no attempt at escape when approached. Sometimes they were shot at the end of the musket, sometimes laid hold of and forced on shore. Three or four hundred were met with together, and they were so far from shy that they suffered themselves to be handled, and the fattest were thus selected. The larger ones were avoided, not only on account of the trouble they gave in the capture, but because their flesh was not so good as that of the smaller and younger ones.

The female Dugong produces generally only one young at a birth, and to this the mother bears such strong affection that, if the young is speared, the mother will not depart, but is sure to be taken also. The Malays consider this animal as almost typical of maternal affection. The young utter a short and sharp cry, and are said to shed tears, which are carefully preserved by the common people as a charm, under the notion that they will secure the affections of those whom they love, as they attract the mother to the young Dugong.

Utility to Man.—The flesh is delicate, and is said to be superior to that of the buffalo or common ox. The Dugong is considered by the Malays as a royal fish, and the king has a right to all that are taken. Sir Stamford Raffles states that this species afforded much satisfaction on the table, as the flesh proved to be most excellent beef.

The Dugong of the Red Sea is considered different from that above noticed, by Professor Rüppell, who describes it by the name of *Halicore tabernaculi*, under the impression that it was with the skin of this species that the Jews were directed to veil the Tabernacle. He saw it swimming among the coral banks on the Abyssinian coast near the Dalac islands. The fishermen harpooned a female, which he dissected, ten feet long. The Arabs stated that they live in pairs or small families, that they have feeble voices, feed on *algæ*, and that in February and March bloody battles occur between the males, which attain the length of eighteen feet. The female brings forth in November and December. The flesh, teeth, and skin are esteemed by the Arabs.

The Dugong.

For an account of the northern form of this group, *Stellerus* or *Rytina*, our limits compel us to refer the reader to Steller's description in the second volume of the 'New

Memoirs of the Petersburg Academy' (1751). Very little addition has since been made to its history.

Zoophagous Cetaceans.

Delphinidæ.

These have an elongated body, with their jaws more or less projecting in the form of a beak, are without tusks, but most frequently furnished with a great number of teeth simple and equal in size, which are however wanting altogether in some species; no baleen or whalebone; blow-holes with a common opening in a crescent shape on the head.

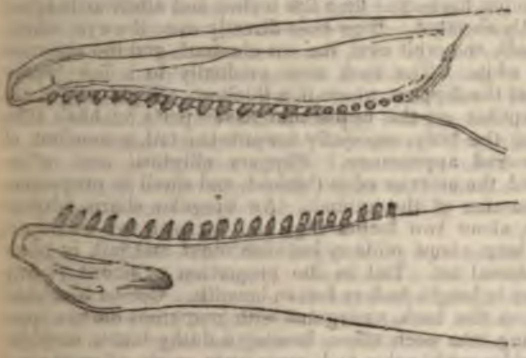
The dental formula of the family may be stated generally as consisting of from 84 to 95 teeth in the upper jaw, and from 84 to 95 in the lower, = 168 to 190.

Space will not permit us to notice more than two of the numerous genera of this family.

Phocæna.

Generic Character.—Muzzle short, convex, and not terminated in a rostrum; teeth numerous, placed irregularly in each jaw; a dorsal fin.

Dental formula:—Molars, $\frac{40 \text{ to } 46}{40 \text{ to } 46}$, = 80 to 92.



Teeth of Porpesse. (F. Cuv.)

Example, *Phocæna communis*, *Delphinus phocæna*, Linn.

Description. Upper part of the body deep bluish or greenish black fading on the sides into the polished silvery whiteness of the belly. The brownish flippers rise from a white ground. Length from four to five feet.

Geographical Distribution.—Atlantic Ocean. Seas of Europe.

This appears to be the *φώκαινα* (*phocæna*) of Aristotle ('Hist. An.' vi., 12). Some, Pennant and others, have supposed it to be the *Tursio* of Pliny ('Nat. Hist.,' ix., 9), which, according to the Roman naturalist, bears some likeness to the Dolphins, of which he relates so many anecdotes illustrative of their affection for man in the preceding chapter. It is the *Porco pesce* of the Italians (whence probably the English name *Porpesse*); *Marsouin* of the French; *Marsuin* and *Tumblare* of the Swedes; *Meerschwein* of the Germans; and *Llamhidydd* of the antient British.

Habits, Food, &c.—Porpesses swim in shoals, and drive the mackerel, herrings, and salmon before them, pursuing them up the bays 'with the same eagerness,' says Pennant, 'as a pack of dogs does a hare. In some places they almost darken the sea as they rise above water to take breath: they not only seek for prey near the surface, but often descend to the bottom in search of sand-eels and sea-worms, which they root out of the sand with their noses in the same manner as the hogs do in the field for their food.' In fine weather they leap, roll, and tumble in the manner so well known, principally in the spring and summer, which is supposed to be their rutting season. They go up the rivers in pursuit of the salmon, to which they are a deadly enemy, and other fish; and have been seen high in the Loire, Charente, and Seine in France. It has been remarked that when the porpesses are gamboling in the spring and summer, they appear heedless and blind to all danger and risk, which, as their brain is highly developed, strengthens the supposition that they are, at such times, actuated by the sexual impulse to an extent that lessens their usual wariness. On the 23rd May, 1842, we saw, about 10 A.M., two rolling and sporting a little above London Bridge towards the Surrey shore. They seemed to disregard the numerous steam-vessels which were constantly passing, and to pay no attention to the wherries, some of which went close to them. The man on the look-out in the steamer from whose deck we watched them said that they had been seen between five and six that morning near Southwark Bridge, and that one of them had been hooked with a boat-hook, but had got away. It was blowing fresh from the south-west, and the tide was running up; the time for high water at London Bridge that day being 0·45.

The period of utero-gestation is said to be six months, and the young at the birth twenty inches in length. The mother watches over it with the most tender care.

Those who have seen the porpesse in pursuit of the salmon, describe the scene as most interesting from the efforts of the salmon to escape, and the adroitness with which the porpesse counteracts their attempts. In their distress the salmon frequently spring high out of the water, but their ever watchful foe bides their relapse, and by its rapid, quick, and well directed turns, seldom fails to secure its prey.

Utility to Man.—The oil produced from the fat surrounding the body is of the purest kind, and the skin when carefully tanned and dressed is used for wearing-apparel, and for coverings for carriages. The shoals of porpesses on the west coast of Ireland are said to be immense, and might be well worth the attention of the neighbouring population if furnished with boats and proper implements for their capture, and conversion to œconomic purposes. As an article of food, the flesh was antiently esteemed, and considered worthy of the tables of the great. Receipts for dressing it appear in the 'Forme of Cury,' compiled (circ. 1390) by the master cooks of King Richard II. It appears to have been served in 'Furmente,' in broth, and roasted, and was evidently used both fresh and salted. Several of them were on the board at the great feast holden at the 'intronazation' of George Nevell, Archbishop of York, in the reign of Edward IV. In Henry VIII.'s time it continued to be a royal dish, and was in fashion in the reign of Elizabeth. It appears to have been, in those days, generally presented as a roast with a sauce made of fine white bread crumbs, mixed with vinegar and sugar. The common dolphin, *Delphinus delphis*, was then considered so great a delicacy, that, according to Dr. Caius, one which was taken in his day was thought a present worthy of the Duke of Norfolk, who distributed it amongst his friends: it was roasted and dressed with the porpesse-sauce last above mentioned. At a later period, the porpesse kept its ground on the table of Roman Catholics on fish-days and during Lent. Nor have modern navigators found it undesirable food. Captain Colnett's people, who fell in with numbers of them off the Mexican coast, mixed their flesh with their salt-pork—making excellent sausages, which formed their ordinary food. Captain Basil Hall speaks with some unction of a dish of porpesse-cutlets, well separated from the investing lard and blubber, which was served at his table with such happy effect that the dish left his cabin empty.

The flesh of the porpesse is the Greenlander's great dainty, and he quaffs its oil as the most delicious of draughts.

The Porpesse

Delphinapterus.

Generic Character.—Head obtuse, muzzle short and conical, or terminated in an elongated rostrum; number of teeth variable; no dorsal fin.

Dental formula, according to F. Cuv., $\frac{9-9}{8-8} = 34$.

Example, *Delphinapterus leucas*, *Delphinus leucas*, Gm.

Description.—Head obtuse, muzzle short and conical; a small angular eminence in place of the dorsal fin; colour yellowish white or cream-colour; but they have been seen yellowish approaching to orange, and white tinged with red. The young with brownish spots, and occasionally, blue or slaty. No external ear, mouth small, eye hardly larger than that of man: iris blue. Spiracle on the vertex with its horns turned backwards. Length from 12 to 18 feet.

Geographical Distribution.—The Northern Ocean.

This is the *Beluga* and *White Whale* of authors and navigators, *White Fish* of the whalers.

One of these dolphins haunted the Frith of Forth in the summer of 1815 for nearly three months, passing almost daily upwards, and again retiring, with the flood and ebb. It was supposed to be in pursuit of salmon, and, after many unsuccessful attempts, the salmon-fishers killed it with fire-arms and spears. Mr. Bald, of Alloa, bought it and sent it to Professor Jameson: it is now in the Edinburgh Museum, and formed the subject of the interesting observations of Dr. Barclay and Mr. Neil in the *Transactions of the Wernerian Society*.

Mr. Neil remarks that the shape of this animal is very symmetrical, suggesting the idea of perfect adaptation to rapid progression in the water. Its head, he observes, is small and lengthened, and over the forehead there is a thick round cushion of flesh and fat: the body continues to swell as far as the large, thick, oval flippers, and from that point gradually diminishes to the setting on of the tail, which is powerful, and described as bent under the body in swimming, and propelling the animal with the velocity of an arrow.

The contradictory accounts of the number of the teeth arise probably from differences of age. In the specimen examined by Mr. Neil, they were $\frac{9-9}{6-6}$.

Habits, Food, &c.—The higher and Arctic latitudes appear to be the chosen haunts of the Beluga. They abound in Hudson's Bay, Davis's Straits, and on parts of the southern coasts of Asia and America, where they ascend the large rivers. Steller noticed them at Kamtchatka; and in Charlevoix's time they were numerous in the Gulf of St. Lawrence, going with the tide as high as Quebec. Disco Island in Greenland is said to abound with them, nor are they scarce at Spitzbergen. Scoresby did not see them lower than Jan Mayen's Land: he seldom observed them among the ice, but where the water was clearest and smoothest. They are described as not at all shy, but often following the ships, tumbling about the boats in herds of forty or fifty, bespangling the surface with their brilliant whiteness. The whale-fisher seldom disturbs these beautiful creatures, for they are not only difficult to strike on account of their activity, but, when stricken, the harpoon frequently draws, and if it holds, the capture is but of little value. Sir Charles Giesecke speaks of their regular annual visits about November to the west coast of Greenland, where they become a seasonable supply to the natives when other provisions fall short. They arrive in herds with stormy weather and south-west winds, and are taken with harpoons and strong nets. Cod, haddock, flounders, &c., are said to be the usual food of the Beluga.

Beluga.

Utility to Man.—The oil is reported to be of the best, whitest, and finest quality, and of their skins a sort of Morocco leather is said to be made, which, though thin, will resist a musket-ball. The internal membranes are used for windows, and bed-curtains, and the sinews for thread. The flesh, it is asserted, resembles beef, though somewhat oily. Hans Egede describes both it and the fat as having no bad taste 'when it is marinated with vinegar and salt,' and says that it is then as well flavoured as any pork whatever. He declares the fins also and the tail 'pickled or sauced' to be very good eating, so that, according to Hans, 'he is very good cheer.'

Monodon.

Generic Character.—Body elongated, a slight longitudinal projection or crest in place of the dorsal fin; flippers oval.

Dental formula:—$\frac{1-1}{0}$; molars 0.

Example, *Monodon monoceros*.

Description.—General form long ovoid. Head about a seventh of the whole length, with a slight depression behind it where it joins the body; forehead rising suddenly and almost perpendicularly from the mouth, then becoming horizontal for a few inches, and afterwards again slightly elevated. Blow-hole directly over the eye, which is small, the orbit oval, the iris chestnut, and the sclerotic coat white. The back rises gradually to a few inches behind the flippers, where it is thickest. Slight ridges are perceptible on the upper and lower parts on each side, giving the body, especially towards the tail, somewhat of a squared appearance. Flippers elliptical and rather curved, the anterior edge thickest, and small in proportion to the size of the animal. An irregular sharp adipose ridge, about two inches high and between two and three feet long, about midway between snout and tail, in place of a dorsal fin. Tail in the proportion of about twenty inches in length to four feet in breadth. Colour blackish-grey on the back, variegated with numerous darker spots running into each other, forming a dusky-black surface; the sides with paler and more open spots of grey on a white ground. No spots on the belly. The ground colour in old narwhals is stated to be entirely white, with dark-grey or blackish spots of different degrees of intensity; whilst on the belly they are faint and few, occurring at intervals, and considerable spaces being spotless. In one stranded in the Elbe the skin was white as snow, marked with a multitude of dark spots to a considerable depth; but the belly was everywhere white and glistening. Length from fifteen to sixteen feet without the tusks.

Geographical Distribution.—The Northern Ocean.

This is the *Naarwal* of the Germans; *Narwhal*, *Unicorne*, and *Licorne de Mer* of the French; and *Narwhal* and *Unicorn Whale* of the English.

Habits, Food, &c.—Under this head we must first notice the tusks, one of which only, as observed above, p. 278, is generally developed, the other remaining within the socket: but this is not always the case; for specimens have been taken with both incisors or tusks exposed, though one was somewhat less than the other. These incisors appear to be common to both sexes. In one at Hamburg the tusks where they emerge from the sockets are two inches asunder: they then gradually diverge till the space between their points is thirteen inches. The length of the left tusk is seven feet five inches; that of the right seven feet. The question arises as to the use of the tusk, for one appears to be the normal development in the economy of the animal. Mr. Scoresby has expressed an opinion that as the end of the tusk is smooth and clean, while the rest of it is rough and dirty, and as a broken tusk was found rubbed and rounded, it may be used to pierce thin ice for the purpose of enabling the animal to respire without the necessity of retreating into open water. Again, he states that his father sent him the contents of a narwhal's stomach, consisting of several half-digested fishes, with others of which the bones only remained. There were the remains of a cuttle-fish, part of the spine of a flat-fish, probably a small turbot, and a skate almost entire. The last was two feet three inches in length, and one foot eight inches in breadth, comprising the bones of the head, back, and tail, the side-fins, and considerable portions of the muscular substance. It appears, he observes, remarkable that the Narwhal, an animal without teeth, with a small mouth, and stiff lips, should be able to catch and swallow so large a fish as a skate, the breadth of which is nearly three times as great as the width of its own mouth. As the animal in which these remains were found had a tusk of seven feet, Mr. Scoresby apprehended that this instrument had been employed in the capture of the fishes on which it had recently fed. It seemed probable to him that the skates had been pierced with the horn and killed before they were devoured; otherwise, he observes, it is difficult to imagine how the narwhal could have swallowed them, or how a fish of any activity would have permitted itself to be taken, and sucked down the throat of a smooth-mouthed animal without teeth to detain and compress it.

Narwhals swim with great swiftness. When at the surface for respiration, they blow repeatedly with considerable force, and then frequently lie motionless for several minutes with their back and head just above water. Mr. Scoresby describes them as often sporting about his ship, sometimes in bands of fifteen or twenty together, often elevating their long tusks and crossing them with each other as if they were fencing. They often uttered a very unusual sound, resembling the gurgling of water in the throat, which Mr. Scoresby thinks produced it, as it only occurred when they reared their tusks, with the front of the head and mouth out of the water. Several of them followed the ship, seeming to be attracted by curiosity: as the water was perfectly transparent, they could be seen descending to the keel and playing about the rudder for a considerable time. Sir Joseph Banks stated to Dr. Fleming, who has published a very interesting account in the 'Wernerian Transactions,' that a narwhal stranded on the Lincolnshire coast was found with the whole of its body buried in the mud of the beach, and seemed safely and securely waiting the return of the tide.

Utility to Man.—The blubber yields a very superior oil, which, as well as the flesh, is considered a dainty by the Greenlander, who regards the Narwhal as the herald of the Mysticete, in whose neighbourhood the former is, they say, generally to be found, perhaps from partaking of the same food. When harpooned, it swiftly dives to about two hundred fathoms, and on its return to the surface is killed by lances. The Greenlander drives them to fissures in the ice, where they come up to respire, and kills them with harpoons, &c. The ivory of the tusk is considered superior to that of the elephant: it is very dense and hard, very white, is not subject to become yellow, and is susceptible of a high polish. They formerly brought a high price, and many virtues were attributed to them [UNICORN]: they still form a valued article in commerce. The celebrated throne of the Danish kings is stated to be made of the tusks of this animal.

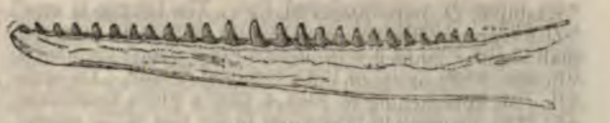
The Narwhal.

Physeteridæ.

Physeter.

Generic Character.—Length of the head equal to a third or half of the total length; upper jaw large, elevated, and either without teeth or furnished with very few, which are short, and nearly entirely hidden by the gum; lower jaw narrow, and armed with stout conical teeth; orifices of the blow-holes united, and situated at the end of the upper part of the muzzle; no dorsal fin.

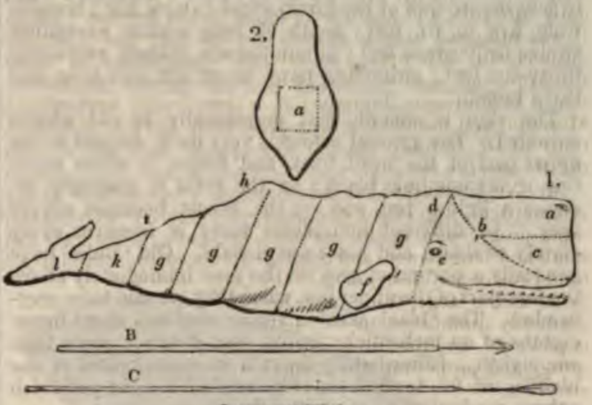
The subjoined cut is from M. F. Cuvier, who gives it from the skeleton in the Paris museum, and is confined to the lower jaw only, from which it may be inferred that in the French specimen there is no appearance of teeth in the upper jaw: in the lower there are 27 on each side = 54.



Teeth of Cachalot.

Example, *Physeter macrocephalus.*

Description.—To render the following abridgment of the description by Mr. Beale (who, in his excellent work on the 'Natural History of the Sperm Whale,'[*] has done more to elucidate its habits and form than any other writer) more intelligible, we prefix, as he himself does, his cut, which is by far the most accurate published figure extant of the Spermaceti Whale.



Spermaceti Whale.

1. Outline of the entire form. 2. Anterior aspect of the head. *a*, nostril or spout-hole: *b*, situation of the case; *c*, the junk; *d*, bunch of the neck; *e*, eye; *f*, fin; *g*, spiral strips or blanket pieces; *h*, the hump; *i*, the ridge; *k*, the small; *l*, the tail or flukes.

B, a harpoon.

C, a lance.

a, in *Fig.* 2; the lines forming the square are intended to represent the flat anterior part of the head.

The head presents a very thick blunt extremity, constituting about a third of the whole length of the animal; at its junction with the body is a large protuberance on the back called 'the bunch of the neck;' immediately behind this is the thickest part of the body, which from thence gradually tapers off to the tail, but it does not become much smaller for about another third of the whole length, when 'the small' or tail commences; and at this point also, on the back, is a large pyramidal prominence called 'the hump,' from which a series of smaller processes run half way down the 'small' or tail, constituting what the whalers term the 'ridge.' The body then contracts so much as to become finally not thicker than that of a man, and terminates by expanding on the sides into the 'flukes' or tail, forming a large triangular horizontal fin with a slight notch or depression posteriorly between the flukes, which are about six or eight feet in length, and from twelve to fourteen in breadth in the largest males or 'Bulls.' The chest and belly are narrower than the broadest part of the back, and taper off evenly towards the tail: the depth of the head and body is, in all parts except the tail, greater than the width. The head, viewed in front, presents a broad somewhat flattened surface, rounded and contracted above, considerably expanded on the sides, and gradually contracted below, resembling in some degree the cutwater of a ship. The slit of the single blowing-hole or nostril is about twelve inches in length. In the right side of the nose is the 'case,' a cavity for the purpose of secreting and containing an oily fluid, which after death concretes into a granulated yellowish substance: this is the spermaceti. In the case of a large whale there is not unfrequently a ton, or more than ten barrels, of spermaceti. Beneath the case and nostril is the elastic 'junk,' formed of dense cellular tissue strengthened by strong tendinous fibres, and infiltrated with very fine sperm oil and spermaceti. The mouth extends nearly the whole length of the head. Both the jaws, especially the lower, are contracted in front to a very narrow point; and when the mouth is closed the lower jaw is received within a sort of cartilaginous lip, or projection of the upper one; but principally in front, for further back at the sides, and towards the angle of the mouth, both jaws are furnished with tolerably well-developed lips. The tongue is small and white. The throat is capacious enough to give passage to the body of a man, presenting a strong contrast to the contracted gullet of the Greenland Whale. Throughout, the mouth is lined with a pearly white membrane. The eyes are small in proportion to the size of the animal, and are furnished with eyelids, the lower of which is most moveable. At a short distance behind the eyes are the external openings of the ears, sufficiently large to admit a small quill. Not far from the posterior angle of the mouth are the swimming-paws or fins, which are not much used in progression, but probably more as balances, and occasionally in supporting the young.

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[*] London, John Van Voorst, 1839, 8vo.

Mr. Beale gives the following as the dimensions of a sperm whale of the largest size, or about eighty-four feet in length:—depth of head from eight to nine feet; breadth from five to six feet; depth of body seldom exceeding twelve or fourteen feet; circumference seldom exceeding thirty-six feet; swimming-paws about six feet long and three broad.

The skin is smooth, but occasionally in old whales wrinkled. The general colour is very dark, deepest on the upper part of the head, back, and flukes, in which situation it is sometimes black; on the sides it gradually assumes a lighter tint, and on the breast becomes silvery grey. In different individuals there is however every variety of shade, and some are piebald. Old 'Bulls' have generally a portion of grey on the nose immediately above the fore-part of the upper jaw, when they are said to be grey-headed. The 'black skin' in young whales is about three-eighths of an inch thick: in old ones it is not more than one eighth. Immediately beneath the black skin is the blubber or fat, termed the 'blanket,' of a light yellowish colour, producing when melted the sperm oil.

Habits, Food, &c.—The bulk of the head is, as we have seen, made up of a membranous 'case,' containing a thin oil of much less specific gravity than water; below which again is the 'junk,' which, although heavier than the spermaceti, is still lighter than the element in which the whale moves; consequently, observes Mr. Beale, the head taken as a whole is lighter specifically than any other part of the body, and will always have a tendency to rise at least so far above the surface as to elevate the nostril or blow-hole sufficiently for all purposes of respiration; and more than this, a very slight effort on the part of the whale would only be necessary to raise the whole of the anterior flat surface of the nose out of the water. At very regular intervals of time the snout emerges, and from the extremity of the nose the spout is thrown up, and at a distance appears thick, low, bushy, and white; it is formed of the expired air forcibly ejected through the blow-hole, and acquires its white colour from minute particles of water previously lodged in the chink or fissure of the nostril, and also from the condensation of the aqueous vapour thrown off by the lungs. The spout, says Mr. Beale in continuation, is projected at an angle of 136° in a slow and continuous manner for about three minutes, and may be seen from the mast-head in favourable weather at the distance of four or five miles. When the whale is alarmed or 'gallied,' the spout is thrown much higher with great rapidity, and differs much from its usual appearance. Immediately after each spout the nose sinks beneath the water, scarcely a second intervening for the act of inspiration, which must consequently be performed very quickly, the air rushing into the chest with astonishing velocity; there is however no sound caused by inspiration, and very little by expiration in this species; in short, nothing of that loud noise called the 'drawback' in the Finback and other whales. Ten seconds is occupied by a large bull sperm whale in making one inspiration and one expiration: during six of these the nostril is beneath the water. At each breathing time the whale makes from sixty to seventy expirations, and remains therefore at the surface ten or eleven minutes. When the breathing-time is over, or, as the whalers term it, he has had his 'spoutings out,' the head sinks slowly, the 'small,' or the part between the 'hump' and 'flukes' appears above the water curved, with the convexity upwards; the flukes are then lifted high into the air, and the animal having assumed a straight position, descends perpendicularly to an unknown depth: this last act is called 'peaking the flukes,' and those who are on the look-out call loudly when they see it—'there goes flukes.' The whale continues thus hidden beneath the surface for one hour and ten minutes; some will remain one hour and twenty minutes, and others only for one hour; but these, Mr. Beale says, are rare exceptions. A seventh of the time of this whale is, Mr. Beale makes out, consumed in respiration.

Small fishes are occasionally swallowed in quantities by this whale, and one has been known to eject from its stomach a fish as large as a moderate sized salmon; but the principal food of the Sperm Whale appears to consist of squids or cuttle-fishes. [SEPIADÆ.]

This species is gregarious; and the herds called 'schools' are of two kinds, one consisting of females, the other of young males not fully grown. Mr. Beale has seen as many as five or six hundred in one 'school.' With each female 'school' are from one to three large 'bulls' or 'schoolmasters,' as they are termed by the whalers. The full-grown males almost always go alone in search of food: they are when alone very incautious and easily killed. It is the smaller, or 'forty-barrel bull,' as he is called, that makes the most desperate resistance. A large whale will yield eighty, and sometimes one hundred barrels of oil.

Mr. Beale states that the female is smaller than the male, and that she breeds at all seasons, producing generally only one at a time, but sometimes two. Nothing certain appears to be known as to the period of gestation, but M. F. Cuvier supposes it to be ten months. A fœtal cachalot, dissected by Mr. Bennett,* was fourteen feet long and six in circumference, deep black mottled with white spots. Its position in the womb was that of a bent bow. According to M. F. Cuvier, the two brought forth by the stranded whale near D'Audierne, were ten or eleven feet long; and Captain Colnett states that the young sperm whales which he saw in great numbers off the Galapagos Islands were not larger than a small porpesse. Mr. Beale's own observations coincided with those of Mr. Bennett.

For many other habits of this whale, such as 'breaching,' or leaping clear out of the water and falling back again on its side, so that the breach may be seen in a clear day from the mast-head at a distance of six miles; 'going head out,' a mode of progression which enables it to attain ten or twelve miles an hour, which Mr. Beale believes to be its greatest velocity; 'lob-tailing,' or lashing the water with its tail; and the vivid descriptions of the dangers and hair-breadth escapes attending its capture, we must refer to Mr. Beale's book, which every one who is anxious for information on this subject should read. Other information on the whale fishery is contained in the article FISHERIES, vol. x., p. 288.

Geographical Distribution.—Very wide: the species has been seen in almost all seas, but it is now principally found in the Southern Ocean, on the coasts of America, Japan, New Guinea, Timor, &c. Cachalots have occasionally been stranded in the British Islands, as in the Frith of Forth, the Orkneys, &c.

The Spermaceti Whale. (Beale.)

Balænidæ.

Family Character.—Head not so convex forward as that of the Cachalot: both sides of the upper jaw furnished with transverse plates of a fibrous horny substance with loose or unwrinkled edges, being the baleen, or whalebone; lower jaw entirely unarmed.

Balæna.

Generic Character.—No dorsal fin, which in some species is replaced by a boss or hump.

In this genus, the baleen or whalebone is most highly developed. John Hunter describes this extremely elastic animal substance as being of the same nature as horn, a term which he uses to express what constitutes hair, nails, claws, feathers, &c. It consists, he remarks, of thin plates of some breadth and in some of very considerable length, their breadth and length in some degree corresponding to one another; when longest they are commonly the broadest, but not always so. The plates differ in size in different parts of the same mouth, more especially in the Large Whalebone Whale. 'They are placed,' continues Hunter, 'in several rows, encompassing the outer skirts of the upper jaw, similar to teeth in other animals. They stand parallel to each other, having one edge towards the circumference of the mouth, the other towards the centre or cavity. They are placed near together in the Piked Whale, not being a quarter of an inch asunder, where at the greatest distance, yet differing in this respect in different parts of the same mouth; but in the Great Whale the distances are more considerable. The outer row is composed of the longest plates; and these are in proportion to he different distances between the two jaws, some being ourteen or fifteen feet long and twelve or fifteen inches broad; but towards the anterior and posterior parts of the mouth they are very short, they rise for half a foot or more, nearly of equal breadths, and afterwards shelve off rom their inner side until they come near to a point at he outer: the exterior of the inner rows are the longest, orresponding to the termination of the declivity of the uter, and become shorter and shorter till they hardly rise bove the gum. The inner rows are closer than the outer, nd rise almost perpendicularly from the gum, being longitudinally straight, and have less of the declivity than the uter. The plates of the outer row laterally are not quite lat, but make a serpentine line; more especially in the Piked Whale, the outer edge is thicker than the inner. All round the line made by their outer edges runs a small white bead, which is formed along with the whalebone, nd wears down with it. The smaller plates are nearly of n equal thickness upon both edges. In all of them the ermination is in a kind of hair, as if the plate was split nto innumerable small parts, the exterior being the longest nd strongest. The two sides of the mouth composed of hese rows meet nearly in a point at the tip of the jaw, and pread or recede laterally from each other as they pass ack; and at their posterior ends, in the Piked Whale, hey make a sweep inwards, and come very near each other, just before the opening of the œsophagus. In the Piked Whale there were above three hundred in the outer ows on each side of the mouth. Each layer terminates n an oblique surface, which obliquity inclines to the roof f the mouth, answering to the gradual diminution of their ength; so that the whole surface, composed of these terminations, forms one plane, rising gradually from the roof f the mouth: from this obliquity of the edge of the outer ow we may in some measure judge of the extent of the whole base, but not exactly, as it makes a hollow curve, which increases the base. The whole surface resembles he skin of an animal covered with strong hair, under which surface the tongue must immediately lie when the mouth is shut; it is of a light-brown colour in the Piked Whale, and is darker in the Large Whale. In the Piked Whale, when the mouth is shut, the projecting whalebone remains entirely on the inside of the lower jaw, the two aws meeting everywhere along their surface; but how this is effected in the Large Whale I do not certainly know, the horizontal plane made by the lower jaw being straight, as in the Piked Whale; but the upper jaw being an arch cannot be hid by the lower. I suppose therefore that a broad upper lip, meeting as low as the lower jaw, covers he whole of the outer edges of the exterior rows. The whalebone is continually wearing down, and renewing in he same proportion, except when the animal is growing t is renewed faster and in proportion to the growth. The formation of the whalebone is extremely curious, being in one respect similar to that of hair, horns, spurs, &c.; but t has besides another mode of growth and decay equally singular. These plates form upon a vascular substance, not immediately adhering to the lower jaw-bone, but having a more dense substance between, which is also vascular. This substance, which may be called the nidus of the whalebone, sends out (the above) thin broad processes, answering to each plate, on which the plate is formed, as the cock's spur or the bull's horn, on the bony core, or a tooth on its pulp; so that each plate is necessarily hollow at its growing end, the first part of the growth taking place on the inside of this hollow. Besides this mode of growth, which is common to all such substances, it receives additional layers on the outside, which are formed from the above-mentioned vascular substance extended along the surface of the jaw. This part also forms upon it a semi-horny substance between each plate, which is very white, rises with the whalebone, and becomes even with the outer edge of the jaw, and the termination of its outer part forms the bead above mentioned. This intermediate substance fills up the spaces between the plates as high as the jaws, acts as abutments to the whalebone, or is similar to the alveolar processes of the teeth, keeping them firm in their places. As both the whalebone and the intermediate substance are constantly growing, and as we must suppose a determined length necessary, a regular mode of decay must be established, not depending entirely on chance, or the use it is put to. In its growth three parts appear to be formed; one from the rising core, which is the centre; a second on the outside; and a third being the intermediate substance. These appear to have three stages of duration; for that which forms on the core, I believe, makes the hair, and that on the outside makes principally the plate of whalebone; this, when got a certain length, breaks off, leaving the hair projecting, becoming at the termination very brittle; and the third or intermediate substance, by the time it rises as high as the edge of the skin of the jaw, decays and softens away like the old cuticle of the sole of the foot when steeped in water. The use of whalebone, I should believe, is principally for the retention of the food till swallowed; and do suppose the fish they catch are small when compared with the size of the mouth.' (Hunter *On Whales*.)

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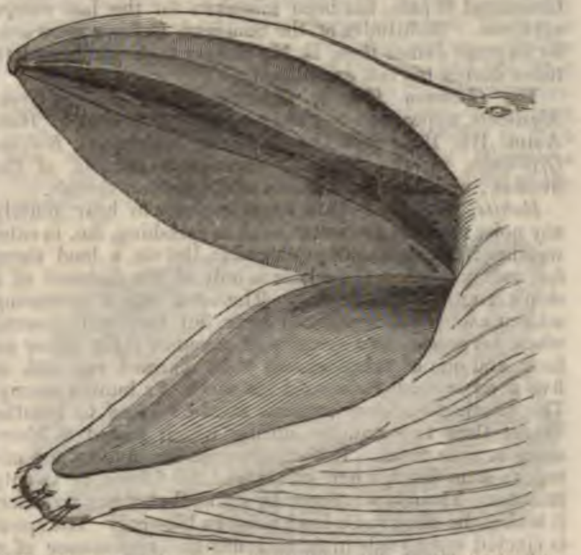
* 'Narrative of a Whaling Voyage round the Globe,' 2 vols. 8vo., Bentley, 1840. Many interesting facts in natural history are recorded in this entertaining book.



View of the inside of the jaws of a fœtal Balænoptera, showing the arrangement of the whalebone. (Owen, *Odontography*.)

Example, *Balæna mysticetus.*

Description.—Colour velvet-black, grey, and white, with a yellow tinge. Back, greater portion of the upper jaw, part of the lower, fins, and tail, black. Lips, fore part of lower jaw, sometimes a little of the upper, and a portion of the abdomen, white. Eyelids, junction of the tail with the body, part of the axilla of the flippers, &c. grey. The older the whale, the more white and grey is there upon it; some are piebald all over. The surface of the body is rather furrowed. The head is very large, forming nearly a third of the whole bulk, the under part, the outline of which is given by the jaw-bone, flat. The lips enclose the cavity of the mouth. The upper jaw is bent down at its edges like a boat upside down, so as to shut in the front and upper parts of the cavity. On the most elevated part of the head are situated the blow-holes, two longitudinal apertures like the holes in the belly of a violin, and from eight to twelve inches long. There are upwards of three hundred of these plates of whalebone on each side of the jaw, enclosing the tongue between their lower extremities and themselves covered by the lower lip. The body is thickest a little behind the flippers, near the middle of its whole length, whence it gradually tapers conically towards the tail, and, slightly, towards the head. There is no dorsal fin. The flippers, about nine feet long and five broad, are placed about two feet behind the angle of the mouth, and cannot be raised above a horizontal position. The horizontal tail is flat and semilunar, indented in the middle; the two lobes somewhat pointed and turned a little backwards. The eyes, not much larger than those of an ox, have a white iris, and are situated on the sides of the head about a foot obliquely above and behind the angle of the mouth. The sense of sight appears to be acute in the water, but not above it. The size of this whale has been supposed to have been greatly exaggerated by old statements. Eighty and a hundred feet were mentioned as a frequent length, and many accounts more than doubled that measurement. At present sixty-five or seventy feet appear to be the extreme length of a full grown Mysticete. Mr. Scoresby, who has elucidated the history of this whale as satisfactorily as Mr. Beale has that of the Sperm Whale, and who was personally concerned in the capture of three hundred and twenty-two, found not one that exceeded sixty feet. It should be remembered however, in criticising old accounts, that the great persecution which these animals have long undergone and still undergo, while it reduces their numbers, is very unfavourable to longevity.

Geographical Distribution.—The habitat usually assigned to this whale is most extensive: thus M. Lesson states that it inhabits all the seas of the globe, especially the two poles; but it is not improbable that the Whalebone Whale or Black Whale of the South Seas, *Balæna Australis*, Desmoulins, *Balæna Antarctica*, Less., which has every appearance of being distinct, and moreover of being infested with cirrhipede parasites (*Tubicinella*, *Coronula*, &c.) of different species from those which infest the Greenland Whale, has been mistaken for the last named cetacean. Multitudes of the Southern *Balæna* were seen by Captain James Ross, R. N., in very high southern latitudes during his last expedition.

The *Common Whale*, *Greenland Whale*, or *Great Mysticete*, appears to be the μυστικητος of Aristotle, (Hist. Anim. III. 12.); it is the *Baleine Franche* and *Baleine Ordinaire* of the French; *Gronlands Walfisk* of the Swedes; and *Morfil Cyffredin* of the antient British.

Habits, Food, &c.—This species seems to hear acutely any noise made in the water, such as splashing, &c. in calm weather: but a sound produced in the air, a loud shout for instance, when the whale is only at the distance of a ship's length, is disregarded. The usual rate of swimming seldom exceeds four miles an hour, but they will descend when harpooned at a velocity of seven or eight miles an hour, and one of these whales when alarmed can sink in five or six seconds far beyond the reach of a human enemy. The Mysticete seldom remains at the surface to breathe longer than two minutes, during which period it blows eight or nine times. It then descends for five or ten minutes; sometimes, when on its feed, for fifteen or twenty minutes. Though Mr. Scoresby states that it has no voice, it makes, he observes, a loud noise in blowing. The spout is ejected some yards high, and has the appearance of a puff of smoke at a distance. They blow strongest, densest, and loudest, when alarmed, or after a long stay under water.

A very considerable portion of the feeding grounds is occupied by what is termed "green water," which swarms with minute life, and has been carefully examined and described by Mr. Scoresby. The smallness of the gullet is only fitted for swallowing small animals, such as the *Clio borealis*, numerous specimens of which, the *Whale's Food* of the Greenland Whalers, will be found in the preparation No. 323 A of the Physiological series of the Museum of the Royal College of Surgeons in London. This small mollusk is said to constitute the chief support of the Mysticete, and the structure and disposition of the whalebone plates, illustrated in the preceding preparations, explain how these or any other small species of animal are retained in the capacious mouth of their devourer, while the water taken in along with them drains through the interstices of the plates. When the Mysticete feeds, it swims rapidly below the surface with open jaws; a stream of water enters them, and with it myriads of small marine animals; the water finds an outlet at the sides, but the thick internal hairy apparatus of the whalebone does not permit one of those animals to escape.

Nine or ten months is supposed to be the period of utero-gestation, and the mother is so attached to her young one, or "sucker," as it is termed, that it is often struck as a snare to the affectionate parent, for she will not leave it, and falls a victim to her maternal love. Mr. Scoresby relates instances of this kind which cannot be perused, much less witnessed, without great pain by any person of ordinary humanity. Such a mode of capture seems hardly justifiable, whilst it must be ruinous to future prospects.

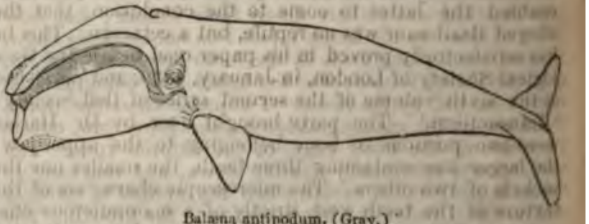
This species is generally found alone or in pairs, excepting when many individuals are attracted to some abundant feeding ground, or to a desired locality, such as the vicinity of ice-bergs.

Utility to Man.—To the Esquimaux and the Greenlander this species is all in all. They eat the flesh and fat with indescribable relish. The membranes of the abdomen serve them for clothing, and the thin transparent peritoneum admits light through the windows of their huts whilst it keeps out the weather. The bones are made into props for their tents, or aid in the formation of their boats, and supply them with harpoons and spears for the capture of the seal, and greater sea-birds. The sinews divided into filaments are used as thread for sewing their dress, &c. Some have stated that pickled and boiled blubber is palatable, and that the tail, first parboiled and then fried, is agreeable eating. The flesh of the young whale is said to be by no means indifferent food. To civilized nations, the oil made from its fat or blubber, and the whalebone, have long made it a great commercial object. [FISHERIES, vol. x., p. 288.]

The Greenland Whale.

To Mr. Scoresby's well-known book we must refer for further interesting and amusing particulars. The history of the *Balænopteræ*, or *Rorquals*, some of which grow to eighty or a hundred feet in length, may be found in the works of Lacépède, and of Baron Cuvier and M. F. Cuvier.

In the *Fauna of New Zealand*, published at the conclusion of Dr. Dieffenbach's work,* Mr. I. E. Gray figures a whale which he is induced to regard as a new species, and names *Balæna antipodum*. The description is taken from a drawing engraved in the book. It is the *Tuku peru* of the natives. The specimen was sixty feet in length. The following cut is reduced from Mr. Gray's plate.



Balæna antipodum. (Gray.)

FOSSIL CETACEANS.

The fossil remains of cetaceans have hitherto been found in the tertiary formations only. Those bones from the Portland Stone, which were at first thought to belong to whales, proved to belong to the genus *Cetiosaurus*, Owen, the most gigantic of all the fossil reptiles (See Professor Owen's *Report on British Fossil Reptiles*). Dr. Buckland, in his *Bridgewater Treatise*, remarks that the seas of the Miocene and Pliocene periods were inhabited by marine *Mammalia*, consisting of Whales, Dolphins, Seals, Walrus, and the Lamantin or Manatee, whose existing species are chiefly found near the coasts and mouths of rivers in the torrid zone. The presence of the Lamantin, he observes, adds another argument to those which arise from the tropical character of many other animals, even e latest tertiary strata, in favour of the opinion that limate of Europe maintained a high, though probably idually decreasing temperature, even to the latest l of the tertiary formations.

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* "Travels in New Zealand," &c. 2 vols. 8vo. 1843. John Murray.

Phytophagous Cetaceans.

vier figures and describes the remains of a Manatee ing from the existing species. Specimens were col- l from various parts of France, and he states it to be :ertain that an animal of the genus *Manatus*, a ge- ow peculiar to the torrid zone, inhabited the antient hich has covered Europe with its shells at an epoch rior to the formation of the chalk, but anterior to that the gypsum was deposited and the *Palæotherium* ts contemporary genera lived on the soil of France. *Foss.*)

Hermann von Meyer, in his *Palæologica*, notices ssil herbivorous cetacean under the name of *Mana- ssilis*, Cuv. He also refers to another *Manatus* the name of *Manatus fossilis*, Harlan. (*Fauna ic. Journ. of Philad.* IV.) &c. See post, last para- of the article.

Zoophagous Cetaceans.

Delphinidæ.

ier notices and figures with an accurate description mains of a fossil dolphin approaching the Grampus *elphinus globiceps* from Lombardy, the skeleton of was found nearly entire by M. Cortesi; and another very long symphysis of the lower jaw from the de- ent of Landes. Also a fossil dolphin closely approxi- g the common dolphin from the same locality, and r from the calcaire grossier of the department of (*Oss. Foss.*)

von Meyer refers to these and another (Grateloup, *Gener. d. Sc. Phys.* iii., s. 58, t. 36; Taylor, *Magaz. Hist.*, March, 1830, s. 262) giving the following :—*Delphinus Cortesii*, *Delphinus macrogenius*, *Del- longirostris*. (*Palæologica.*) See post, last para- of the article.

Monodon.

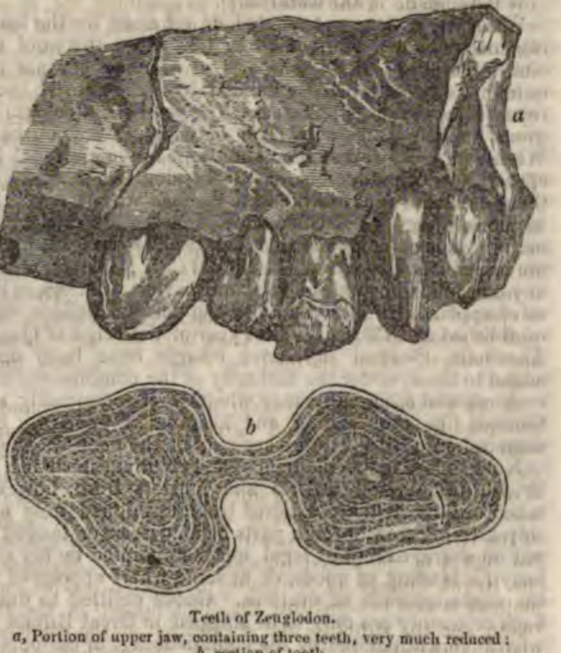
ier collects notices of fossil fragments of the Nar- rom Parkinson and Georgi: he adds, that he him- w a broken piece of a tusk in the cabinet of Natural y of Lyons which had formerly been in that of Pesta- (*Oss. Foss.*)

Ziphius (fossil only).

ier founded this extinct genus, which approximates chalots and Hyperoodons, on crania discovered on the f Provence, and disinterred in excavating the docks werp, and on a fragment in the Paris Museum. On naterials he rests three species, viz.:—*Ziphius cavi-* , *Ziphius planirostris*, and *Ziphius longirostris*, the s of which he figures and describes. (*Oss. Foss.*)

Zeuglodon.*

arrival of Dr. Harlan in this country with some of nains of his *Basilosaurus*, which he and others con- to be a fossil reptile, and the permission given to or Owen to make sections of those specimens, d the latter to come to the conclusion, that the Basilosaur was no reptile, but a cetacean. This he isfactorily proved in his paper read before the Geo- Society of London, in January, 1839, and published sixth volume of the second series of that Society's actions.' The parts brought over by Dr. Harlan wo portions of bone belonging to the upper jaw; ger one containing three teeth, the smaller one the of two others. The microscopic characters of the of the teeth were strictly of a mammiferous cha- and the nature of their investing substance limited nparison of them with those of the few mammals in the teeth are devoid of enamel. Among these are *lentata*, including the *Megatherium* and its con- , the Morse, the Dugong, and the Cachalot. It is to th of the Cachalot and Dugong that those of the so- Basilosaur offer the nearest resemblance, and Professor conceives that its position in the natural system was cetaceous order, intermediate between the Cacha- l the herbivorous species. Dr. Harlan, who ex- l with the Professor the sections of the various teeth ch this conclusion was founded, himself suggested opriety of substituting another generic name more in accordance with the true affinities of the animal. In recapitulating the chief points of evidence which, when Professor Owen read his paper, could be brought to bear on the question of those affinities, he observes that it may be stated that the form of the humerus, though unlike that of any known vertebrate animal, yet approaches much closer to the mammalian than to the saurian type; the vertebræ which Professor Owen examined not only presented a strictly mammalian organization, but also the cetaceous modification of that type. The teeth being of two kinds, some with single, others with double fangs—being freely implanted in distinct sockets,—consisting only of dentine and cæment, and both these presenting an intimate structure most closely resembling that of the same constituents of the teeth of certain aquatic mammals, as the Dugong,—afford, the Professor observes, a body of evidence which is conclusive as to the class of *Vertebrata* to which the extinct animal belonged, and point with a high degree of probability to the order and family to which it bore the closest affinities. 'The teeth,' says Professor Owen in conclusion, 'in their combination of an exaggerated condition of the conjugate form—which is but indicated in certain teeth of the Dugong, with two distinct fangs, in their oblique position in the jaw, and the irregular interspaces of their alveoli,—present very striking peculiarities; and when to these dental characters we add the remarkable and abrupt contraction of the distal end of the humerus, which is nevertheless provided with an articulating surface for a ginglymoid joint, and its remarkably diminutive size,—a cetaceous character, which likewise is here carried to an extreme,—and when we also consider the dense laminated structure of the ribs, and the third exaggeration of a cetaceous structure in the extreme elongation of the body of the caudal vertebræ,—we cannot hesitate in pronouncing the colossal *Zeuglodon* to have been one of the most extraordinary of the *Mammalia* which the revolutions of the globe have blotted out of the number of existing beings.'



Teeth of Zeuglodon.
a, Portion of upper jaw, containing three teeth, very much reduced; *b*, section of tooth.

In the *American Journal of Science* for April, 1843, is a *Notice of the discovery of a nearly complete Skeleton of the Zygodon* (Zeuglodon) *of Owen* (*Basilosaürus of Harlan*) *in Alabama*; by S. B. Buckley, A.M.

The entire length of the skeleton, including the head, is described as nearly seventy feet, and was imbedded 'in a marly limestone soil' on the plantation of Judge Creagh, the same gentleman who had forwarded the bones to Dr. Harlan, some of which were brought by the latter to London as above noticed. This discovery entirely corroborates the conclusions to which Professor Owen came in the memoir above quoted. Bones of this gigantic fossil cetacean have been also found near the Washita River in Louisiana, and have been seen in Washington County, Mississippi: from

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fossil cetacean was first named by Professor Owen *Zygodon*, but the s afterwards properly changed by him, it having been applied to a ge- ses, to Zeuglodon.

thence, Mr. Buckley adds, they have been found in several places as far east as Claiborne, on the Alabama River. The skeleton is now at New York.

Balænidæ.

Balænoptera.—Cuvier figures and describes the skeleton of a fossil whale, which he considers to have been a subgenus of *Balænoptera*, or Rorqual, found in Lombardy by M. Cortesi, on the east flank of Monte Pulgnasco (Apennines) in 1806. Cuvier calculates the entire length at twenty-one feet, French, observing that if the animal was adult, it was a very small *Rorqual*. Another skeleton of the same species, not more than twelve feet five inches long, was also discovered by M. Cortesi in similar beds and a neighbouring valley, near a small stream which falls into the Chiavenna, one of the tributaries of the Po. (*Oss. Foss.*)

Balæna.—Numerous remains of *Balænæ* have been found in the tertiary formations. Cuvier mentions a considerable fragment of the skull of a *Balæna* disinterred in the Rue Dauphine at Paris, in 1779. Daubenton came to the conclusion that the whale to which it belonged must have been a hundred feet long; but Cuvier on satisfactory calculations reduces the length to sixty, and states his opinion that it is an unknown species. (*Oss. Foss.*) Dr. Mantell detected the remains of *Balæna* in Sussex (Brighton Cliffs). A narwhal and porpesse appear to have been found in alluvial deposits of the district noticed in the *Geology of the South-east of England*. We refer to the *Edinburgh Phil. Trans.*, and the *Edinburgh Phil. Journal*, for instances which have occurred in Scotland, and to Hermann von Meyer's *Palæologica* ('Balæna;' 'Wallfisch'), p. 100, for reference to authorities on this subject.

The animal described by Brandt as *Cetotherium Rathkii*, and which occurs in the tertiary limestone of Taman, has, we have reason to believe, attracted the notice of Mr. Murchison, Count Keyserling, and M. de Verneuil, as a new link in the animal series, and more allied to the herbivorous Cetaceans than to the Dolphins.

WHALLEY. [LANCASHIRE.]

WHARF, a place constructed or set apart for the loading and unloading of goods. In this sense the word includes the quays of all sea-ports at which goods are required to be shipped or landed by 1 Eliz., c. 11 (now repealed) and subsequent acts. The sea-beach, or natural ground on the banks of a river or canal, is not a wharf. Wharfs in docks and similar situations are made legal by special acts of parliament, as the London Docks, &c., and there are some places which are deemed wharfs from immemorial usage, as at Chepstow. For the use of a wharf certain rates of compensation are usually charged, which are called *wharfage*, and the act 22 Car. II., c. 11, allows any one to load or unload goods on paying wharfage at the rates appointed. The wharfs of the port of London were established in 1558, in the first year of the reign of Queen Elizabeth. Several *sufferance wharfs* have been since added to these, under the authority of the commissioners of customs, and other sufferance wharfs are occasionally authorized for the landing and keeping of goods by the custom-house till the duties are paid or the goods bonded.

No goods except diamonds and bullion, fresh fish of British taking, and turbots and lobsters fresh, however taken or imported, are allowed to be unshipped from any ship arriving from foreign parts beyond seas, or landed or put on shore, except at legal quays appointed by her majesty for landing of goods, or at some wharf appointed by the commissioners of customs. Goods entitled to drawback or bounty are only to be shipped in Great Britain by wharfingers appointed by the commissioners of customs.

(Ellis's *Laws of the Customs*, vol. ii., p. 90; M'Culloch's *Dictionary of Commerce.*)

WHARTON, THOMAS WHARTON, MARQUESS OF, was the eldest son of Philip, Lord Wharton,—one of the few noblemen who adhered to the parliament in the civil wars, and who is characterised by Clarendon as 'a man very fast' to that side,—by his second wife, Jane, daughter and heiress of Arthur Goodwyn, of Upper Winchendon, in Buckinghamshire, Esq. Mr. J. T. Rutt, in a note to his edition of Burton's 'Diary' (i. 367), makes him to be the son of whom Lord Wharton's lady is recorded in the Diary to have been delivered on Tuesday, 13th January, 1657—an event which his lordship's relation, Sir Thomas Wharton, is stated to have related to the writer 'with great joy;' but this we apprehend must be a mistake. The common account is that he was born about 1640. In a note on a passage of Burnet's 'History of his Own Time' (i. 790), in which mention is made of Lord Wharton, Swift says—'famous for his cowardice in the rebellion of 1642;' upon which the Oxford editor remarks, 'It was Mr. Wharton, his son, as Speaker Onslow has noted.' It is evident that this bad repute, on whatever it was grounded, could not have been earned by a person born only in 1657. Besides, Swift, to whom he was personally well known, elsewhere speaks of him in 1710 as having 'passed some years his grand climacteric.' Mr. Thomas Wharton, who did not succeed to his father's title till 1696, is stated to have entered parliament in the reign of Charles II.; and from the commencement of his political life he adhered steadily to the Whig party. On the landing of the Prince of Orange at Torbay, in November, 1688, he and his father were among the first who joined him; and after the settlement of the new government he was made comptroller of the household, and sworn of the privy council. In April, 1697, being now a peer, he was appointed lord lieutenant of Oxfordshire, and also one of the two chief justices in eyre, then an office of some importance. On the accession of Anne he was removed from his places by the Tory ministry, which then came into power; but after Whig principles re-acquired the ascendancy, his eminent abilities came again into request, and, after having given his assistance as one of the commissioners in arranging the treaty of union with Scotland, he was, in December, 1706, created Viscount Winchendon and Earl of Wharton. In 1708 he was appointed lord lieutenant of Ireland, and he held that post till after the overthrow of the Whig administration of Lord Godolphin in the autumn of 1710. For the remainder of the reign of Anne he was one of the most active leaders of the opposition. In September, 1714, immediately after the arrival of George I., he was made lord privy seal, and on the 1st of January, 1715, he was created Marquess of Wharton and Malmsbury in the peerage of England, and Baron Trim, Earl of Rathfarnum, and Marquess of Catherlogh in that of Ireland; but he died at his house in Dover Street, London, on the 12th of April in the same year.

The Marquess was twice married: first to Anne, daughter of Sir Henry Lee of Ditchley, in Oxfordshire, by whom he had no issue; secondly, to Lucy Loftus, daughter of Viscount Lisburne, by whom he had the son who succeeded to his honours. Both these ladies were cultivators of literature. Some account of the first, who died in 1685, and also some poetical pieces written by her, may be read in Nichols's 'Collection,' i. 51-53, and ii. 329. She is highly complimented in various passages by Waller, especially in his 'Two Cantos of Divine Poesy, occasioned upon sight of the 53rd chapter of Isaiah turned into verse by Mrs. Wharton.' Some love-verses by the second (entitled 'To Cupid') are in Nichols, v. 10. The famous ballad of 'Lilliburlero,' made on the Earl of Tyrconnel, who had in 1686 been appointed lord lieutenant of Ireland by James II., going over to his government for the second time in 1688, is said to have been written by Lord Wharton (see Percy's *Reliques*, iii. 373-376).

The Marquess of Wharton, probably on account of his eminent abilities and services to his party, appears to have been an object of special dislike to the Tories of his own day. There are two characters of him by Swift, one in his 'Four Last Years of Queen Anne,' which is severe enough; the other, dated London, August 30th, 1710, a concentration of bitterness and venom. In the latter he says, among other things, 'He bears the gallantries of his lady with the indifference of a Stoic, and thinks them well recompensed by a return of children to support his family,' &c. This would seem to imply that the Marquess's second wife bore him several children. In the notes upon Burnet's 'History of his Own Time,' by Lord Dartmouth, among other caustic things, it is said that the Marquess, 'in respect to his great sincerity and veracity, went amongst his own party by the name of honest Tom Wharton.'

WHARTON, REV. HENRY, was born 9th November, 1664, at Worstead in Norfolk, of which his father, the Rev. Edmund Wharton, the descendant of an antient family, and afterwards rector of Saxlingham in the same county, was then vicar. After being taught Latin and Greek by his father, he was admitted of Caius College, Cambridge, 17th February, 1680; and at Michaelmas in the same year was chosen to one of the scholarships founded by Mr. Matthew Stockys, who was his great-uncle. Having taken his degree of B.A. in 1684, he resided in his college till 1686, when he was taken into the employment of Dr. William Cave, then engaged in the compilation of his 'Scriptorum Ecclesiasticorum Historia Literaria,' in which Wharton assisted him not only as an amanuensis, but to so great an extent, in at least the collection of materials, that a dispute afterwards arose as to his claim to be considered the author of a considerable part of the work. Cave himself acknowledges his obligations in large terms in his Preface; but after Wharton's death he addressed a long letter to Archbishop Tenison, which is printed in Chalmers's 'Biographical Dictionary,' in confutation of an account of the matter which Wharton had left behind him. The publication of Cave's work (in 1688) immediately made Wharton's name known, and brought him into reputation as a young man of remarkable talents and acquirements. The year before it appeared he had been ordained deacon, and had also taken his degree of M.A., and he was now sought out by Dr. Tenison, then vicar of St. Martin's, afterwards primate, who employed him to translate and epitomize a Latin manuscript on 'The Incurable Scepticism of the Church of Rome,' written by Jean de la Placette, the French Protestant divine, which it was thought desirable to make public in an English dress. He was also, on Tenison's recommendation, engaged by the second Lord Arundel, of Trerice, as tutor to his son; and about the same time he was presented to Archbishop Sancroft, who soon after made him one of his chaplains, and otherwise took him into great favour. Having been ordained priest in November, 1688, he was collated the following year both to the vicarage of Minster in the Isle of Thanet, and to the rectory of Chartham. The catalogue of the works which he wrote or compiled, or in the publication of which he was concerned from his first appearance as an author till the close of his short life, makes one of the most noteable displays of literary ardour and exertion on record. His biographers enumerate eight or nine treatises which he had already published or edited even before he had taken priest's orders: their titles may be found in the account of his Life prefixed to his Sermons, and, abstracted thence, in the 'Biographia Britannica.' They were principally directed against popery. The most important was a quarto volume, entitled 'A Treatise of the Celibacy of the Clergy, wherein its Rise and Progress are historically considered,' which appeared in 1688, the imprimatur being dated 3rd November, 1687. In 1691 he brought out at London, in two volumes, folio, his great work, entitled 'Anglia Sacra,' being a collection of original histories of archbishops and bishops in England from the introduction of Christianity to the year 1540. In this undertaking his patron had been Bishop Lloyd, who appears to have generously defrayed all the expenses of transcribing the manuscripts and printing the work. Unfortunately very much of it has been hurriedly prepared, and it abounds with errors both of the printer and of the amanuenses; but the original matter that Wharton has supplied evinces a great command of antiquarian learning; and of many of the pieces in the collection there is as yet no other edition. The 'Anglia Sacra,' accordingly, with all its defects, still retains a high value. In 1692 Wharton published, in 8vo., 'A Defence of Pluralities,' which was held to display great ability. In 1693 he edited, in a 4to. volume, some hitherto unpublished works of Bede, under the title of 'Bedae Venerabilis Opera quaedem Theologica,' &c.; and the same year, under the fictitious name of Anthony Harmer, he published an 8vo. pamphlet entitled 'A Specimen of some Errors and Defects in the History of the Reformation of the Church of England, written by Gilbert Burnet, D.D.' Burnet replied, acknowledging the ability of his assailant, but complaining of his bitterness and bad temper; and Wharton did not continue the controversy. In 1695 appeared another of the most elaborate and valuable compilations of this indefatigable illustrator of our ecclesiastical history—the first volume, in folio, of 'The History of the Troubles and Trials of Archbishop Laud.' This is Laud's own account, written during his imprisonment in the Tower, accompanied with his Diary of his Life and other papers, printed from the originals, which had been placed in Wharton's hands by Archbishop Sancroft a few days before his death. A second volume, consisting of further collections relating to Laud, was left ready for the press by Wharton, and was published by his father in 1700.

Wharton died at Newton in Cambridgeshire, worn out by his labours, on the 5th of March, 1695. Two octavo volumes of his Sermons were printed after his death; and his papers, among which were several transcripts of old English historians, and notes upon various printed books, were purchased by Archbishop Tenison, and are now in the library at Lambeth. The second edition of Cave's 'Historia Literaria,' printed at Oxford, in 2 vols. folio, 1740, 1743, is enriched with many additions from Wharton's manuscripts.

WHARTON, PHILIP WHARTON, DUKE OF, was the son (we believe the only son) of Thomas, Marquess of Wharton, and was born in December, 1698. Having early shown great quickness of parts, he was carefully educated at home under the superintendence of his father, whose ambition was to make him both a great orator and a great patriot; the latter term meaning in his lordship's notion not only a pure Whig in politics, but further, it would seem, a Presbyterian in religion. Either the training he received, however, or possibly the nature with which he had come into the world, proved more favourable to the intellectual than to the moral progress of the boy. His first folly was an early one, his getting himself married clandestinely at the Fleet, when he was scarcely sixteen, to the daughter of Major-General Holmes, a shock which his father took so much to heart, that it is said to have killed him in six weeks. The old Marquess died 12th April, 1715; and the Marchioness, also, it is affirmed, killed in effect by the same stroke, followed her husband to the grave in the course of the next year. Yet it is admitted by Wharton's biographers that, although the match he had made was 'no ways suitable to his birth, fortune, or character, and far less to the great views which his father had of disposing of him in such a marriage as would have been a considerable addition to the fortune and grandeur of his illustrious family,' the lady was unobjectionable, except upon the score of the inequality of her condition, and 'deserved infinitely more happiness than she met with in this unfortunate alliance.' They appear to have parted soon after the marriage; in the beginning of 1716 the Marquess, probably in obedience to directions left by his father, went abroad with a French Huguenot governor to be educated or confirmed in strict Presbyterian principles at Geneva. In passing through Germany, his vanity was gratified by receiving an order of knighthood from some petty court; he also immediately began to run in debt; his Huguenot governor only disgusted him by his 'dry moral precepts and the restraints he endeavoured to lay upon him;' the Geneva discipline proved intolerable, and, after a brief space, cutting all entanglements, he left the Huguenot behind, and, 'as if he had been flying from the plague,' set out post for Lyon, where he arrived on the 13th of October, 1716. His next proceeding was to write a letter to the Pretender, then residing at Avignon, which he forwarded with the present of a fine stallion; the Chevalier in return sent for him to his court, where he spent a day, and, it is said, accepted from the *soi-disant* king the title of Duke of Northumberland. After this he presented himself in Paris, where he visited the widow of James II. at St. Germain, and borrowed 2000*l.* from her; without, however, declining the attentions of the English ambassador, Lord Stair, at whose table he repeatedly dined. To get the money from the queen-dowager, who was obliged to pawn her jewels to raise it, he is asserted to have engaged to employ it in promoting the interest of her family in England: at the same time he told a friend who remonstrated with him, that till he could repay what he had thus borrowed he must remain a Jacobite, but when that obligation was discharged he would return to the Whigs. 'We have heard it credibly reported,' says his original biographer, 'that it was the too great strictness of his trustees, particularly of the Lord L—re, who was the person that acted most, in not making him remittances anyway suitable to his quality and estate, that first drove him into those measures which afterwards proved so fatal and destructive to him. We have also had it from good hands, that it was the great antipathy he conceived against that nobleman for his treatment of him whilst under his care, that gave the Marquess a sort of aversion even to his principles, and made him in a manner resolve not to be of the same side with him.'

Having signalized his stay in Paris by sundry extravagances, he returned to England in December, but soon after set out for Ireland, where he was immediately allowed to take his seat in the House of Peers, although as yet only in his eighteenth or nineteenth year. Whether he had purchased this indulgence by any engagement to support the government does not appear; but he forthwith took that side with all apparent sincerity and zeal, and speedily raised himself to such distinction by the figure he made in debate, that, under age as he still was, it was thought proper to raise him to the highest rank in the English peerage, and on the 20th of January, 1718, he was created Duke of Wharton. If we put aside those bestowed on members, legitimate and illegitimate, of the royal family, this was certainly the most extraordinary creation of an English dukedom on record; and it may also be regarded as the most remarkable passage even in Wharton's singular career. Notwithstanding the practice which then prevailed, of conferring that dignity with much less reserve than at present, the attainment of it in such circumstances must be held to bear strong testimony to the impression which the talents of the young nobleman made at his first appearance on the political stage.

It was probably not till after he had attained his majority, early in 1720, that he took his seat in the English House of Peers. His name first appears in the records of the debates on the 5th of April in that year. Up to this time he is said to have continued to support the ministry; but he now warmly joined the opposition to the great government measure of the South Sea Bill, in the debate on the motion for its committal, which took place on the above-mentioned day. He also spoke several times on the same subject after the explosion of that wild scheme; and it was in replying to a bitter invective of his, on the 4th of February, 1721, that Earl Stanhope, then secretary of state, burst a blood-vessel, which occasioned his death the next day. [Vol. xxii., p. 441.] His next able appearance was as an opponent of the bill of pains and penalties against Atterbury, in the great debate about which, on the 15th of May, 1723, on the motion that the bill should pass, he delivered a long and able speech, a full report of which was soon after published. This is the last speech of the Duke of Wharton's that is noticed in the 'Parliamentary History.' His estate, worth, it is said, 16,000*l.* a year when he came to it, had by this time become so involved, that his property was placed in the hands of trustees, for the benefit of his creditors, and he was allowed only 1200*l.* per annum. He now, perhaps in the hope of making money by the speculation, set up a twice-a-week political paper, under the title of 'The True Briton:' the first number appeared on Monday, 3rd June, 1723; the second, on the following Friday; the 74th and last, on Monday, 17th February, 1724. At the same time he exerted all his influence in every other way against the ministry and the court; even going the length of getting himself made a member of the Wax-Chandlers' company in the city of London, that he might speak and vote at common-halls and other civic meetings. But he soon got tired of that unprofitable work, and giving out that his intention was to retrench for a few years, he went off to the continent, apparently in the early part of the year 1724. Proceeding first to Vienna, he made a distinguished figure at that court for a short time; then he set out for Madrid, 'where,' says his original biographer, 'his arrival alarmed the English minister so much, that two expresses were sent from Madrid to London, upon an apprehension that the duke was received there in the character of a minister himself; upon which his grace was served with an order under the privy seal to summon him home.' This order he entirely disregarded: 'His grace,' says one account (Salmon, in 'Chronological Historian,' under date of 10th June, 1726), 'being in a coach when it was delivered to him, contemptuously threw it into the street without opening it; and soon after, it is said, declared himself a Roman Catholic.' He 'endeavoured,' continues the writer of his Life, 'to stir up the Spanish court not only against the person that delivered the warrant, but against the court of Great Britain itself, for exercising an act of power, as he was pleased to call it, within the jurisdiction of his Catholic Majesty's kingdom. After this he acted openly in the service of the Pretender, and appeared at his court, where he was received with great marks of favour.'

The subsequent conduct of this spoiled child of fortune can only be attributed to a species of madness. His duchess, whom he had entirely neglected from an early period of their marriage, having died, 14th April, 1726, he immediately offered his hand to Miss O'Byrne, the daughter of a deceased Irish colonel in the Spanish service, who was then one of the maids of honour to the queen of Spain: her majesty at first refused her consent to their union, but he threatened to kill himself, or at least to die, if she would not relent; and the marriage took place. After this he went to Rome, where he accepted the order of the garter from the Pretender, and openly assumed the title of Duke of Northumberland, formerly bestowed upon him by that personage. But it seems to have been soon discovered that he was likely to be of more detriment than service to the cause in which he had thus enlisted himself. 'As he could not always keep himself within the bounds of the Italian gravity,' says his first somewhat tender biographer, who has been substantially followed in all the later accounts, 'and had no employment to divert and amuse his over-active temper, he ran into his usual excesses; which being taken amiss, without falling into actual disgrace, it was thought advisable for him to remove from that city for the present.' His next appearance was at the siege of Gibraltar, in the spring of 1727, where, having offered his services as a volunteer to the King of Spain, he was appointed by the Conde de las Torres one of his aides-de-camp. Here, we are told, he was often in the trenches, and exposed himself wherever any service was going forward; but his conduct appears to have partaken quite as much of mere recklessness and bravado as of real gallantry. 'He went one evening,' it is related, 'close to the walls, near one of the posts of the town, and either called to, dared, or threatened the soldiers of the garrison. They asked who he was: he readily answered, "The Duke of Wharton:" and, though his grace appeared there as an enemy, they suffered him to return to the trenches without firing one shot at him; had they done otherwise he must inevitably have perished.' The only injury he received at the siege was a slight wound in his foot from the bursting of a grenade; and as a reward for what he had done, the King of Spain gave him a commission of colonel-aggregate to one of the Irish regiments. But this was small compensation for what his frantic conduct lost him at home: where, soon after, a bill of indictment was preferred against him for high treason, committed by appearing in arms before, and firing off cannon against, his majesty's town of Gibraltar, upon which a conviction followed in due course, and he lost both his peerage and all else that he possessed in his native country. Before this had happened however he had written to the Pretender, proposing to come back to Rome, but received for answer a strong exhortation rather to make the best of his way to England, and try if he could accommodate matters there. On this he set out with his duchess for Paris, where he arrived in May, 1728. He immediately waited upon Mr. Walpole, the English ambassador, who received him with abundance of civility, but was not a little surprised when, at parting, his grace told him he was going to dine with the Bishop of Rochester (the exiled Atterbury). Walpole replied, that if he meant to dine with that prelate, there was no reason why he should tell him of his intention. From Paris he went on to Rouen, and here, where he first heard of his indictment, it is affirmed that he was visited by two emissaries from the English minister (Walpole), who endeavoured to persuade *him* to avert his fate by making some sort of submission to the government; but he remained deaf to all they could urge. The rest of his history reads like an account of a long fit of drunkenness—which indeed it no doubt in great part actually was. He extorted some further pecuniary assistance from the Pretender, and also from other quarters; but, notwithstanding these occasional supplies and his military pay, he was now commonly involved in all the embarrassments of the most extreme poverty; for whenever he received any money, if it escaped his clamorous rabble of creditors, it was spent as fast as his still untamed profusion and taste for luxury and dissipation could squander it. He moved about as whim, or hope, or sometimes desperation drove him; first to Paris, then to Orleans, then to Nantes, whence he took ship for Bilbao, and, leaving his duchess there, went to join his regiment, which appears to have been stationed at Madrid.

Some time after he is stated to have been in garrison at Barcelona, where he got into a quarrel with the Marquess de Risbourg, governor of Catalonia, the end of which was that he received orders from court not again to enter Barcelona, but to repair to his quarters at Lerida. On this, we are told, giving way to melancholy, he fell into a deep consumption; so that, by the beginning of the year 1731, he had lost the use of his limbs, and was not able to walk from his bed to the fireside without assistance. After about two months he rallied somewhat, from drinking a mineral water in the mountains of Catalonia; but in May, having gone with his regiment to Tarragona, he became again as ill as ever; and, going back to the mineral spring, 'he fell,' says his biographer, 'into one of those fainting fits to which he had for some time been subject, in a small village, and was utterly destitute of all necessaries, till some charitable fathers of a Bernardine convent, which happened to be near the place where he lay, hearing of his miserable condition, offered him what assistance their house afforded.' After languishing in the convent for a week, he died there on the 31st of May, 1731, and was buried the next day by the monks in the same manner in which one of themselves would have been interred. His widow survived, in obscurity, till February, 1777, when she died in London, and was buried in Old St. Pancras Churchyard.

The account from which the preceding facts are chiefly extracted was originally published in 8vo., at London, in 1731, under the title of 'Memoirs of the Life of His Grace Philip late Duke of Wharton, by an Impartial Hand.' It is prefixed to two octavo volumes published in 1732, entitled 'The Life and Writings of Philip, late Duke of Wharton,' but which contain only the 74 numbers of the 'True Briton,' and the speech on the bill of pains and penalties against Atterbury, the paging of which is a continuation of that of the 'True Briton,' although it has a title-page of its own, dated 1724. There is another publication, in two volumes, 8vo., without date, entitled 'The Poetical Works of Philip, late Duke of Wharton, and others of the Wharton Family, and of the Duke's Intimate Acquaintance, particularly Lord Bolingbroke, Dean Swift, Lady Wharton, Doctor Delany, Lord Dorset, Major Pack, the Hon. Mrs. Wharton, &c.' These two volumes however appear to have been all printed in 1727 (before the duke's death), with the exception only of this general title-page and a Life of the duke, which is substantially the same with that noticed above, and is here stated to be 'communicated by a person of quality, and one of his grace's intimate friends.' The volumes contain very little that is even attributed to the duke; but in the second are some letters in prose, addressed to Lady Wharton, his father's first wife, and her poetical paraphrase of the 'Lamentations of Jeremiah.' It is said that Ritson had at one time an intention of collecting and publishing the poetical productions of the Duke of Wharton, which however probably would not be very easily ascertained. Nichols has printed two poems by his grace in the 5th volume of his Collection, pp. 24-33. Pope's highly finished character of him in his 'Moral Essays,' beginning 'Wharton, the scorn and wonder of our days,' is familiar to most readers.

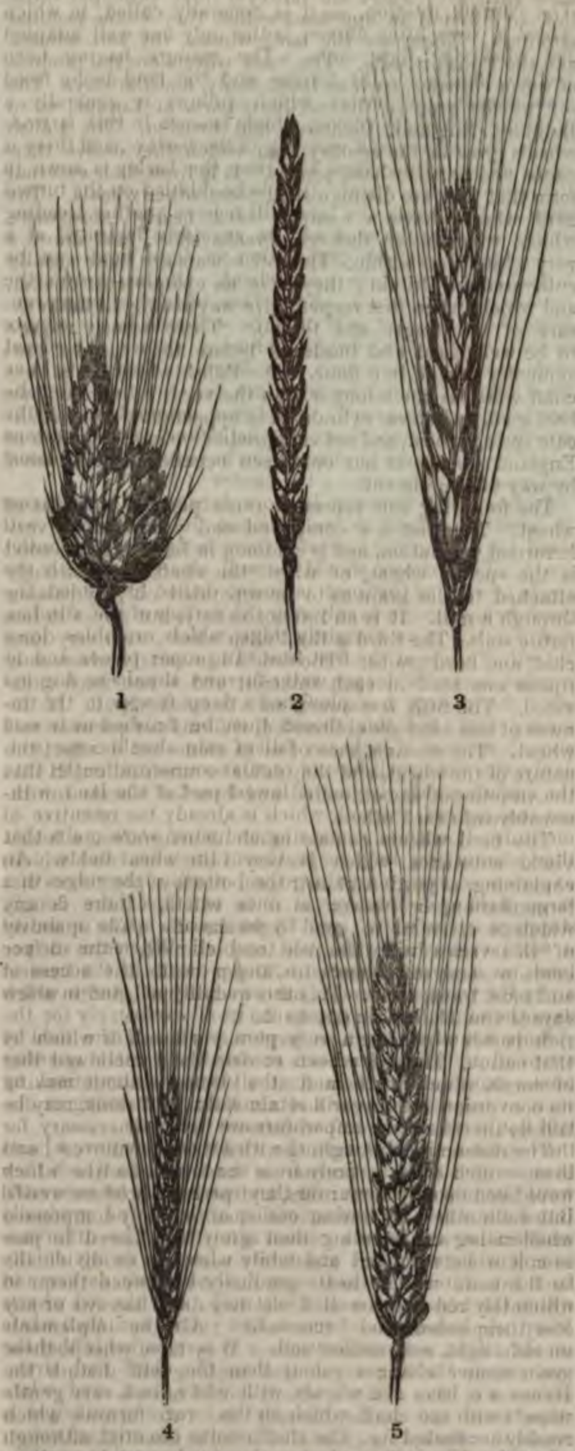
WHEAT. Of all the plants which are cultivated, there is none of more importance than wheat. It grows readily in almost every climate from the torrid to the frigid zones. A temperate climate, such as is best suited to the nature of man, seems to be its natural home. It has been so long cultivated, that where it appears to grow spontaneously, as in some uncultivated spots in the East, it is doubtful whether it be not the remains of wheat antiently cultivated there. It is an extremely hardy plant, and its vitality is such that it is not easily destroyed. Wheat has been known to be covered with the water of floods so long, that every other remnant of vegetation was destroyed; and yet, on the waters retiring, it has sprung up from the root and come to perfection: it has also been found in Egyptian tombs, and, if the statements are true which have appeared in the 'Doncaster Gazette' and other publications, it has grown when planted.

The botanical characters of wheat will be found under the word TRITICUM, its generic name. Some botanists have divided wheats into different species, from some marked peculiarity in their formation. Others, considering that they mostly form hybrids when mixed in the sowing, and that their peculiarities vary with the soil and climate, have looked upon all the cultivated wheats as mere varieties. There are however three principal varieties, so different in appearance that they claim peculiar attention. These are the hard wheats, the soft wheats, and the Polish wheats. The hard wheats are the produce of warm climates, such as Italy, Sicily, and Barbary. The soft wheats grow in the northern parts of Europe, as in Belgium, England, Denmark, and Sweden. The Polish wheats grow in the country from which they derive their name, and are also hard wheats. It is from their external form that they are distinguished from other wheats. The hard wheats have a compact seed nearly transparent, which, when bitten through, breaks short, and shows a very white flour within. The soft wheats are those usually cultivated in Britain; they have an opaque coat or skin, and which, when first reaped, give way readily to the pressure of the finger and thumb. These wheats require to be well dried and hardened before they can be conveniently ground into flour. The Polish wheat has a long chaff which is much longer than the seed, a large oblong hard seed, and an ear cylindrical in appearance. It is a delicate spring wheat, and not very productive in the climate of England: hence it has only been occasionally cultivated by way of experiment.

The following cuts represent some peculiar varieties of wheat. The first is a compound ear, produced by very luxuriant vegetation, and is common in Egypt. The second is the spelter wheat, of which the chaff is so strongly attached to the grain as to be separated only by passing through a mill. It is an inferior variety, but grows in less fertile soils. The third is the Polish wheat, with very long chaff and hard grains. The fourth is a variety which only ripens one seed in each spikelet, and is not much cultivated. The fifth is common soft bearded wheat. If the awns of this kind are obliterated, it forms our common soft wheat. The circumstance of awns seems not to affect the nature of the wheat, and they differ so much in length that the varieties of smooth-eared and bearded wheats run insensibly into each other.

The hard wheats contain much more *gluten*, a tough viscid substance which is very nutritious, and which, containing a portion of nitrogen, readily promotes that fermentation, or *rising*, as it is called, of the dough, which is essential to good light bread. The quantity of this varies with the soil and climate, from 5 per cent. in some soft wheats, to 30 per cent. in the hardest and most transparent. It is this quantity of gluten which causes the Italian wheats to be used exclusively for the rich pastes which form so large a portion of the food of that nation. The soft wheats contain the greatest quantity of starch, which fits them for the vinous fermentation, by its conversion into sugar and alcohol: for brewing or distilling, therefore, the soft wheats are the best.

The distinction between the winter and summer wheats is one which arises entirely from the season in which they have been usually sown; for they can readily be converted into each other, by sowing earlier or later, and gradually accelerating or retarding their growths. The difference in colour between red and white wheats is owing chiefly to the soil; white wheats gradually become darker and ultimately red in some stiff wet soils, and the red wheats lose their colour and become first yellow and then white on rich, light, and mellow soils. It is remarkable that the grain sooner changes colour than the chaff and straw. Hence we have red wheats with white chaff, and white wheats with red chaff, which on the foregoing principle is readily accounted for. The chaff retains the original colour when the skin of the grain has already changed to another. We state this on our own experience. The soil best adapted to the growth of wheat is a deep loam inclined to clay, with a dry subsoil. If this is not so naturally, it must be drained artificially, to ensure good crops of wheat. In such a soil, wheat may be sown every third year, with proper intermediate crops. Formerly the preparation for a wheat crop was generally by a clean naked fallow, with a certain addition of manure, the remains of which were thought sufficient for a crop of barley or oats; after which the fallow recurred. It was soon found out that, by this means, a crop of wheat could never be forced beyond a certain average; for if more than the usual portion of manure was carried on the land, the wheat failed, by being laid before it arrived at maturity. Thus a limit appeared to have been set to its increase. New modes of cultivation



1. Egyptian Wheat (Triticum Egyptiacum); 2, Spelter Wheat (Triticum Spelta); 3, Long-chaffed Polish Wheat (Triticum Polonicum); 4, Single-grained Wheat (Triticum monococcum); 5, Common Bearded Wheat (Triticum turgidum).

have shown that this was not without its remedy, and that it was recent manuring which caused the wheat to lodge; but that an increased fertility, produced by judicious preparation, enabled the land to bear crops of wheat far superior to what it ever could before. Wheat requires a soil in which the organic matter is intimately mixed with the earthy ingredients; where it can have a firm hold by its roots, and can at the same time strike the fibres of them downwards, as well as around, in search of food. When it meets with such a soil and is deposited at a proper depth, it vegetates slowly, pushing to the surface one cylindrical filament, while numerous fibres strike into the soil from *the seed.* These supply the plant with regular nourishment, and in due time a knot is formed at the surface of the soil, from which several roots and stems branch out. This is called the tillering of the wheat. The new roots near the surface soon become the chief source of nourishment, and in a rich compact soil, where there is room, numerous stems arise, forming a tuft, and each of these in time bears a large ear well filled with seeds; so that from a very moderate quantity of seed a great return is produced. The strong stems supporting each other are well able to resist the effect of storms and rains, which would lay weaker plants level with the ground. The effect of abundant manuring immediately before the seed is sown is to produce too rapid a growth, weakening the straw, and increasing its quantity at the expense of the ear, which does not attain its proper development. This is called running to straw. All strong manures which contain many saline particles have this effect; which is corroborated by late experiments with saltpetre, nitrate of soda, and other saline compounds. They produce more straw and less corn, and hence are not found of the same use, when applied to crops which are cultivated for their seed, as they are on grasses.

A certain portion of nitrogen is essential to the production of good wheat, as that element enters into the composition of the gluten, which will be found to abound in proportion as nitrogen exists in the soil, or can be supplied from the atmosphere. The experiments of Liebig seem to show that the nitrogen of the atmosphere will not enter into the substance of plants, except in the form of ammonia, and hence the efficacy of manures has, of late, been estimated by the quantity of ammonia which they can produce. This theory however requires to be confirmed by experience, before it is at once adopted without limitation. Decayed vegetable matter, or humus, seems essential in a good wheat soil, and it may, in the slow progress of its entire decomposition, when it is continually absorbing the oxygen of the air, have some chemical effect on the nitrogen also, so as to make it of use in the vegetation, whether by first forming ammonia, or in any other way. Further experiments may perhaps throw a light on this subject. It is well known however that, provided a soil be compact, its fertility is very nearly proportioned to the quantity of humus which it contains, especially if there be calcareous earth or carbonate of lime in its composition. Lime has been often considered as the most efficacious manure for wheat, even more than dung. As long as there is organic matter in the soil, lime acts beneficially, and the richer the land which does not contain carbonate of lime already, the more powerful the effect of liming. But experience has proved that lime has little effect on poor soils, until they are first manured with animal and vegetable substances. To produce good wheat then, the land should be gradually brought to the proper degree of fertility, by abundant manuring for preparatory crops, which will not suffer from an over-dose of dung, and will leave in the soil a sufficient quantity of humus, intimately blended with it, for a crop of wheat. Clover is a plant which will bear a considerable forcing, and so are beans, and both are an excellent preparation for wheat. The roots left in the ground from a good crop of either, decay slowly, and thus furnish a regular supply of food for the wheat sown in the next season. Potatoes also admit of much forcing, but the necessary loosening of the soil for this crop renders it less fit as a preparation for wheat. Experience has fully proved that, as a general rule, it is better to sow barley and clover after potatoes, and let the latter be succeeded by wheat.

Improved chemical analysis has discovered various substances in minute quantities in the grains and straw of wheat; and this has led to the doctrine that these substances, being essential to its formation, must be excellent manures for it, if they do not already exist in the soil in sufficient quantities. Most of these substances are found in all soils which contain a due proportion of clay. Silica in a very minutely divided state, and probably in combination with alumina or potass, seems one of the most important to give due strength to the straw; and hence, in some soils, potass or wood-ashes which contain it may be advantageously used as manures to the young clovers preceding the wheat. The analysis of the ashes of grains of wheat chosen out of the ears, by Theodore de Saussure, who is generally considered an excellent authority, gives the following results:—

Potass	15
Phosphate of potass	32
Muriate of potass	0·16
Sulphate of potass, a trace.	
Earthy phosphates	44·5
Silica	0·5
Metallic oxides	0·25
Loss	7·59
	100·

The analysis of the ashes of the straw gave the following sult :—

Potass	12·5
Phosphate of potass	5
Muriate of potass	3
Sulphate of potass	2
Earthy phosphates	6·2
Earthy carbonates	1
Silica	61·5
Metallic oxides	1
Loss	7·8
	100·

The analysis of the ashes of the whole plant, when in ossom, gives of—

Soluble salts	41
Earthy phosphates	10·75
Earthy carbonates	0·25
Silica	26
Metallic oxides	0·5
Loss	21·5
	100·

By comparing these results it will appear, that from the e of flowering to the maturity of the seed a portion of soluble salts is converted into earthy phosphates; that ca accumulates in the straw, but not in the grain: and potass is the principal means of rendering the silica ible, it is an important ingredient in a wheat soil, as l as the phosphoric acid. This last is found chiefly in mal manures.

lthough wheat thrives best on heavy soils, and without preparation produces only scanty and uncertain crops those which are naturally light and loose, it may be de to give a very good return in soils which would once e been thought fitted only for the growth of rye and . But then the texture and composition of these soils t have been greatly improved by judicious tillage and uring. While the heavy soils are repeatedly ploughed pulverized to render them mellow, the lighter are dered more compact by marling, where this can be lily done, by adding composts in which the principal h is clay, and especially by such plants as have substial and long roots, by which the soil is kept together, h as clover, lucern, sainfoin, and other grasses. If e plants have been well manured, and cover the und well, keeping in the moisture, the soil will have ome sufficiently compact to bear wheat. One ploughis then quite sufficient, and if a heavy land-presser is de to follow two ploughs and press in the furrows, so as eave deep smooth drills eight or nine inches apart, in ch the seed can find a solid bed, there will be every bability of a good crop of wheat, which will come up egular rows, the roots being at such a depth as to run risk of wanting moisture till the stem has arisen to its height, and the ear is formed: a few showers at that ical time will make the grain swell, and insure a good p.

n some soils it may not be judicious to attempt to sow eat; but these are the poorest loose sands, which natuy would bear only oats and buckwheat; on these, unless y can be abundantly marled, it is much better to sow .

When wheat is sown on light soils in good heart, it ws vigorously in spring, if it has not been injured by frost, which is very apt to raise up the roots and throw m out of the ground. The driving of sheep over the d presses the roots into the ground, and prevents this owing out; but a vigorous growth of straw is not always ure sign of a good crop at harvest, as many farmers w by sad experience: what would be advisable in vy soils is not always so in lighter. A heavy rolling pring after a light harrowing is very useful at a time n the surface is moist. It closes the pores and checks the evaporation: and the tighter the surface can be made the better chance there is of a fair crop. The Norfolk rotation, as it is generally called, in which wheat is sown after clover, is the only one well adapted for wheat on light soils. The manure having been put abundantly for the turnips, and the land being freed from weeds, the barley which follows is generally a good crop; and the clover, which is sown in this, is trodden in the reaping and carrying of the barley: and there is only one ploughing from the time the barley is sown to the sowing of the wheat. If this be dibbled on the turned sward of the clover, the land will receive another treading by the dibblers, the seed will be regularly deposited at a proper depth, and no preparation of light land can be more likely to produce good wheat. On heavy soils the process must be varied; the surface, instead of being rendered more compact, will often be so bound as to require to be stirred by harrowing or hoeing before the wheat plant can properly tiller. If a farmer is anxious to have good crops of wheat, he must not rest satisfied after he has ploughed, manured, and sown: he must watch the growth of this important crop daily, and use the means which experience and observation have suggested to assist the growth and to remove the causes of failure.

In heavy soils nothing is more detrimental than excess of moisture. Even in well-drained fields the water will stand too long in the furrows if there is not a proper outlet for it. The furrows should be well cleared out with the spade as soon as the seed is sown, drilled or dibbled, the earth being thrown evenly over the surface of the stitches, and not left in an unsightly ridge, which crumbles down with the furrow at the first frost. In proper places and at regular distances deeper water-furrows should be dug out after the plough has ploughed a deep furrow in the intended line; and this should then be finished as is said above: so that if a heavy fall of rain should come suddenly, the water will have a regular course and outlet into the ditches which lie in the lowest part of the land, without soaking into the soil, which is already too retentive of moisture. It is chiefly in spring and when snow melts that there should be a daily inspection of the wheat-fields. An experienced eye going along the bottom of the ridges of a large field will discover at once whether there is any stoppage of the water; and by means of a spade or shovel it will be remedied with little trouble. When the surface binds, as it does in some soils, and prevents the access of air to the roots, the land is harrowed or hoed, and in a few days the effect will be apparent.

Soils which lie on a very porous subsoil, or which by artificial draining have been so dried and mellowed that horses can go over the land at all times, without making such an impression as will retain water if it rains, may be laid flat, without more open furrows than is necessary for the convenience of ploughing with a fixed turnfurrow; and thus a considerable portion is made productive which would be taken up by furrows, and perhaps produce weeds. But if the soil is of a tenacious quality, easily compressed when moist, and horses cannot safely be allowed to pass over it when wet, it is absolutely necessary to divide the land into stitches, or beds with furrows between them, in which the horses can walk while they draw harrows or any other implement over the land. All the implements should be so constructed that, if they have wheels, these may run in the furrows, so that nothing will disturb the evenness of the stitches, which should have a very gentle slope from the centre towards the two furrows which bound it. For spring crops this is not so essential, although it is advisable not to deviate from the usual form, even when barley and clover are sown, because, when the surface is laid in double stitches, as is sometimes done, it is not very easy to lay it in narrow stitches again, at one ploughing, for wheat. No doubt a very expert ploughman would do so, but it is not often that many expert ploughmen are on the same farm. Even in very light soils, as in Flanders, narrow stitches with deep intervals are thought most advantageous.

It is a very common notion that good wheat and bean land is not well adapted to the growth of roots, especially of such as are usually fed off the land by sheep, because the treading of animals is injurious in winter and spring, when these crops are usually wanted; and if they are carried off, the wheels and the horses make such impressions as are equally detrimental or more so. But all soils, even the white turnip, will grow luxuriantly on heavy soils well prepared and manured; and they may be so managed as to be taken off before the winter, or even very soon after wheat harvest. The bulbs will not be so large, but they will be more succulent, and may be kept in various ways till they are wanted for the cattle. The land being ploughed immediately on the removal of the turnips, will be well prepared for wheat, or, when mellowed by the winter's frost, may be sown in spring with beans, barley, or oats. The manure will be incorporated with the soil, even if it has been put on in a very fresh state for the roots, which can only be recommended on very compact soils. If the root crops are well cleaned, fallows may be avoided, or, at least, recur very seldom, and then only when root weeds have accumulated from neglect.

When the wheat has blossomed, and the grain in the ear is fully formed, it should be watched, and as soon as the seed feels of the consistence of tough dough, and the straw is dry and yellow below the ear, it should be reaped. The skin of the grain will be thinner, and its substance will harden readily by mere drying, while the straw is better fodder for the cattle. It is found by experience that the increase of flour by adopting this method is very considerable.

It was the custom of our forefathers to cut the straw half-way between the ear and the ground, and their reason was, that thus less room was required in the barn, and no seeds of weeds were carried there in the straw: but the loss of half the straw, which might have afforded litter or fodder for cattle, was overlooked: and if the weeds were not taken into the barn, where they could do little harm, except giving a little more trouble in winnowing and sifting the corn, they were left to shed their seeds on the land, and thus perpetuate its foulness, or add much to the labour of weeding the succeeding crops. The stubble or halms had to be mown or raked off before the land could be well ploughed, and although this might make a very good shelter for cattle in a yard, when made into halm-walls, as they are sometimes called, there was a great loss of labour in thus going twice over the field. The most approved mode of reaping now is that which is called fagging or bagging in Middlesex and Surrey [HARVEST], but the most expeditious is mowing, which, by means of a cradle scythe, may be done so regularly as to allow all the corn to be tied up in sheaves without any loss. The weeds are tied up with the corn, and when the whole is thrashed, the seeds of the latter are winnowed out and burnt: thus they cannot infest the land, and there is double the quantity of straw to convert into manure—a matter of great importance where cattle are fed on turnips in the yard, chiefly for the sake of their dung.

The choosing of wheat for seed is a matter of great importance. Some farmers like to change their seed often; others sow the produce of their own land continually, and both seem persuaded that their method is the best. The fact is, that it is not always the finest wheat which makes the best seed; but it depends on the nature of the land on which it grew. Some soils are renowned far and wide for producing good seed, and it is well known that this seed degenerates in other soils, so that the original soil is resorted to for fresh seed. Many places have been noted for this peculiarity; and among them we may mention the parish of Burwell, in Cambridgeshire: the wheat which grows there is mostly sold for seed at a price considerably above the average. It has been asserted of late, and we have no reason to doubt the assertion, that the various noted seed-wheats, when analyzed, are found to contain the different elements of which they are composed in nearly the same proportion, especially the starch and gluten. For bread, that which contains most gluten is preferred, as we observed before; but to produce a perfect vegetation, there should be no excess of this substance, nor any deficiency. The seed also should have come to perfect maturity. This last is usually obtained by beating the sheaves over a block of wood or a cask, without untying them, by which means the ripest seeds fall out. The proportion between the starch and gluten is easily ascertained by carefully washing the flour when the wheat has been ground. It is most convenient to tie up the flour in a cloth, which, shaken and beaten in water, will let all the starch pass through and retain only the gluten. The operation should be continued as long as the water is tinged with the white starch. Any one can readily make the experiment; and as the soft wheats vary much in the proportion of the gluten they contain, the difference will be readily ascertained. This leads to a practical conclusion: if we wish to grow any peculiar sort of wheat for seed, and if we find that, by our preparation of the soil, or its original composition, we produce a wheat in which the gluten and starch are in a different proportion from that of the original seed, we may conclude that this is owing to more or less of azotized matter in the soil, that is, more animal manure, or more vegetable humus; and by increasing the one or the other, we may bring our wheat to have all the properties of the original seed. This is a valuable discovery, and deserves to be fully confirmed by experience.

While the wheat is growing it is exposed to various accidents, which it is often difficult to foresee, and more difficult to guard against. The smut and burnt-ear are diseases which may be generally prevented by a proper preparation of the seed before it is sown. [BURNT-EAR; SMUT.] Many corrosive substances have been recommended to steep the seed in, such as blue vitriol and arsenic, and those who have used these steeps place great confidence in them. It seems however that washing the seed well with plain water or with salt and water, and afterwards drying it with quicklime, sufficiently destroys the germ of the smut to prevent its propagation. The most common steep is water in which so much salt has been dissolved as will enable it to float an egg. In this the seed may be left for 12 hours or more, and then spread on a floor and mixed with as much quicklime as will absorb the moisture, and allow it to be sown or drilled, without the grains adhering to one another.

In the second volume of the 'Journal of Royal Society of Agriculture of England,' Part I., is a valuable paper, by the Rev. T. S. Henslow, on the diseases of wheat. He describes the different *fungi* which produce the various diseases of pepper-brand, dust-brand, rust, and mildew: he doubts the truth of the assertion that Berberis trees or bushes cause mildew in wheat which grows near them, although this is believed by many farmers.

The ergot in wheat is an excrescence from the ear, like a small horn, into which the seed is transformed. It has a poisonous quality and a medicinal one. The cause of this monstrosity in the seed is not fully known. It is supposed to be caused by the puncture of some insect, introducing a virus which has entirely altered the functions of the germ, and made it produce this ergot, instead of a healthy seed.

Another disease of the seed is called ear-cockles, and is caused by extremely minute insects like eels, which fill the skin of the seeds, instead of flour. This insect, which is called *Vibrio Tritici*, is described by Mr. Bauer in the 'Philosophical Transactions' for 1823. This disease is not so common as the smut and pepper-brand. It is probable, according to Mr. Henslow, that the animalcula may be killed by exposing the grain to a certain heat, so as not to destroy its power of vegetation, but sufficient to kill the vibrio.

The wheat-midge (*Cecidomyia tritici*) is another external enemy, which does more harm to the crop than is generally known. It deposits its eggs at the root of the germ in the ear, and prevents the filling of the grain, the maggot living on the nutritive juices which should produce the farina. The Hessian fly, which caused such depredations in America and Canada at one time, is a different species of the same fly. This deposits its eggs in the straw near the root, and thus destroys the whole plant. We must refer the reader for further particulars to the paper above mentioned. Great attention has been lately paid to the introduction of the best and most prolific varieties of wheat, and by merely observing what ears appear much superior to others in a field of ripe wheat, and collecting these to be sown separately in a garden or portion of a field, the variety, which may have been produced by some fortuitous impregnation, or some peculiarity in the spot where it grew, is perpetuated. By carefully selecting the seed which is best adapted to the soil, by a more careful and garden-like cultivation, and by adding those manures which are found most adapted to favour its perfect vegetation, crops of wheat have been raised which, at one time, would have been thought miraculous; and the average produce of this important grain has been increased on all soils. When we consider how closely this is connected with the welfare of a nation, we must be grateful to those who devote themselves practically and theoretically to the increased production of this staff of life.

Corn-Trade.—Under Corn-Trade are given accounts of the estimated quantities of wheat and other corn and grain produced in this country at different periods, also the quantities imported and exported, and the general regulations of the trade. Since that article was written several important alterations have been made, affecting the corn-trade, and it may be useful to notice them in this place. On the 7th of May, 1841, an abortive attempt was made by the ministry of the day to establish a fixed duty of 8*s.* the quarter on the importation of foreign wheat. The dissolution of parliament, which took place very shortly after this proposition, was unfavourable to the ministry. However, on the 9th of February, 1842, their successors brought forward a measure for the modification of the corn law of 1828, which was successfully carried, and came into operation on the 29th of April following.

Under the act 9 Geo. IV., c. 60, which lasted from the 15th of July, 1828, to the 29th of April, 1842, the total quantity of foreign wheat admitted was 13,562,856 quarters and 4,305,150 cwts. of foreign wheat-flour, and, in addition, at a lower rate of duty, 597,700 quarters of colonial wheat and 1,744,591 cwts. of colonial flour. Nearly one-half of the foreign wheat and flour was admitted at the lowest rate of duty, and comparatively little at the higher rates, as the following statement will show:—

Duty at	Qrs. Wheat.	Cwts. Wheat-flour.
1*s.* . . .	5,788,045	1,758,372
2*s.* 8*d.* . .	2,880,613	862,262
6*s.* 8*d.* . .	1,997,226	519,123
10*s.* 8*d.* . .	820,342	243,120

The average rate of duty was under 6*s.* the quarter. For the whole period during which this act was in operation the average price of wheat in England and Wales was 58*s.* 4*d.*, and the extreme points of fluctuation in the weekly averages were from 36*s.* 8*d.* to 81*s.* 6*d.*, or 122 per cent. The highest yearly average was 70*s.* 8*d.*, in 1839; and the lowest 39*s.* 4*d.*, in 1835. In 1838 the duty underwent thirty different changes. The scale of duties was so constructed as to offer great inducements to the holders of foreign wheat to withhold supplies until the duty had reached the lowest point; and a rise in prices, at one particular point, of only one shilling, brought down the duty four shillings. It was often stated that prices were fictitiously raised in order that the dealers might gain by the diminished duty; but the strong motives for all holders of wheat to keep back supplies, operated much in the same way, without any fraud on their part. In a single week, when the lowest duty has been attained, above 1½ million quarters of wheat have been liberated from the bonding warehouses, the holders of which had resolutely resisted the prevailing high prices until this object had been accomplished. The following is the scale of prices and rates of duty for foreign wheat and wheat-meal under the new corn act (5 Vic., c. 14):—

Wheat.					Wheaten Flour or Meal.					
Average per Qr.		Duty per Qr.			Duty per Cwt.			Duty per Barrel.		
s.	*s.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
under	51	1	0	0	0	6	10½	0	12	0⅞
51 ,,	52	0	19	0	0	6	6⅜	0	11	5⅛
52-3-4 ,,	55	0	18	0	0	6	2¼	0	10	10
55 ,,	56	0	17	0	0	5	10⅛	0	10	2¼
56 ,,	57	0	16	0	0	5	6	0	9	7½
57 ,,	58	0	15	0	0	5	1⅞	0	9	0¼
58 ,,	59	0	14	0	0	4	9¾	0	8	5
59 ,,	60	0	13	0	0	4	5⅝	0	7	9¾
60 ,,	61	0	12	0	0	4	1½	0	7	2⅝
61 ,,	62	0	11	0	0	3	9⅜	0	6	7⅜
62 ,,	63	0	10	0	0	3	5¼	0	6	0⅛
63 ,,	64	0	9	0	0	3	1⅛	0	5	5
64 ,,	65	0	8	0	0	2	9	0	4	9¾
65 ,,	66	0	7	0	0	2	4⅞	0	4	2½
66-7-8 ,,	69	0	6	0	0	2	0¾	0	3	7¼
69 ,,	70	0	5	0	0	1	8⅝	0	3	0
70 ,,	71	0	4	0	0	1	4½	0	2	4⅞
71 ,,	72	0	3	0	0	1	0⅜	0	1	9⅜
72 ,,	73	0	2	0	0	0	8¼	0	1	2½
73 & upwards.		0	1	0	0	0	4⅛	0	0	7¼

The lowest duty in the above scale is not reached by jerks, as in the former one, and the 'rest' between 66*s.* and 69*s.* is an important modification. One hundred and thirty-eight new towns are added in the new act to the one hundred and fifty which returned the average prices under the act of 1828. From July, 1842, to January, 1843, inclusive, the average price of wheat in the 138 new towns was 53*s.* 8*d.*; in the 150 old towns, 52*s.* 6*d.*; making an aggregate average of 52*s.* 10*d.* The importations of wheat which have taken place under the act 5 Vic., c. 14, from April 29th, 1842, to 5th April, 1843, are:—

	Foreign.	Average Duty.	Colonial.	Average Duty.
Wheat . qrs.	2,623,478	8*s.* 5*d.*	37,886	1*s.* 11*d.*
Wheat-flour, cwts.	524,491	2*s.* 11*d.*	602,868	7*d.*

Since the passing of this act another change has been made in the corn law. Under the act of 1828 the duties on colonial wheat were 5*s.* when the price here was under 67*s.*, and 6*d.* when at or above 67*s.* the quarter. The act 5 Vic., c. 14, fixed the duties on colonial wheat as follows:—When the price here was under 55*s.* the quarter the duty was 5*s.*;

55*s.* and under 56*s.* . . . duty 4*s.*
56*s.* ,, 57*s.* . . . ,, 3*s.*
57*s.* ,, 58*s.* . . . ,, 2*s.*
58*s.* and upwards . . . ,, 1*s.*

The above are still the rates of duty charged on wheat imported from all other colonies, except Eastern and Western Canada; but the Canadian legislature having, at the suggestion of the home government, agreed to impose a duty of 3*s.* on all wheat imported there, an act has been passed (6 & 7 Vic., c. 29) during the present session (1843), under which wheat from Canada, or flour manufactured there, will be at all times admissible into the United Kingdom at a fixed duty of 1*s.* per quarter charged here. For the five years ending January, 1843, the rate of duty on Canadian wheat averaged 2*s.* 1*d.* per quarter. Thus there are now three distinct regulations for the importation of wheat,—the foreign sliding scale, the colonial sliding scale, and the fixed duty for Canada. The effect of the New Canada Corn Act is of course matter of speculation at present. The largest quantity of wheat imported from Canada in any one year was 249,989 quarters, in 1841, of which above two-thirds was in the shape of flour; but the English market under the previous sliding scale was a very uncertain one. Since the article on the Corn-Trade appeared, the imports of wheat from Ireland have fallen off 36 per cent. on a comparison of the seven years from 1835 to 1841, with the preceding seven years, or from 4,672,825 to 2,989,060 qrs. Taking periods of ten years, the importation of foreign wheat has gone on in a constantly increasing ratio since the balance was fairly turned, and this country ceased, or nearly so, to export wheat. The following is taken from a Parliamentary Return:—

Periods of Ten Years.	Average Annual Importation of Foreign and Colonial Wheat.
1761-70	94,089 qrs.
1771-80	111,372 ,,
1781-90	143,292 ,,
1791-1800 . . .	470,342 ,,
1801-10	556,959 ,,
1811-20	429,076 ,,
1821-30	534,762 ,,
1831-40	908,118 ,,

WHEATEAR, one of the English names for the *Saxicola œnanthe* of authors, *Motacilla œnanthe*, Linn., genus *Vitiflora* of Belon and Brisson.

Description. Old Male.—Upper parts of the body ashy-grey; forehead, band above the eyes, and throat, white; black passing from the root of the bill below the eye and covering the orifice of the ears; wings black; rump and tail white for two-thirds of the length of the latter; the rest, towards the end, black, excepting the two middle feathers, which are entirely black; front of the neck and breast buff-colour; the rest of the lower parts pale buffy-white. Total length 6½ inches.

Female.—Upper parts ashy-brown; forehead rusty-grey; deep brown above the eye and covering the orifice of the ears; wings blackish-brown, bordered with bright brown; white at the origin of the tail less extended; neck and breast rusty; the rest rusty-white.

Young of the Year.—At their departure from the nest, with the upper parts variegated with rusty and ash-colour, and spotted with brown; feathers of the rump white; throat and lower part of the body ruddy, dotted and finely striped with blackish brown; wing-coverts bordered with rusty; quills and tail-feathers bordered with ruddy.

Varieties.—The *Grey Wheatear* (*Cul-blanc gris*) and the *Ash-coloured Wheatear* (*Cul-blanc cendré*) of Brisson. M. Temminck states that the *Motacilla Œnanthe major* only differs in its large size; and he adds that this species, as well as all others that live in dry places, varies singularly in this respect. The same author states that the *male at its first moult* puts on the black band between the eyes and bill, but the orifice of the ears is still brown; the upper parts present variegations of ruddy or rusty and ash-colour; the lower parts and the throat are shaded with rusty, which borders the wing-coverts; the quills are terminated with rusty-white, and pure white is observable at the extremity of the tail-feathers.

This is the *Moteux, Vitrec, and Cul-blanc* of the French; *Codo-bianco, Culo bianco, Fornarola, Petragnola, Culbianco*, and *Codetta d' Estate* of the Italians; *Steinschwatzer, Steinschnapperl, Graurückiger, Steinschmatzer*, and *Weisschwanz* of the Germans; *Tapuit* of the Netherlanders; *Stensquetta* of the Swedes; *Steendolp, Steensquette*, and *Steengylpe* of the Norwegians; *Fallow-finch, Fallow-chat, Fallow-smith, Whitetail, Fallow-smiter, Horsematch, Snorter, Stone Chacker, Chickell*, and *Chack Bird* of the modern British; and *Tinwyn y cerrig* of the antient British.

Geographical Distribution.—Very wide. Lapland, Denmark, Sweden and Norway, Iceland, and Faroe Islands. Capt. Sabine states that though it was not seen on the shores of Greenland where he landed, it was observed in October (1818), on the return of the expedition, off Cape Farewell, at a distance from the land—on its southward passage, in his opinion. In the outward voyage Captain Sabine observed it in lat. 60° N., long. 13° W., then probably migrating northward. Fabricius and others have noticed it in Greenland. Captain James Ross relates that one of these birds was seen flying round the ship in Felix Harbour (70° N., 91° 53′ W.) on the 2nd of May, 1830, but was found dead alongside next morning. (*Appendix to Sir J. Ross's last Voyage.*)

In Europe it is abundant, particularly on the northern shores of the Mediterranean. It is found in Dalmatia and the Morea. Belon saw it flying above the bushes in Crete; Mr. Strickland noticed it at Smyrna in April; and Mr. Keith Abbott procured it at Trebizond (40° 45′ N., 40° 25′ E.).

In these islands, where it is generally diffused, the Wheatear arrives about the middle of March, and the great body have left us about the end of September, though some stragglers stay later, and have been seen as late as past the middle of November. The Hebrides, Orkneys, and Shetland are visited by them.

Habits, Food, &c.—Insects generally, which are captured on the wing, coleoptera and their larvæ, and worms, form the food of the Wheatear, which generally sits on the watch upon an elevated clod or stone.

The nest is framed of dried roots and feathers, rabbit's down, &c.; and the eggs, generally six in number, are pale blue. The bird manifests sometimes great precaution in selecting a place for it not easily detected. Belon states that it chooses some hole among the rubbish of an old ruined house, sometimes on the earth, in a depression made by the foot of a bullock, or in a quarry. Old walls, gravel or chalk pits, are not unfrequently the localities. The Cornish fisher-boys informed Mr. Couch that the nest is concealed at the bottom of a deep recess, under some huge stone or rock beyond the reach of their arm, so that when they have found it, and the discovery is not easy, they can only procure it by a hook fastened to a rod. Mr. Knapp, in his interesting 'Journal of a Naturalist,' gives an account of one which had made her nest deep in the crevice of a stone-quarry, so carefully hidden by projecting fragments, that it was not observed from without until part of the rock had been removed. It was large, and rudely constructed with dried bents, scraps of shreds, feathers and rubbish, collected about the huts on the down, and contained four eggs. He adds that another hen bird had descended through the interstices of some rather large loose stones, as a mouse would have done, and then proceeded laterally to a hollow space in a bank, against which the stones were laid. Mr. Salmon states that in Suffolk and Norfolk a deserted rabbit-burrow is usually selected for the nest, which is placed near the entrance. In such situations, he adds, the nest is sure to be discovered by the accumulation of a number of small pieces of the withered stalks of *Pteris aquilina* which the old birds amass outside the entrance. Mr. Yarrell found the nest in a fallow field under a large clot, to which his attention was drawn by a portion of its materials appearing outside the hole through which the bird passed to the hollow space within.

When the Wheatears begin to draw towards our southern counties previous to their departure, they soon fall victims to the eagerness with which they are sought as delicacies for the table. The shepherds form traps for them in the turf of the downs by cutting an oblong piece seven or eight inches by about eleven, and six inches thick. This is taken up in a solid mass and laid contrariwise both as to surface and direction over the hole: a hollow chamber is thus formed beneath the cover. Two other openings are also cut in the turf, about six inches wide and of greater length, leading into the chamber at opposite ends, so that the bird may run in under the turf through either of them. A little on one side of the middle of the square chamber a small straight stick, sharp at each end, not unlike a common wooden brimstone match, but stouter, is fixed upright, and supports two open running nooses of twisted horsehair placed vertically across the line of passage from each end to the opposite outlet. The least alarm—even, it is said, the shadow of a passing cloud—sends the poor bird to take refuge under this treacherous roof, and, as it attempts to run through, it is almost sure to be caught by the neck in one of these loops.

The numbers thus taken in the season, which commences on St. James's Day (25th July), when the traps are first opened, appear to be almost incredible. A shepherd has been known to capture eighty-four dozen in a day. Pennant declares that about Eastbourne about eighteen hundred and forty dozen were annually caught in his time. The traps are in full operation about the 1st of August, and the season is over about the end of the third week in September. Six or seven hundred of these traps are sometimes looked after by one shepherd and his boy. In Pennant's time they were usually sold at sixpence per dozen; Montagu states the price at a shilling for the same number, and says that it is a common custom in those parts where the Wheatears are taken, to visit the traps, take out the bird, and leave a penny as a reward for the shepherd. Pennant observes that great quantities of these birds are sent potted to London, and numbers are dressed fresh in the country. They are roasted wrapped up in vine-leaves, on account of the great tenderness of the flesh. The flavour is delicious, and it has been termed, not inaptly, the English Ortolan. Properly picked on the spot and carefully packed, they might now be supplied to the London market by railroad in almost as good a condition as they would be on the spot.

The flight of the Wheatear is smooth and rapid, but low. Its song, though heard with difficulty in the open air, is soft and sweet, often uttered while on the wing in the season of love, as the male hovers over the female, expanding the feathers of his tail. In the aviary it soon becomes a favourite. Mr. Sweet states that there they are almost continually in song, singing by night as well as by day a pleasant and variable strain, different from that of all other birds. Sometimes, he says, it is very loud, and continued a great length of time, not broken off like that of the robins and some other birds; but their winter song, according to him, is the best and most varied. A pair that he possessed were caught in September, began to sing in a few days, and continued in full song on the day when he wrote, the 22nd December following. Where there is plenty of room, it is, he adds, 'very amusing to see them at play, flying up and down, and spreading open their large wings in a curious manner, dancing and singing at the same time.'

Bechstein says that in the house they must be given plenty of meal-worms and ant's eggs as soon as they are taken; afterwards they may be fed on nightingale's food, and occasionally on white bread soaked in boiled milk.

The following quatrain appears under the figure of this species in the 'Portraits d'Oyseaux, Animaux, Serpens, etc., observez par P. Belon du Mans:—

'L'oyseau petit, que lon nomme Culblanc,
Cherche à se paistre et vivre de vermine
Qu'il trouve en herbe, ou que dans terre il mine:
Et a tel nomme, pour avoir le cul blanc.

Besides the Wheatear here noticed, Mr. Gould describes and figures the following as European:—The Black

Wheatear (*Saxicola cachinnans*, Temm.); the Pied Wheatear (*Saxicola leucomela*, Temm.); the Russet Wheatear (*Saxicola stapazina*, Temm.); and the Black-eared Wheatear (*Saxicola aurita*, Temm.).

The Wheatear: lower figure, male.

WHEATLEY, FRANCIS, R.A., an English painter of various subjects. He excelled in rural pieces with figures, and in landscape, which he painted in oil and water colours. His father was a tailor in London, where Wheatley was born in 1747. He received his first instruction as an artist in Shipley's school, and when young obtained several premiums from the Society of Arts. He assisted Mortimer in a ceiling which he painted for Lord Melbourne at Brocket Hall, Hertfordshire.

'It is to be lamented,' says Edwards, 'that however good this artist's abilities might be, his conduct was highly irregular; for he left London for Dublin in company with Mrs. Gresse, with whom he had the folly to engage in an intrigue, for which he was prosecuted and cast in the Court of King's Bench.'

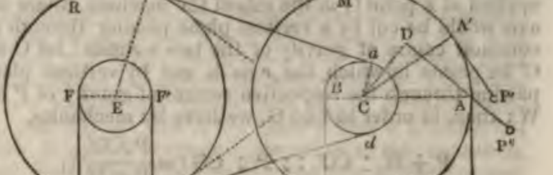
While in Dublin Wheatley painted an interior view, of considerable merit, of the Irish House of Commons, in which he introduced portraits of several of the members.

One of Wheatley's best works, a picture of the London riots of 1780, was burnt in the house of James Heath, the engraver, who had made a print of it for Alderman Boydell, who gave 200*l*. for the use of it. In this print the figure giving orders is a portrait of Sir Bernard Turner, that receiving them is a portrait of Henry Smith, one of the Bank directors at that time, and major of the Camberwell volunteers; the figure assisting the wounded person is intended for Sir William Blizard, surgeon, who then served in the corps. Wheatley was elected a member of the Royal Academy in 1791: he died in 1801. (Edwards, *Anecdotes of Painting*.)

WHEEL AND AXLE, is a machine consisting usually of a cylinder to which a wheel is firmly united, so that the mathematical axes of both are coincident. The wheel and cylinder are of wood or metal, and the diameter of the former is greater than that of the latter.

A cylinder on the circumference of which are fixed exteriorly boards whose planes, if produced, would pass through the axis, and which (being turned by the force of running water, or by the weight of men in the act of stepping from one board to the next above it) is employed to raise a heavy body by means of a rope passing over a smaller cylinder on the same axis, is a simple machine of this kind: the same may be said of a hollow cylinder which, with its axle, is made to revolve by men or animals walking in the direction of its circumference, in its interior surface. The capstan, the windlass, and the helm-wheel of a ship are only so many different forms of the same class of machines. Frequently also the axle is made to carry a wheel with teeth on its circumference, in order that, by revolving, motion may be communicated to machinery: such are the wind and water mills which are employed for grinding corn.

When it is required to exhibit the mechanical properties of the wheel and axle, a weight representing the moving power is applied at one extremity of a string which at the other extremity is attached to and passes round the circumference of the wheel; and a weight, representing the resistance to be overcome, is applied in like manner at one end of a string which passes round the axle or cylinder. Let MN be a section passing through the wheel and cylinder perpendicularly to their common axis, and let CA, or CA′, and CB be the semi-diameters of the circles in that section: let P represent the moving power and W a weight to be raised, or held in equilibrio; AP or A′P′, and BW, being the directions of the strings to which those weights are attached; and for simplicity, let these lines be in one plane and coincident with tangents to the circles at A, or A′, and at B. Here it is evident that the mechanical power of the wheel and axle is the same as that of a lever of the first kind; for, the thickness of the ropes and the weight and inertia of the materials being disregarded, the forces P and W acting perpendicularly to the arms CA, or CA′, and CB, the effect is the same as if those forces were applied immediately at the extremities of the straight line AB, or of the bent line A′CB, and C being the fulcrum or point of support, we have by the nature of the lever, in the case of equilibrium,



$$P : W :: BC : AC\ (= A'C), \text{ or } P = W.\frac{BC}{AC}.$$

The wheel and axle has manifestly however a great advantage over the simple lever, since the weight W may be raised to any height which is consistent with the lengths of the ropes.

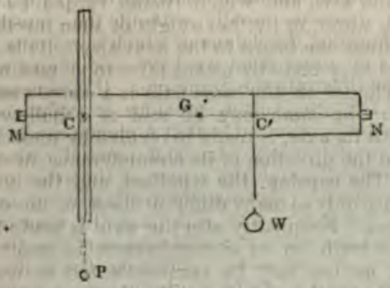
If the power P or P′ do not act in the direction of a tangent to the circle, but in some other, as AP″; then letting fall CD perpendicularly on P″A, produced if necessary, we have, by the lever,

$$P'' : W :: BC : CD.$$

If the ropes to which the weights are attached have sensible thicknesses, and it is thought proper to take those thicknesses into consideration, the ropes may be conceived to be reduced to their mathematical axes, and these to pass over the circumferences of the wheel and cylinder at distances equal to the semidiameters: thus, if r and R be the semidiameters of the ropes passing over those circumferences, respectively, we obtain, in the case first supposed,

$$P : W :: BC + R : AC + r.$$

If it be required to determine the pressures on the supports of a wheel and axle when the weights applied to it are in equilibrio, and the whole machine is at rest, the investigation may be conducted in the following manner:—Let the weight of the wheel be represented by A and that of the cylinder by B; also let M and N be the points on which the two pivots rest; then $\frac{1}{2}$B is evidently the pressure supported on each of the points M and N, arising



from the weight of the cylinder. Let the weight A be supposed to act at C, the centre of the wheel, and let CM $= m$, CN $= n$; then by mechanics,

$$m+n : m :: \mathrm{A} : \text{pressure at N}, = \frac{m}{m+n}\mathrm{A}:$$

in like manner, $\frac{n}{m+n}$ A expresses the pressure at M; each of these pressures arising from the weight of the wheel.

In order to find the pressures arising from the weights P and W, the sum of those weights must be considered as applied at a point G in the axis of the machine, where that axis would be cut by a vertical plane passing through the common centre of gravity of the two weights: let C and C′ be points in which the axis is cut by vertical planes passing through the respective centres of gravity of P and W; then, in order to find G, we have by mechanics,

$$\mathrm{P+W : CC' :: P : CG} \left(= \frac{\mathrm{P.CC'}}{\mathrm{P+W}}\right);$$

$$\text{hence } \frac{\mathrm{P.CC'}}{\mathrm{P+W}} + m, \text{ or } \frac{\mathrm{P.CC'} + m(\mathrm{P+W})}{\mathrm{P+W}}, = \mathrm{MG},$$

$$\text{and } n - \frac{\mathrm{P.CC'}}{\mathrm{P+W}}, \text{ or } \frac{n(\mathrm{P+W}) - \mathrm{P.CC'}}{\mathrm{P+W}}, = \mathrm{GN}:$$

therefore, again by mechanics,

$$m+n : \frac{\mathrm{P.CC'} + m(\mathrm{P+W})}{\mathrm{P+W}} :: \mathrm{P+W} : \text{pressure on N} \left(= \frac{\mathrm{P.CC'} + m(\mathrm{P+W})}{m+n}\right),$$

and, in like manner, $\frac{n(\mathrm{P+W}) - \mathrm{P.CC'}}{m+n}$ expresses the pressure on M.

Consequently the whole pressure on M is

$$\tfrac{1}{2}\mathrm{B} + \frac{n\mathrm{A} + n(\mathrm{P+W}) - \mathrm{P.CC'}}{m+n},$$

$$\text{and on N, is } \tfrac{1}{2}\mathrm{B} + \frac{m\mathrm{A} + m(\mathrm{P+W}) + \mathrm{P.CC'}}{m+n}.$$

If the wheel and cylinder are in a state of motion about their mathematical axis, the pressure on the supports will evidently be diminished by the force with which the common centre of gravity of the weights P and W tends to descend; the value of this force is investigated in treatises of dynamics.

If two wheels and cylinders are connected together by a string *b a d f*, as in the first cut, or by teeth in the circumferences, the ratio between the power P and the resistance *w*, in the case of equilibrium, may be determined by the same rule as would be employed if those weights were at the opposite extremities of a double lever of the first or second kind. For the power P may be conceived to be applied at A perpendicularly to the semidiameter CA, and it will be in equilibrio with a resistance at *a*, perpendicular to C*a*, which may be expressed by $\mathrm{P}.\frac{\mathrm{CA}}{\mathrm{C}a}$: let this be represented by *p*. Now this force at *a* may, in consequence of the string passing round the axle CB and the circumference of the wheel RS, be conceived to be a moving power applied at *b* perpendicularly to E*b*; and this will be in equilibrio with a resistance *w* at F, acting perpendicularly to FE, which may be expressed by $p\frac{\mathrm{E}b}{\mathrm{EF}}$; therefore, substituting in it the above value of *p*, we have $w = \mathrm{P}.\frac{\mathrm{CA}}{\mathrm{C}a}.\frac{\mathrm{E}b}{\mathrm{EF}}$. And in like manner may the relation between the power and resistance be foun the case of equilibrium, whatever be the number of w and axles.

It is to be understood, in the above description, the axles of the two wheels MN and RS are suppos be parallel to one another and to the horizon; and the parts of the string *b a d f* are in a vertical plane pendicular to those axes, in order to avoid the redu which would be necessary on account of a loss of resulting from an oblique action of the forces at *a* The forces acting in AP and BW, or F*w*, are also posed to be exactly or very nearly in one vertical in order to avoid the strain on the axle which otherwise take place. [MATERIALS, STRENGTH OF, p

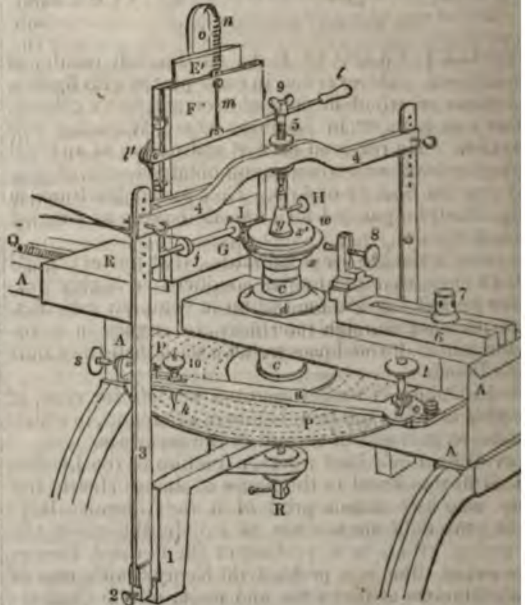
If the string passing over the circumference o wheel RS and the axle CB were to cross itself, as sented by the lines *b d a f*, the relation between the p would be the same as before, but the weight *w′* wou raised in the direction *w′*F′ instead of *w*F.

It is easy to perceive that (as in the lever and mechanical powers) the spaces described by the P and W, in a given time, when in motion, are t another in the inverse ratio of those weights: fo spaces described are respectively equal to the leng the strings which pass over the circumferences o wheel and axle in the given time; and these length proportional to the circumferences, or radii, that versely as the weights acting at the circumferences.

WHEEL-BIRD. [NIGHT-JARS, vol. xvi., p. 226.]

WHEEL-CUTTING, a term applied to a part branch of practical mechanics, which comprehend modes of cutting the teeth in the wheels used by and clock makers and for other mechanical purposes engines used for this purpose vary in their constr according to the wants or caprice of the artists w them. We shall content ourselves with giving a de tion of the engine commonly employed, with a few re on the kind of cutters used for cutting the spaces be the teeth, which operation is usually termed cuttin teeth in a wheel, although in reality the teeth are portions of the metal which are left standing. We however employ the common phrase, as it will perh best understood by all who feel an interest in the art.

Description of the engine commonly used:—AA

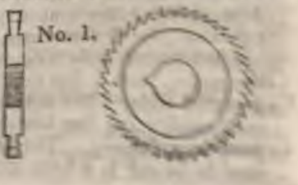


strong frame of cast-iron consisting of two parallel the stouter the better, firmly connected together, that the plates are from 3 to 5 inches apart, to all dividing-plate PP to revolve between them. The PP is fixed firmly to the axis *c* (about 8 or 9 inches which works at its upper end in a collar *d*, in the plate, and its lower end in the centre of a screw, R axis *c* has a hole down from its upper end, about fourths of its length, to receive the smaller axes, arb pinions of the wheels which are to be cut. E is a hori slide, of which the vertical part E′ is formed into a tail, on which slides the vertical slide F, to which is securely attached a frame G, having two projecting sides through which pass two screws, one of which is seen at H. These screws have female centres to receive the ends of the arbor which carries the cutter I: *j*, a pulley on the cutter-arbor which receives the band by which motion is communicated to the cutter I; *l*, the handle of a lever, whose centre of motion is at *l′* on a piece projecting from the back of the fixed dovetail E′, to which is attached the connecting-rod *m*, for depressing the slide F, and thereby passing the cutter through the wheel; *o*, a piece attached to the back of the dovetail E′, for the purpose of fixing the spring *n*, one end of which is attached to the slide F, and operates to bring up the slide after the cutter has passed through the wheel. The slide E is for the purpose of bringing the cutter to the requisite distance from the centre of the wheel to be cut, and has a screw, not seen in the drawing, for the purpose of setting it fast when brought by the screw Q to its proper place. The dividing-plate PP has on its surface a number of concentric circles, which occupy that portion of the plate nearest its circumference: these circles are each accurately divided into such a number of equal parts as are likely to be suitable for the wheels required to be cut: the outer circles, being the largest, generally contain high numbers, such as 400, 360, 192, 168, 160, 150, 140, 136, 130, &c., and with these almost any common number can be cut. Firmly fixed on a moveable centre or joint attached to the frame of the engine is an index *u*, capable of a motion on its joint parallel to the plate PP, and having at its end a pin *k*, with a rather long conical point. On the plate PP, at the intersection of each division with its corresponding circle, is drilled a hole; and if these holes are drilled quite through the plate all the better. The pin *k* is attached to the index *u* by a moveable piece which is acted upon by the screw *s*, and serves the purpose of shifting the plate PP any small quantity less than the distance of a single division on the plate; and 10 is a nut to set the pin *k* fast in any required position.

The index being placed with its conical point *k* in one of the holes in any circle by means of slit *v*, say that of 360 divisions, is screwed fast by screw *t*, and the elasticity of the index keeps it sufficiently tight in the hole to prevent the plate and arbor from moving round: if the end of the spring or index be now lifted up by the hand, and the plate be moved round till the next division or hole in the same circle comes under the conical point, and the point *k* be then dropped into it, the distance moved over by the plate, and also by the wheel which is screwed or otherwise fixed on to the end of the arbor *c*, will be $\frac{1}{360}$th part of a circle. The cutter having been adjusted to such a distance from the centre of the arbor *c* as is required to cut a proper depth into the wheel, the operation of cutting is performed by bringing down the slide F which carries the cutter-arbor by the lever *l*, the arbor being carried round by the band which passes round the pulley *j*, and a wheel similar to a lathe-wheel, which the operator keeps in motion by the foot acting on a treaddle in the same way as in a common lathe. As soon as the cutter has passed through the thickness of the wheel, the pressure is taken off the lever by which the cutting-frame or slide has been depressed, and is brought back to the position it had before by the spring *n*, the plate is shifted one division, and the operation of cutting is repeated. It will be perceived that any number can be cut from each circle, provided the required number is an aliquot part of the divisions in the circle used: thus, on the circle of 360, by passing over two divisions between each cutting, 180 will be cut; three divisions, 120; four divisions, 90; and so on.

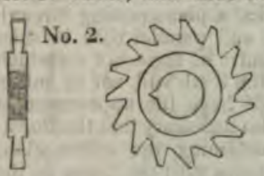
In some engines the edge of the dividing-plate, or rather a rim just within the edge on the under side of the plate, has a screw cut upon it, into which a tangent-screw is made to act; and the head of this screw consists of a small wheel or dividing-plate, removable at pleasure, in order to substitute another of a different number. By such an arrangement as this just described, not only may any number (even prime numbers) be cut, but the plate itself may be divided: the cutting of wheels, or rather shifting the plate by the screw, would take too much time for ordinary wheel-cutting; hence the numbers most in use are drilled in the plate as above described. A great many ingenious methods are resorted to in wheel-cutting for the purpose of cutting odd numbers, for moving the plate over any number of divisions rapidly without the possibility of making a mistake, the details of which our limits will not allow us to go into: what we have said above we deem sufficient to illustrate the principle. It is necessary here to observe that the cutter, previous to commencing to operate, should be adjusted so that a plane passing through the centre of its cutting-edge and parallel with its sides should pass also through the centre of the arbor on which the wheel is fixed; otherwise the teeth will not be cut in straight to the centre, and will have the appearance of being bent on one side: it is also necessary that the downward motion of the slide, containing the cutter-arbor, should be perfectly at right angles with the plane of the wheel. We have hitherto spoken of the wheels as being screwed to the arbor *c*, but we have also said the arbor *c* is hollow, for the purpose of receiving the axes of the wheels to be cut: this hollow arbor is in fact capable of receiving end-pieces, which are firmly fixed therein; and it is on these latter pieces that the wheels which have no axes of their own, but simply a hole through them, are screwed. But when the wheel to be cut is already fixed on an axis, the hollow arbor is used with an apparatus shown in the figure, which we shall now describe:—1, 1, part of a very firm bar attached to the lower frame, and extending horizontally across the centre of the engine-plate, the extremities of which bar terminate in two pins or pivots, 2, 2, one of which is not seen, extending a short distance beyond the edge of the dividing-plate: on to these pins are hooked two pieces, 3, 3, which, at their upper ends, pass through slits in the piece of iron 4, 4, which has a screw, 5, passing through its centre (in all this apparatus, except the screw 5, there must be no nice fitting, but perfect freedom): the screw 5 has a centre, either male or female, by which it presses down the hollow cone *y*; but the foregoing apparatus, called the gallows, will be best understood by describing the mode of putting on a wheel having an arbor in it:—Remove the gallows; on to the end of axis *c* drop a flange *x*, a little less in diameter than the circle which corresponds with the bottom of the teeth to be cut: through the centre of this flange drop the longer part of the arbor of the wheel *w*, to be cut, so that the wheel rests on the flange *x*; then over the wheel drop the flange or collar *x′* (of the same diameter as *x*); over the shorter part of the axis of wheel *w* place the hollow cone *y*: bring the gallows over the cone; screw down screw 5 just sufficiently tight to hold the gallows in its position, but not to set the wheel *w* fast; remove the pin *k* from the plate PP, and cause the latter to revolve rapidly by the hand or otherwise; the wheel *w* will in all probability be far from concentric with the plate, as will also the centre of cone *y*. With the hand slip the wheel *w* or cone *y*, or both, as may be required, together with the upper flange *x′*, as nearly concentric with the plate PP as the hand and eye will enable you in one or two seconds to do; next slide the piece 6 so as to bring the screw 8 to a convenient distance from the wheel *w*, and set fast by screw 7; then by revolving the plate rapidly, and gradually bringing the end of 8 to the edge of wheel *w*, it will be got perfectly concentric; next screw down 5 sufficiently light to prevent the wheel from moving, and set fast screw 5 by lightening nut 9: the cutter being then adjusted so as to cut the teeth a proper depth, the cutting proceeds as before described. This operation of setting the wheel perfectly concentric will not occupy an experienced hand more than fifteen seconds.

Of the Cutters, and the mode of making and using them.—The cutters vary with the nature of the work to be done, and much depends upon having good ones and well adapted for the purpose. The first kind we shall describe is used for the commonest work, that is, for cutting merely spaces whose sides are parallel through their whole length (in which case the teeth have to be rounded up afterwards), and the cutter is merely a circular disc of steel with teeth on its edge, similar to a circular saw, the two sides being slightly undercut, as seen in the section No. 1: this allows the cutter to pass freely through the metal without clogging, which it would do were the sides parallel: these teeth in the cutter are sometimes made with a file by hand,


No. 1.

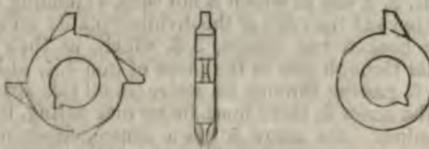
but they are much better made in the engine. Cutters of this description are generally tempered so low, after having been hardened, as to allow of the teeth being renovated with a 3-square file when they become dull, and answer the purpose well enough for common purposes: a better sort of cutter, and more lasting, is made with from six to sixteen or eighteen teeth, as in No. 2, which gives a side-view and section: these are left very hard, being tempered only to a light straw-colour, and are sharpened with emery and oil on a metal mill or lap; these take much longer making than those first described. When these consist of not more than six teeth, each tooth is generally relieved in direction shown in section No. 3, but not on the sides, by which means the cutter frees itself better, and cuts on its sides to the very root of its tooth, which can be kept sharper and in much better working condition than the foregoing.

No. 2.



Cutters are also made having but one tooth, others with two, three, and four: but these are more frequently used when the teeth are to be cut and rounded up at one operation, in which case the side view and section No. 3 will represent the form in which they require to be made to produce the necessary curve for the wheel-teeth; and great nicety is required to produce two curves on each side of the cutting-tooth exactly similar, for unless they are so, the teeth in the wheel cut therewith will have a very unsightly appearance. The writer has invented an engine which he uses for the purpose, which effects that object perfectly, and is also capable of varying the form of the curve given to the cutter, so as to produce wheel-teeth of different shapes.

No. 3.



It will be necessary to say a few words on the different kinds of work to which the various cutters above described are applicable. No. 1 is used, when tempered low, for soft metal, such as gold and brass and gun-metal; if left hard, they should be sharpened with oilstone dust or very fine emery, and they can then be used for harder metals, such as iron and steel. No. 2 may also be used for the same purposes, but when used for the harder metals should have a greater number of teeth, from 20 to 30 not being too many in a cutter of three-quarters of an inch in diameter; in general, the harder the metal to be cut the greater the number of teeth required in the cutter, and in some cases, such as cutting steel and bell-metal, it is requisite to keep the cutter well supplied with oil, and in all cases where hard metals are under operation the cutter should have a much slower motion. Cutters with from one to six teeth may revolve from ten to twenty thousand times in a minute in cutting the softer metals, and those with 10 to 20 teeth from five to eight or ten thousand; in fact cutters with few teeth cannot be used for the harder metals with advantage, and the others should not have more than from 60 to 100 revolutions in a minute. These observations apply to cutters whose diameter is about three-quarters of an inch; if the cutters are larger, they must have a proportionably less number of revolutions. Cutters are sometimes made for cutting steel, and indeed for all the metals, having very fine teeth, from 200 to 300 in the inch, but the use of such is now almost obsolete: in fact the process approximates very closely to filing, and such cutters may be regarded as circular files; and one great disadvantage is that the keen edge is soon lost, and they cannot be renovated without softening.

Wheel-cutting is one of those operations in which much depends upon the manual dexterity and judgment of the operator; for it sometimes happens that steel, one of the hardest metals, may be cut with a more rapid motion of the cutter, and a less number of teeth in the cutter than is stated above; but it is only when it is of a particularly mild quality, or has been prepared especially for the purpose by softening. The following mode of softening the steel to be cut is a very good one, and may be frequently adopted with great advantage:—Envelope the articles in a mass of loam, clay, or lime, with sufficient moisture to make it adhesive, taking care that the articles to be softened have a considerable thickness of the material all round them; heat the mass gradually to a blood-red heat; keep it at this heat as long as convenient—an hour or two will not be too long, less may do; then let it remain in the fire to cool gradually as the fire goes out; after which the articles may be taken out, and will be found much more uniform in texture and easier to be cut than before being subjected to the operation. In making cutters, as well indeed as any other edge-tools, the susceptibility of receiving and retaining a keen edge will be considerably increased by subjecting the steel to great condensation, by cold hammering, previous to the process of hardening; and more especially if the scale left after forging be first removed with a file. Harden in water, but do not heat your steel too hot; for every degree that steel is heated above its hardening point deteriorates its quality.

WHEELER, SIR GEORGE. [Spon, Jacob.]

WHEELE'RA, a genus of plants belonging to the natural order Leguminosæ. This genus was originally referred to the species of Pterocarpus, and was afterwards made into a genus by P. Browne, under the name of *Brya*, from *βρύω*, to sprout, as the seeds germinate before they fall from the tree. This name, being the plural of Bryum, is objected to by Burnett, who has proposed the name of *Wheelera* in honour of Mr. Thomas Wheeler, who was for upwards of forty years Professor of Botany at the Botanic Garden of the Society of Apothecaries at Chelsea.

This genus is closely related to *Amerimum*, and has flowers of the same character. The stamens are all monadelphous, but the tenth adheres to the rest for only half of its length. The legume is bi-articulate; the joints 1-seeded, dehiscent, compressed, with the superior suture straight, and the lower one convex, but the upper joint is sometimes wanting. There is only one species of this genus well made out, and this is a native of America. It is a tree, furnished with stipular spines, simple crowded leaves, or trifoliate leaves with the leaflets sessile. It is called American Ebony and has the name *W. Ebenus*. It has distinct spines, with aggregate obovate leaflets, and axillary 1-2-flowered peduncles, which are shorter than the leaves. It is chiefly a native of the West Indies, and is cut and sent to this country under the name of ebony, although it is a very different plant from the true ebony. The wood is very hard, of a brownish green colour, and bears a fine polish, and is much employed by cabinet and musical-instrument makers. The tree is very small, not attaining a height of more than twelve or fourteen feet. The young branches are very tough and flexible.

Another species of this genus, the *W. parviflora*, has been described as inhabiting Brazil. It is a shrub, with connate spines and few-flowered peduncles.

WHEELS, considered as component parts of machinery, are employed in an endless variety of forms and combinations for the purpose of transmitting motion, regulating velocity, converting one species of motion into another, reducing friction, and equalizing the effect of forces applied in an intermittent or irregular manner. From the almost infinite number of forms and combinations of wheels employed for these purposes, a few of the most important may be selected as types or examples; but it forms no part of the design of this article to treat of the mechanical principles involved in the action of the contrivances to be referred to, such being generally referable, more or less directly, to the properties of the wheel as a perpetual lever, or an endless succession of levers, as explained under Wheel and Axle, while all theoretical matters relating to the form and proportions of toothed wheels are separately treated under Wheels, Teeth of. It may be convenient, without any attempt at perfect classification, to consider—first, those kinds of wheel employed for the purpose of merely transmitting motion, with or without change of velocity; secondly, contrivances for converting one kind of motion into another, or into motion of the same species, but in a different direction; and, thirdly, wheels employed for the purpose of diminishing the effects of friction and inertia. In many cases this division is quite arbitrary, as the mere change in the direction of revolution, which necessarily occurs in a train of wheelwork falling under the first class or division, might be considered to place every train of wheels in the second of the above divisions; while most of the contrivances embraced in the third division are referable to the second. The kind of wheels commonly called pulleys are treated of under PULLEY, vol. xix., p. 117, and wheels for driving machinery by means of a current or fall of water under HYDRAULICS, vol. xii., p. 384.

The simplest mode of transmitting motion from one wheel to another is by causing their peripheries to revolve in contact with each other, and pressing them together, in order to prevent slipping, with a force proportionate to the amount of resistance to be overcome. If two wheels or plain circular discs of equal size be mounted in such a way that their peripheries press against each other, as *a* and *b*, *Fig.* 1, rotatory motion given to one wheel will be communicated to the other without any change of velocity; but, while the wheel *a* will revolve from left to right, *b* will, as indicated by the arrows, revolve from right to left. If a third wheel, *c*, be added, revolving in the same plane as the two first, but having its periphery in contact with the second only, it will revolve in the same direction as the first. The direction of revolution will of course be the same whether the moving power is originally applied to *a*, *b*, or *c*; and by adding more wheels to the series, a train of any length might be produced, in which the velocity of revolution would be the same throughout, while the direction would be alternately from left to right and from right to left. If it be desired to bring the wheels *a* and *c* nearer together than by the arrangement shown in *Fig.* 1, the axis of *b* may be removed so as to allow of an arrangement such as that represented in *Fig.* 2, where precisely similar motion is communicated to *a*, *c*, and *e*, by the intervention of *b* and *d*; or, if necessary, the several axes may be arranged in a circular or any other line. In some cases in which it might be desirable to communicate rotatory motion in the same direction to such a series of wheels as *a*, *c*, *e*, it may not be convenient to employ intermediate wheels of the same size, and then *b* and *d* may, as in *Fig.* 3, be made smaller, in which case, although they will revolve more rapidly than *a*, they will, slipping being supposed impossible, *communicate* the same velocity. Thus, supposing the diameter, and consequently the circumference, of *b* to be only one-third that of *a*, *b* will revolve three times while *a* revolves once; but as *c* is the same size as *a*, and consequently three times as large as *b*, it will only revolve once while *b* revolves three times. This illustration leads to the consideration of the means of varying velocity, or obtaining a quick motion from a slow one, or *vice versâ*. Let *a*, *Fig.* 4, be a large wheel, from which it is desired to obtain rotatory motion much more rapid than that imparted to it by the prime mover. It gives motion to *b*, which, being only one-third the circumference, must revolve thrice as fast, or, in other words, must turn completely round three times while *a* turns round once. On the same axis with *b* is a large wheel *b′*, which turns with the small wheel *b*, and imparts motion to the small wheel *c*, the axis of which carries a third large wheel *c′*, which will consequently revolve nine times while *a* revolves once. The addition of another pair of wheels similar to *b b′* and *c c′* would increase the velocity to twenty-seven times that of *a*; and by a further extension of the series, or by making a greater disparity between the diameters of the large and small wheels, the speed might be multiplied to any extent, the power of course diminishing in proportion to the increase of velocity. By reversing the process, and supposing the moving power to be applied first to the wheel *c′*, and transmitted by means of its small wheel or *pinion* *c* to *b′*, and from it through *b* to *a*, the power would be increased ninefold, with a corresponding reduction of velocity. In this illustration nothing has been said as to the mode of applying power to, or obtaining the working effect from, the wheel *a*; but it will be evident that if a smaller wheel, similar to *b* and *c*, were added upon its axis, to receive the impelling power when the train is used for the purpose of increasing velocity, or to impart the power transmitted through the train when its object is to increase, or rather to concentrate, force applied to *c′*, the effect would be again trebled. Of course such a train of wheelwork as the above might be arranged in a circular or any other convenient form as readily as a train of equal-sized wheels, as in *Fig.* 1. A practical illustration of a train of wheels for increasing velocity will be found in the striking-apparatus of the eight-days clock, represented in the article HOROLOGY, vol. xii., p. 300, where a train of toothed wheels, *e*, *f*, *g*, and *h*, *Fig.* 1, connected by the pinions *p*, *q*, and *r*, communicate the power of the fusee F to the small fly *i*, which revolves with great velocity. In this example, as in the above diagram, the train of wheels is arranged with their axes in a straight line; but in the works of a common watch, where a somewhat similar train is required in the most compact form possible, the several axes are arranged in a circular line. In some cases it is necessary to produce rotatory motion of different velocities in two wheels or other members of a machine, which, though not actually fixed upon the same axis, are required to be perfectly concentric; this may be done by surrounding the ordinary axis with another of a tubular form, capable of turning upon it. A familiar example presents itself in the hour and minute hands of a common watch, the relative velocities of which are as 1 to 12, although, at a superficial glance, they may appear to be on the same axis, which would imply their movement with equal velocity. Another example will be found in the pearl-barley mill represented in vol. iii., p. 467, *Fig.* 2, where the stone A and its surrounding case B are caused to revolve in the same direction, but with different velocities, by a similar arrangement. In some machines of like character, by a different arrangement of the connecting train of wheels, the concentric members are made to revolve in contrary directions, as well as with different velocities.

Fig. 1.

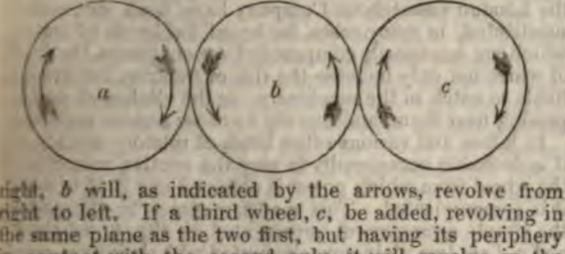


Fig. 2.

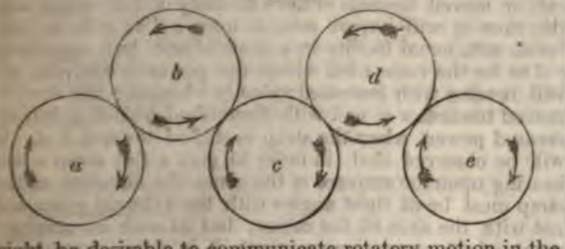


Fig. 3.

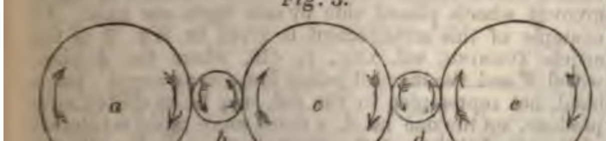
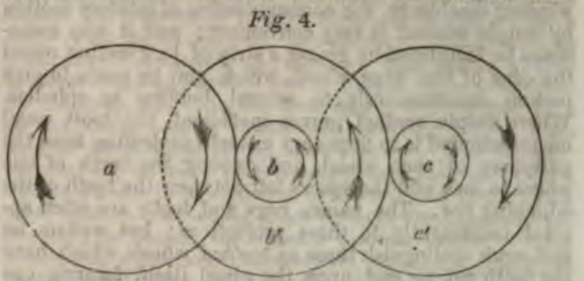


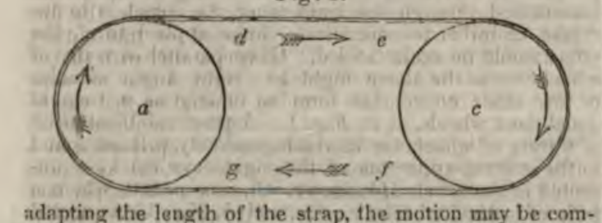
Fig. 4.



Although, for the sake of simplicity, the wheels in the above diagrams have been treated as plain discs, with smooth peripheries, such are not often used, because of the tendency to slipping when any considerable resistance has to be overcome. Gregory, in the second volume of his 'Treatise on Mechanics,' refers to the successful use of plain wheels, acting upon each other by the contact of wood so cut as to present the *end of the grain*, in [illegible] saw-mill at Southampton, as the only instance of the kind, upon a large scale, with which he was acquainted. The wheels were, in this case, *forced* together with the requisite power by means of wedges or weighted levers. For purposes requiring but little power, such as spinning and winding machinery, the communication of rotatory motion by simple contact is very convenient; and it may sometimes be facilitated by gluing a strip of buff leather round the edge of the large wheel, which may be made to give motion simultaneously to several bobbins or spindles. Where simple contact proves inefficient, the most usual means adopted is to form cogs or teeth projecting from the periphery of each wheel, and causing the teeth of one wheel to lock into the spaces left between the teeth of the adjoining one. The names cogs and teeth are often applied indifferently to these projections; but writers on mill-work distinguish those as *toothed* wheels which have the teeth cut or cast upon the wheel itself, forming one whole with it, while they apply the term *cogged* to wheels in which the teeth are formed of separate pieces of metal or wood, inserted in the body of the wheel. *Spur-gear* is a general term applied to such wheels as have cogs or teeth projecting in a radial direction from their periphery; and in describing a train of toothed wheels of different sizes, the larger wheel of a pair working into each other is usually designated the *wheel*, and the smaller the *pinion*; and, as a further distinction, the teeth of pinions are frequently called *leaves*. As the subject of toothed wheels is fully discussed in Wheels, Teeth of, it is unnecessary here to do more than refer to their action in the most general terms.

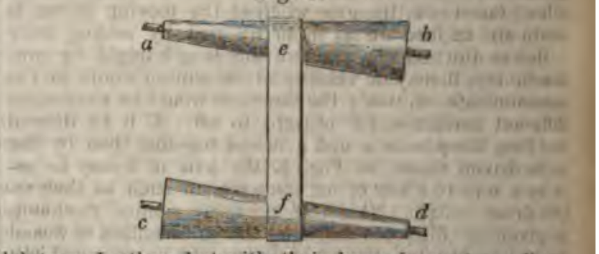
Another mode of transmitting rotatory motion more effectually than by simple contact, is by the use of endless bands or straps passing over the peripheries of the wheels which are intended to revolve together, as in *Fig*. 5, where the rotatory motion of the wheel *a* is transmitted to the wheel *c* by the strap *d, e, f, g*, instead of being communicated by an intermediate wheel, such as ***b***, *Fig*. 1. By adapting the length of the strap, the motion may be communicated, by this means, to a considerable distance, with much less noise, friction, and consequent wear and loss of power, than by an intermediate train of wheels; and the effect will be just as easily produced if the two wheels thus thrown into connection are of different diameters, although in this case the effect is different to that produced by a train of wheel-work such as is represented in *Fig*. 4, inasmuch as velocity is concerned, because the difference of velocity between the large and small wheels will only be in proportion to their respective diameters, while in such a train of unequal wheels as is above described the difference of velocity is multiplied by each wheel and pinion of the series. Straps or belts are much used in cotton-factories and other works in which moving-power has to be communicated to a great number of machines in different parts of a building, and they are preferred to cog-wheels in cases where sudden strains are liable to occur, because of the yielding character of the connection effected by them. In starting machinery by throwing it into connection with a steam-engine, water-wheel, or any other source of power already in rapid motion, peculiar advantages are derived from the use of straps, in connection with the ingenious contrivance of the fast-and-loose pulley, or rigger, an explanation and illustration of which are given under Saw-Mill, vol. xx., pp. 478, 479; as they afford the means of bringing the impelled machinery into motion gradually, by the partial slipping of the strap, and thereby prevent the risk of fracture by a sudden change from a state of perfect rest to one of rapid motion. Allusion is made, in the article above referred to, to the recent introduction of elastic caoutchouc bands for driving machinery; an improvement which appears to be, in many respects, of great importance. Mr. Mordan, the engineer, in a letter to the directors of the London Caoutchouc Company, alludes to an important advantage derived from the elasticity of these bands in the agreeable yielding of their action, which, he ing to their use in lathes, is very sensibly felt by the workman; while he observes that the unyielding tightness of the common catgut band, when put on sufficiently tight to guard against slipping, draws the axis of the mandril or spindle, and that of the fly-wheel from which its motion is derived, so forcibly together as to wear their sockets into an oval form. Such bands may be made sufficiently elastic to work with excentric pulleys; and their superior uniformity of tension renders them particularly valuable in spinning-machinery, since it aids the production of an even thread. The wheels, or, as they are more usually termed, *drums* or *riggers*, over which leather belts work, have their peripheries made slightly convex; such a form being found to retain the strap in its place more securely than a flat rim; but when the driving-band is of a round form, the wheels over which it works are formed with grooved peripheries, the concavity of which should be such as to ensure contact with as much of the surface of the band as possible. The round or rope-like bands of the London Caoutchouc Company have been successfully substituted, in many cases, for broad flat bands of leather, which are necessarily composed of various pieces, the joints of which not only increase the risk of fracture, but are also liable to catch in the machinery, or the clothes of persons passing near them, and thereby to cause serious accidents.

Fig. 5.



In lathes and various other kinds of rotatory machinery, it is desirable occasionally to vary the relative velocities of the wheel from which power is obtained and that to which it is communicated. This may sometimes be effected by the simple arrangement represented in *Fig*. 6, where *a b* and *c d* are two plain cones mounted with their axes parallel to each other, but with their bases in contrary directions. If a strap *e f* be passed over these cones, it will be equally tight whether placed in the centre, as shown in the cut, or moved towards either extremity of the cones, and therefore it will impart motion from *c d* to *a b*, or *vice versâ*, with equal facility in any situation; but, supposing *c d* to be the cone from which the power is derived, *a b* will revolve with increased velocity whenever the strap is moved towards *a c*, and with diminished velocity, but increased power, when the strap is shifted towards *b d*. It will be observed that, in order to give a flat strap a fair bearing upon the surfaces of the cones, the direction of the strap must be at right angles with the external sides, and not with the axes of the cones; but as such an arrangement might prove inconvenient, it is more common to mount the cones with their axes at right angles with the direction of the strap, and to form their surfaces into a series of grooves suitable for the use of round driving-bands, thus making each of them, in effect, a series of grooved wheels placed side by side upon one axis. An example of this arrangement is given in *Fig*. 2 of the article Turning, vol. xxv., p. 419, where the driving-wheel F and the mandril-pulley P are so arranged that a band, not represented in the cut, may be so shifted as to produce, on the one hand, a much more rapid revolution of the mandril than of the crank-shaft, or, on the other, a much slower revolution, suitable for hard work. In a part of Brunel's admirable block-machinery, represented under Saw-Mill, *Fig*. 6, will be found a contrivance for conveying motion, by means of a strap, to a pulley the axis of which is not stationary; and in the same cut is an example of a mode of tightening a strap by pressing a small wheel or roller against that portion of it which extends between the wheels it is intended to connect. In stationary machinery such a roller may be connected with a weighted lever, so as to keep the strap always at the same degree of tension.

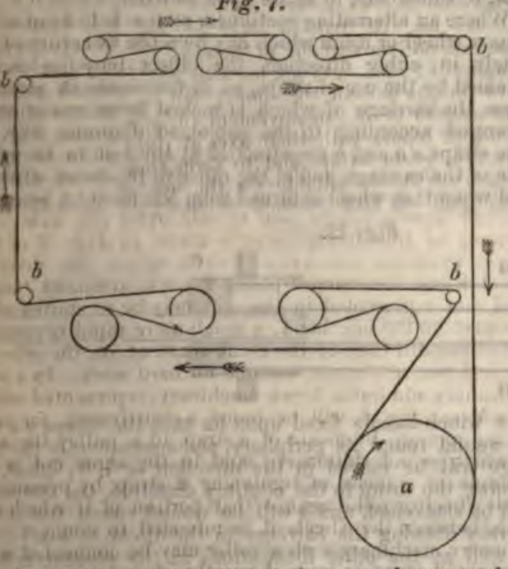
Fig. 6.



In some of the cases in which an endless strap forms the most eligible mode of connecting two wheels, the resistance to be overcome may be so great that no practicable means would make a flat or round band take hold of the peripheries of the wheels with sufficient force to prevent slipping. In such cases an expedient is occasionally adopted which may be considered as holding an intermediate place between direct connection by spur-gear and connection by an ordinary strap. This consists in forming the peripheries of the wheels with projecting pins or teeth, or indenting them with hollows, and using, in lieu of a strap, a kind of iron chain, the links of which either take hold of the projecting pins or teeth, or carry what may be termed teeth, which enter the hollows in the circumference of the wheels. A contrivance of this kind has been adopted in Hancock's steam-carriages for communicating motion from the crank-shaft of the engine to the axle of the running wheels [Steam-Carriage, vol. xxii., p. 491], and a similar contrivance has been applied to the steering-apparatus of many locomotive machines. Chains are also occasionally used without such teeth to assist them in holding the wheel, as, for example, in the steering apparatus of ordinary steam-boats. Chain-pumps [Hydraulics, vol. xii., pp. 383, 384] afford examples of a similar contrivance, in which the moving chain itself, together with the apparatus carried by it, forms the principal part of the mechanism, instead of being merely a means of communicating motion from one part of a machine to another. A very convenient apparatus on the same principle has recently been introduced and patented by Mr. Spurgin, for the purpose of superseding the labour of bricklayers, or rather of *hodmen*, in climbing with hods of bricks and mortar to the upper part of a building. It consists of a light iron chain, with large links, to which hods may be attached by hooks, extending from one polygonal wheel mounted at the top of the scaffolding to another placed near the ground, by the turning of which the chain and its load are set in motion.

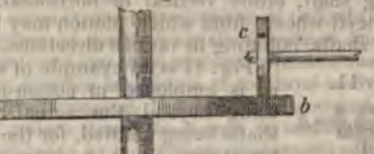
Before quitting the subject of straps or bands for driving machinery, it may be observed that, where it is desired to communicate motion from one source of power to many different machines, the object may be effected either by one long strap so arranged as to pass round all the drums to be driven, these being supposed to be all in one plane, or by a series of shorter straps, each of which passes over two drums only. Of the former arrangement an example is given in *Fig.* 7, which represents the apparatus described in Montgomery's 'Practical Detail of the Cotton Manufacture of the United States of America,' for driving the whole of the machinery of a cotton-mill, though arranged on several floors, by means of one large belt receiving motion from a large wheel *a* in the lower part of the building. The small wheels or drums *b*, *b*, *b*, *b*, are called the belt binders, and are so mounted as to enable them to bind or take up the slack of the belt, and keep it at a proper degree of tension. Such belts are 300 to 400 feet long, and 12 to 15 inches broad, and they are always made of pieces cut from the centre of the back of the hide, in order that they may stretch equally on both sides or edges. The liability to fracture, the difficulty of repairing an accident, and the great friction of the numerous bearings of the apparatus, are disadvantages which check the adoption of this mode of belting to any great extent. These disadvantages are less seriously felt when the connection is formed by a series of shorter straps, each connecting a single pair of drums. Of the manner in which such an arrangement is carried into effect an idea may be formed by supposing the wheels *a* and *c*, *Fig.* 3, to be connected by one strap, and *e*, in the same figure, to be turned by a second strap, passing round and receiving motion from another wheel fixed on the same axis as *c*. The arrangement would be more perfect, supposing the width of the wheels *a* and *c* to be sufficient to allow of two straps being used, with an intervening space between them, to admit of the strap for turning the wheel *e* working between them. Montgomery observes, that however partial manufacturers in the United States may be to the use of straps for conveying motion to the different apartments of a factory, those who have been accustomed to the neat manner in which factories are geared in Great Britain must regard them as heavy, clumsy, and inconvenient, as well as more expensive. As these large belts have to be enclosed, they occupy no inconsiderable portion of room; and much loss of time is occasioned by their stretching and slipping, and the consequent necessity of sewing them up afresh. The tendency to slipping is diminished by soaking the belts with currier's or neat's-foot oil, or with a composition of tallow and wax. He states that the drums are also covered with leather prepared in the same manner. In some cases, with flat as well as with round straps, a strap connecting two wheels is crossed in the intermediate space between them; by which means, at the expense of a little rubbing friction, and, in the case of flat belts, of an unequal strain, the strap is made to come in contact with a larger portion of the periphery of each wheel, and thereby rendered less liable to slip. Occasionally the axes are placed a little out of the parallel, to prevent the friction of a crossed strap.

Fig. 7.



Of the second class of wheels, according to the division indicated at the commencement of this article, the first which claim notice are those employed for transmitting rotatory motion to an axis not lying parallel with that of the driving wheel, but forming a right angle or some other angle with it. The simplest illustration that can be given of this kind of wheel, or rather combination of wheels, is the *face-wheel*, which may be represented by a plain circular disc mounted upon a vertical axis, and shown edgewise at *a b*, *Fig.* 8. Upon the flat upper face of this disc, or wheel, rests the periphery of a smaller wheel *c*, mounted upon an horizontal axis. It is evident that when *a b* is caused to rotate upon its axis, the smaller wheel *c* must also revolve upon its axis with a velocity proportionate to the difference between its diameter and that of the circular path traced by it upon the face of *a b*, although its motion must be attended with some rubbing friction. If the axis of *c* be so mounted as to have the power of motion in the direction of its length, the wheel *c* may be made to revolve with various degrees of velocity by causing it to approach or recede from the axis of *a b*, and thereby to roll upon a smaller or larger circular path. Gregory mentions a kind of spinning-wheel in which motion was imparted to twelve spindles by means of small rollers working upon a large face-wheel, both the peripheries of the rollers and their circular path on the face-wheel being covered with buff leather to increase their hold of each other. For producing a similar change of motion in cases where simple contact would have proved inefficient, millwrights formerly employed a face-wheel with teeth placed in a direction parallel to the axis, instead of projecting from the periphery like radii, as in *spur-gear*. Such a wheel will work with an ordinary pinion, or with the kind of pinion known as a *trundle* [Wheels, Teeth of]; but the arrangement is very inferior to that of bevilling the peripheries of the wheel and pinion, so as to form them into cones rolling upon each other, and forming teeth upon their conical faces. A full

Fig. 8.



explanation of the principle of bevil-gear is given in the next article, and therefore it is sufficient here to observe that, by adopting various forms of cone, the faces of two wheels working together may be made to form any angle with each other, so that rotatory motion may be communicated in any required direction. In ordinary bevil-gear, whatever be the angle formed by the axes of a pair of wheels which work into each other, their mutual position is such, that they both lie in one plane, and that, if continued, they would meet in the same point as the apices of the imaginary cones of which the forms of the wheels are determined; but even where it is required to connect two axes lying in different planes, and so inclined to each other as not to meet in any point, rotatory motion may be imparted from one to the other by means of *skew-bevils*, the teeth of which cross the bevilled faces in a diagonal direction.

If it be required to communicate rotatory motion in one and the same direction, from one shaft or axis to another lying very near to it, either parallel with it or inclined at an acute angle, the object may be effected by means of an *annular wheel*, or a wheel with a projecting rim, toothed internally, and an internal pinion. *Fig.* 9 represents such a wheel and pinion for working two parallel axes; and *Fig.* 10 is a side-view of a similar arrangement with inclined axes and bevilled wheels.

Fig. 9.

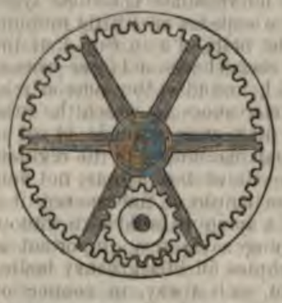
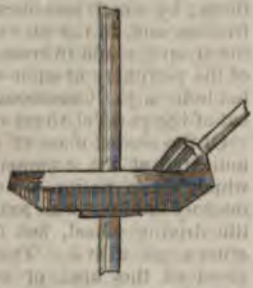


Fig. 10.



Toothed-gear is very conveniently applied, in certain cases, in lieu of a system of straps and drums, for communicating motion from a steam-engine or other prime mover to machines situated on various floors of a building, or to a series of machines arranged upon the same floor. Bevil-gear affords the best mode of accomplishing this object, as one long shaft, either vertical or horizontal, may carry several bevil-wheels, from which motion may be imparted to other shafts, radiating in various directions.

Fig. 11.

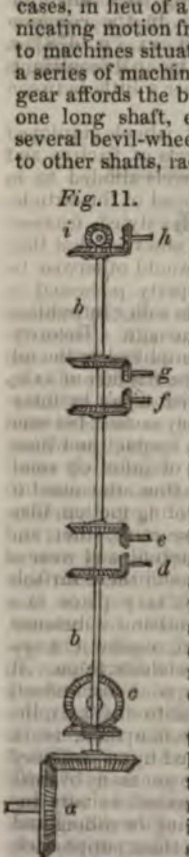


Fig. 11 is an example of such gearing as is employed in cotton-mills, everything beyond the actual wheels and shafts being omitted, for the sake of distinctness. *a* is a large bevil-wheel mounted on the main shaft of the steam-engine, and turning the large bevil-wheel at the bottom of the upright shaft *b b*, which rises through several floors of the factory, and carries several bevil-wheels of smaller diameter, which impart motion to the wheels and shafts *c*, *d*, *e*, *f*, *g*, *h*, and *i*, in the different stories of the building.

Occasionally, but rarely, straps or bands are used to communicate motion between wheels lying in different planes, and forming various angles with each other. Some kinds of potter's wheel are thus driven, the wheel to which power is applied being vertical, that it may be conveniently worked by a boy, while the revolving platform to which motion is communicated by the strap is horizontal.

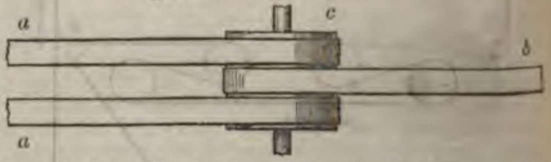
When it is desired to communicate rotatory motion to a wheel from a shaft lying in contact with, and forming a tangent to, its periphery, a connection may be formed by converting the shaft into what is commonly called an endless screw, and cutting the periphery of the wheel into teeth to fit it. By this means the wheel will be moved one tooth, and one tooth only, for each revolution of the screw.

To convert rotatory motion into rectilinear, or *vice versâ*, various forms of the rack and pinion are used. In its simplest form this contrivance is applied in raising sluice-gates, in lifting-jacks and various other machines in which a fixed pinion or small toothed wheel is made to give motion to a straight toothed bar capable of moving in the direction of its length. The same apparatus will convert rectilinear into rotatory motion by applying the power to the rack, or straight bar, instead of to the wheel. In Applegath and Cowper's printing-machine, represented under PRINTING-MACHINE, vol. xix., p. 19, an ingenious modification of the rack and pinion is employed to give the required alternating rectilinear motion to the table which carries the forms of type and the inking-tables. In this admirable contrivance the power is applied, by a pinion lying horizontally under the centre of the machine, to a rack consisting of a flat bar of iron, rounded at both ends, and toothed all round, at both sides and ends. This double rack, or, as it might be termed, long elliptic wheel, is not immediately attached to the traversing table, but is connected with it through the medium of a jointed parallel motion, which so varies its position as the table moves backwards and forwards, as to present every part of its toothed edge to the driving wheel or pinion in succession. Thus, although the pinion revolves constantly in one and the same direction, the rack moves longitudinally from right to left so long as one of its straight sides is presented to the pinion: it ceases to have any longitudinal motion, but has a transverse or lateral motion while its right end is passing the pinion, after which, its second straight side being brought in contact with the opposite side of the pinion, it receives a longitudinal motion from left to right, until, after the left end has passed the pinion, its first straight side is again brought in contact with the first side of the pinion, and it receives again a motion from right to left.

Somewhat akin to the above is the beautiful contrivance of Watt, called the sun-and-planet wheel, intended as a substitute for the crank in converting the alternating motion of the beam of a steam-engine into a rotatory motion. In this apparatus a toothed wheel is fixed upon the axis to be turned, and another, gearing with it, is attached to the lower end of a rod descending from the end of a beam, in such a way that it cannot revolve upon its own axis. The axes of the two wheels are so connected together that they cannot fall out of gear, and the result of this arrangement is that the second or planet wheel passes completely round the first during each up and down stroke of the engine, and, in so doing, causes the first, or sun-wheel, to rotate upon its axis.

Where an alternating rectilinear motion is to be obtained from a wheel or drum which can be made to revolve alternately in either direction, the object may be readily attained by the use of straps, as in the common printing-press, the carriage of which is moved by means of straps arranged according to the subjoined diagram, *Fig.* 12. The straps *a a* and *b* are attached at one end to the under side of the carriage, and at the other to the drum-wheel *c*; and when that wheel is turned from left to right, by means of a winch-handle fixed upon its axis, the straps *a a* will be wound round its periphery, and consequently the carriage will be moved in the direction of *a b*; while, by turning the drum in the contrary direction, the straps *a a* will be slackened, and *b* will be wound round the drum, thereby drawing the carriage in the direction *b a*. This, as well as the other illustrations in the present article, must be considered merely as one of an extensive class of mechanical arrangements.

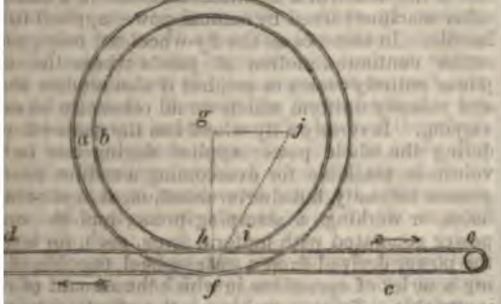
Fig. 12.



In the year 1833 much attention was attracted by a plan patented by Mr. Saxton for obtaining very rapid motion from a rope moved with great power, but moderate velocity, by means of what he styled 'differential pulleys.'

roposed to apply this ingenious apparatus to the ropulsion of carriages upon railways, employing vorking at their most advantageous pace of about per hour, as the prime movers of the machinery. g to Hebert's 'Engineer's and Mechanic's Ency-a,' vol. ii., pp. 563-566, and to the scientific pe- of the time, for a fuller account, we subjoin, from e work, a diagram illustrative of the principle of posed apparatus, which might be advantageously under various circumstances in which it is desirable a rapid motion from a slow one. *a* and *b*, *Fig.* wo pulleys mounted upon one axis, to which is at-he carriage or load to be propelled, and these pulleys pnnected together that they must revolve with each *d* is an endless rope, passing over the small fixed *e e*, which may be supposed to be a considerable apart, and passing also completely round the peri-of the differential pulleys *a* and *b*, the part of the rked *c* passing round the pulley *a*, and that marked the pulley *b*. If the part of the rope marked *d* d, by any adequate power applied to it, in the di-

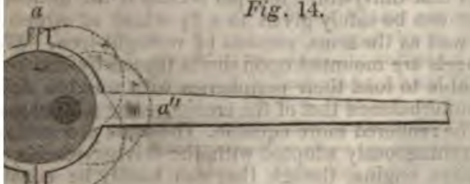
Fig. 13.



of the upper arrow, it will draw the pulley *b* in the ection; but while it does so the part *c* of the end- will be moving in the contrary direction, as indi- the lower arrow, pulling the lower part of the heel or pulley *a* with it. The result of these con-ces will be that the differential pulleys will move point *f* as a fulcrum, and that while the point *h* forward to *i*, the axis of the pulleys will be com-o traverse the longer distance from *g* to *j*. By cting the pulleys *a* and *b*, and allowing them to independently of each other, the propulsion of the and of a carriage or other load attached to it, will thout stopping the motion of the rope.

endless variety of excentric and other wheels for g rectilinear or irregular motion from a revolving or producing uniform rotation from an intermittent ry few can be even alluded to. An excentric one which, whatever be the figure of its periphery, xis removed from the centre. *Fig*. 14 represents le form in which the excentric is applied to the of valves in a steam-engine, or to various other ns in which an alternating movement backwards ards is required to take place for every revolution ft. The small dark circle represents the shaft or ich is supposed to be fixed, and the large circle

Fig. 14.



with a lighter tint is the excentric itself, which is d to the shaft as to revolve with it. This is sur- by a hoop, so fitted to it as to allow the excentric ound within it, and to the hoop is attached the bar or rod which connects the excentric with the other mechanism to be worked by it. The dotted ow some of the positions assumed by the excentric olves upon its axis, and the points a', a'', a''' in-e positions successively occupied by the part of ntric marked *a*, which is the part farthest from its he distance from *a* to a'' marks the extreme length of the longitudinal movement of the rod attached to the excentric. For some purposes the periphery of the excentric is not surrounded by a hoop, but acts immediately upon the tail of a lever, or some other part of the machine, which may be provided with a friction-roller to facilitate the motion. Excentrics of the latter kind are not necessarily circular, but may have any figure that can be required for modifying the motion of the apparatus affected by them. A heart-shaped excentric of this character is represented under THREAD, vol. xxiv., p. 401, and many of similar forms are used in winding and spinning-machinery. Elliptical wheels, which may be used either plain or toothed, may be compared in their action to double excentrics, or to two excentrics working together, inasmuch as they may be made to produce two rectilinear motions in each direction for every revolution of the shaft, whereas an ordinary excentric produces but one. In silk-twisting machinery a peculiar kind of motion is produced by the use of two elliptical toothed wheels, so geared into each other that the long axis of the one is opposed to the short axis of the other: so that while the axes or shafts upon which they are fixed are always at the same distance apart, the toothed peripheries of the wheels, notwithstanding their elliptical figure, are always in contact. By this ingenious arrangement the relative velocities of the two wheels are continually passing through a series of changes, which assist in the proper disposition of the thread upon bobbins.

The escapement-wheels of clocks and watches, of which several varieties are given under HOROLOGY, furnish types of another important class of wheels for modifying motion; and snail-wheels (such as that marked *a* in *Fig*. 2 of the above article), pin-wheels, ratchet-wheels, and fusee-wheels, of all of which examples will be found in the same article, are among the ingenious contrivances by which the rotatory motion of a wheel and axle may be made to set in motion a train of complicated machinery, or to regulate and vary motion at pleasure. Ratchet-wheels are not only important when, as in the mechanism of time-pieces, it is desirable to move one part of a machine backwards without affecting the rest, but they are also very important in cranes, jacks, and other machines for lifting heavy bodies, in which they are applied in such a way, in connection with clicks moved either by springs or by their own weight, as to prevent the machine from running back when the moving-power is suspended for a time. In the common reciprocating saw-mill [SAW-MILL, vol. xx., p. 478], a ratchet-wheel, driven by a pall worked by an excentric, is employed for moving the balks of timber a little between each stroke of the saws.

We now come to the consideration of wheels employed for the purpose of diminishing the effects of friction and inertia, such being the third class of wheels alluded to in the arbitrary division laid down at the head of this article. Of what are commonly, but incorrectly, styled friction-wheels and rollers, generally, it may be observed that they diminish resistance by converting what would otherwise be a rubbing into a rolling contact, a property possessed in common by the various kinds of friction-roller introduced in machinery and by the wheels of a carriage. Theoretically speaking, the same principle is exemplified in the use of oil and grease applied to diminish the friction of axles and bearings, since they effect the desired object by interposing the round particles of which they consist between surfaces which would otherwise come in contact, and these rounded particles act as friction-rollers of infinitely small diameter. When the surfaces of two bodies are caused to pass over each other with a rubbing or sliding motion, their inequalities necessarily meet and oppose each other, and thereby cause resistance to the sliding motion, and wear of the opposed surfaces; and however smooth these surfaces may be, such resistance and wear will take place in a greater or less degree, unless some lubricating substance, or if the roughness of the surfaces should require it, a system of rollers or wheels, be applied between them. In rolling contact such destructive attrition is almost entirely obviated, because, instead of the inequalities of the roller being dragged against those of the surface upon which it rolls, they are successively, as it were, laid upon and lifted up from them. Friction-rollers, which are generally of small diameter, are not necessarily fixed upon axles or shafts, but are interposed bodily between the rubbing or sliding surfaces, which press upon opposite sides of their peripheries; and they may be employed to alleviate friction between concentric circular surfaces, such as those of the axle and nave of a wheel, as well as between flat surfaces. In some arrangements of mechanism friction-rollers, acting as above described, are provided with small axles which do not bear any important strain, but are used chiefly, if not entirely, for the purpose of keeping the rollers in their proper place. Such axles do not affect the propriety of the name friction-*rollers*, which may perhaps be correctly applied in all cases where the bodies between which the rollers are interposed press upon their peripheries in opposite directions. The wheels of an ordinary carriage, and various contrivances which may be properly styled friction-*wheels*, differ materially from the above in this mode of action. They do not entirely destroy rubbing or sliding friction, but remove its action to a smaller and smoother surface. Thus, in comparing the action of a wheel-carriage with that of a sledge, it will be seen that the extent of the rubbing motion is diminished in proportion to the difference between the circumference of the wheel and that of its axle, while the amount of resistance is further diminished by substituting smooth surfaces of metal, which may be lubricated with oil or grease, for the rougher surfaces of the road and those parts of the sledge which lie in immediate contact with it. When friction-rollers are employed to diminish the friction of a shaft or axle in its bearings, six of them may be arranged at equal distances round it, with the addition of some contrivance for keeping them in their proper relative positions. When applied to ease friction at the bottom end, or step, of a vertical shaft, the rollers, as well as the surfaces between which they are applied, must be conical. In well-finished machinery friction-rollers of this character may sometimes be applied with advantage; but the extremely accurate workmanship which they require, and their liability to get out of order, prevents their very general adoption. When they are used it is desirable to have them of hardened steel, and to have the whole apparatus so boxed in as to preclude the entrance of dust. In some cases the friction of axles or shafts is diminished by the use of friction-wheels, which act in a similar way to the wheels of a carriage, but more by diminishing the velocity and the extent of the rubbing surface than by the substitution of smooth for rough surfaces. A sufficient illustration of this use of friction-wheels is given in the article ATTWOOD, vol. iii., p. 71, in the machine contrived by him for measuring accelerated motion, where the axle of a pulley, instead of resting in ordinary bearings, rests upon the peripheries of a series of wheels, the axles of which of course revolve with greatly diminished velocity. Various plans have been tried for applying friction-rollers and friction-wheels to wheel-carriages, especially to such as are used upon railways, to diminish their axle-friction; but while experiments made on a small scale, with accurately formed models, may indicate an important advantage from such mechanism, the writer is not aware that any plan of either kind has been found sufficiently advantageous on a large scale to counterbalance the expense. A very serious objection to the use of large friction-wheels for this purpose is the difficulty of arranging them so as not to interfere with the action of the springs. It should be remembered that axle-friction forms but a very small part of the total resistance to the rapid motion of railway carriages, and therefore that a contrivance which would diminish it one-half, or even more, may be productive of very little saving upon the aggregate amount of resistance to be overcome. A singular contrivance for facilitating the passage of carriages over very uneven ground was patented in 1821 by Mr. Barry, in which it was proposed to dispense entirely with wheels of the ordinary kind, and to substitute for them a series of friction-rollers interposed between the rough surface of the road and smooth bars fixed under the body of the carriage. The action of these rollers resembles that of the rollers employed by quarry-men and masons in moving large blocks of stone; and one of the peculiar features of the contrivance is the connection of the rollers with an endless chain, which not only keeps them at uniform distances from each other, but lifts from the ground those over which the carriage has rolled, and conducts them again to its forward extremity, so as to produce a constant succession of rollers without the inconvenience of having to move them by hand. Of this and several schemes of similar character full particulars are given in Hebert's 'Engineer's and Me- [illegible] cyclopædia,' art. 'Railway.'

Wheels introduced into machinery for the purpose of overcoming inertia, or of rendering uniform and steady a motion derived from an intermittent or variable source, are called *fly-wheels*. Since they owe their effect to their weight, fly-wheels are usually heavy, and as much as possible of their weight is disposed in the rim, where, owing to the effect of centrifugal force, it is of far more value than when near the centre. One of the simplest illustrations of a fly-wheel is that used in a common lathe, by the action of which a power applied by the foot during less than half of the revolution of the crank is distributed over a whole revolution so completely, that after a few strokes of the treadle the machine is brought into a state of uniform and rapid rotation, notwithstanding the intermittent character of the power applied by the foot. In a steam-engine the fly-wheel is applied in like way, with this difference, that the crank is impelled upwards as well as downwards by the power of the piston; so that, as far as the motion of the engine itself is concerned, the impetus of the fly-wheel is only required to carry the crank past the 'dead points,' or those at which it would remain unaffected by either an upward or a downward impulse. Similar to this is the action of a fly-wheel attached to a coffee-mill or other machine turned by manual power applied to a winch-handle. In these cases the fly-wheel not only produces, or rather continues, motion at points where the impelling power entirely ceases to act, but it also renders that power and velocity uniform which would otherwise be constantly varying. Inversely a fly-wheel has the same effect in rendering the whole power applied during one or more revolutions available for overcoming a sudden resistance of greater intensity, but shorter duration, as in punching rivet-holes or working a stamping-press; and in rendering a power generated with uniform force, such, for example, as the power derived from a water-wheel, capable of performing a series of operations in which the amount of resistance is variable. So remarkable are the effects thus produced, that a fly-wheel will often in effect greatly increase the power of an engine to which it is applied, by affording the means of accumulating the power generated during several strokes, and giving it back at once when required to meet an extraordinary strain. Where the velocity of a fly-wheel fixed immediately upon the crank-axis of a steam-engine would be insufficient, the fly may be mounted on a separate axis and driven by the intervention of spur-gear to increase the velocity. Fly-wheels may under some circumstances either receive or impart motion by means of cogs or a strap attached to their periphery; but the more usual arrangement is to drive them by power applied to the shafts upon which they are fixed, and to form their rims solely with a view to the requisite weight and strength, and to passing through the air with the least possible resistance. In most cases the rim is rectangular in section, but sometimes it is made oval, with a view to parting the air more readily. Great strength of structure, to resist the tendency to fly in pieces, is the most important point in the construction of fly-wheels. They are very commonly made of cast-iron, and for that material a velocity of eight feet per second may be very safely applied. Tredgold states that if a velocity exceeding twelve feet per second be required, the arms of the wheel should be of wrought-iron; and that thirty-three feet per second is the utmost velocity that can be safely given to a fly-wheel of which the rim, as well as the arms, consists of wrought-iron. Where fly-wheels are mounted upon shafts turned by cranks, it is advisable to load their peripheries with weights sufficient to counterbalance that of the cranks, as the motion may thereby be rendered more equable. The same precaution may be advantageously adopted with the driving-wheels of a locomotive engine, though they can hardly be considered as fly-wheels, the inertia of the whole machine when once it is set in motion answering the purpose of a fly. In steam-vessels the weight of the paddle-wheels renders the use of a fly-wheel unnecessary.

In roasting-jacks, musical-boxes, the striking-apparatus of clocks, and various other contrivances in which a retarding force is required to prevent the moving power of a spring or weight from running down too rapidly, wheels with projecting vanes, which encounter sufficient resistance from the air to moderate their velocity, are used under the name of *flys* or *flyers*.

Construction of Wheels.—The simplest form of wheel that can be used for any purpose is that of a plain circular disc, such as might be procured by a transverse section of the trunk of a tree of tolerably regular form. Adams, in his work on 'English Pleasure Carriages,' gives a representation of a rude car with wheels of this kind, which is used for agricultural purposes in Chile. Solid wooden wheels are still occasionally used in machinery, but if large they are usually formed of two or three thicknesses of planking fastened together, with the grain crossing in various directions. Wooden wheels for millwork, when not required to be solid, usually have the periphery formed of segments, the inner sides or edges of which are left straight. The periphery may consist of three thicknesses of planking, each composed of six or eight such segments; and if the three thicknesses are properly break-jointed, a wheel of considerable strength may be thus produced. The arms or radii of the wheel are fitted to the inner or straight sides of the segments by bolting or other modes of fastening. Wooden wheels are occasionally morticed into their shafts or axes; but a preferable plan is to use four arms, arranged in two pairs crossing at right angles and halved into each other in the centre, where their intersection leaves a square opening for the shaft. This opening should be somewhat larger than the shaft itself, and the difference of size should be made up by the insertion of wedges, which afford the means of adjusting the wheel perfectly true upon the axis. In very large wheels, such as water-wheels, two complete sets of clasp arms, one on each side of the wheel, are used. In mounting face-wheels it is not unusual to add stays or braces from the back of the wheel to a point at some distance along the shaft, to resist the tendency of the trundle or pinion to force the wheel out of its true position at right angles with the shaft. Hornbeam s considered to be the best kind of wood for the cogs or teeth of wheels.

In modern machinery cast-iron has almost entirely su-
erseded the use of wood for cog-wheels of every descrip-
on. If they do not exceed eight or ten feet in diameter,
ey may be cast in one piece; but if above that size it is
sirable to form them in two or more parts, because of the
fficulty of cooling a very large casting without unequal
ntraction. Where the diameter does not exceed twelve
fourteen feet, the rim may still be formed in one piece
d the centre and arms in another, the two to be united
bolts; but when those dimensions are exceeded, a
ther subdivision is necessary. The rim may then be
st in three segments, the box or centre in one piece, and
arms in several pieces, each terminating in a rib form-
g half the thickness of an arm, for convenience of bolt-
g together. Large iron wheels are adjusted accurately
their axes by wedges or keys, but small ones may in
ny cases be adjusted by turning the periphery in a lathe
er mounting. When cogs are cast upon a wheel, it is
t unusual to cast them larger than they should be, and
en to reduce them to the proper size, and to a truer
ure than could be obtained by casting, by chipping them
th a cold chisel, and filing; but a serious objection to
is plan is, that it removes the external crust of the iron,
ich forms a kind of natural case-hardening, and so ex-
ses the teeth to rapid wear.

Carriage-wheels are the wheels in which the greatest
genuity of construction is called for, as they are exposed
strains far greater for their size and weight than almost
y others. The peculiar nature of these strains requires
t only that the wheels be made exceedingly strong, but
so that they possess a degree of elasticity sufficient to
able them to bear the violent concussions to which they
e continually exposed, without risk of fracture or with-
t the starting of any of their numerous joints. An ordi-
ry carriage-wheel consists of the *nave*, a cylindrical
ock of wood, usually elm, which forms the centre of the
heel, and which is pierced longitudinally with a hole to
ceive the axle; the *spokes*, which are radiating arms
amed into the nave at equal distances; and the *felloes*,
hich are circular segments framed on to the outer ex-
emities of the spokes, and forming collectively the peri-
hery or rim of the wheel. The external surface of the
lloes is usually protected by a covering of iron, called the
re, which may either be put on in several pieces, or
rakes, the joints of which are made to alternate with
ose of the felloes, or in a single piece, forming a *hoop-*
re. The simplest form in which such a wheel as here
lluded to could be formed would be that in which the
okes would stand at right angles with the axis, and would form a flat or plane figure when the wheel is viewed edgewise; but such a wheel would be ill adapted to meet the lateral shocks to which a carriage-wheel is exposed. The more common form is that called the *dished* wheel, in which the centre or nave is made to fall back a little from the plane of the felloes, so that the face of the wheel is not flat, but slightly concave. The elasticity of this form is a very great recommendation, and it possesses also this great advantage, that if the axle be slightly bent downwards towards its extremity, so as to bring the spokes of the lower half of the wheel into a nearly vertical position, which will enable them to bear the greatest possible weight, the upper half of the wheel will have such an inclination outwards as to leave more room for the body, and to throw particles of dirt, caught up in its revolution, away from it. A further advantage of this arrangement is that such a wheel, mounted as described, is not likely to exert injurious pressure upon the linch-pin or other contrivance for retaining it upon the axle, since the weight of the body tends to keep the wheels upon their axles without any aid from the linch-pins. Very strong wheels are occasionally made in a double-dished form, or with the spokes alternately inclining outwards and inwards from the felloes, so that the centre or nave of the wheel forms the base of a pyramid of which the felloe forms the apex; but such wheels are very deficient in elasticity, and consequently will not bear much concussion. In ordinary dished wheels the spokes are arranged in two sets, being alternately more and less inclined or dished; and in some cases every alternate spoke is set absolutely straight or square with the nave. The dished form of wheel, together with the bending of the axle, involves some increase of axle friction, and also, if the wheel be wide, the use of a conical tire, which cannot possibly roll in a straight line without a degree of rubbing friction most injurious to the road, and which also increases the draught. Some years ago the use of conical wheels for waggons, combined with the inordinate breadth of tire encouraged by injudicious legislation, was carried to a most absurd extent, and broad-wheeled waggons were used which were far better adapted for grinding stones into dust and mud than for the purpose of locomotion. This extravagance however is now seldom seen, and for light carriages, in which the amount of concussion is greater in proportion to the bulk and strength of the wheels than in any others, the use of moderately dished wheels can hardly be said to be attended by any practical inconvenience. The tires of such wheels are often rounded, so as to have an exceedingly narrow bearing upon a firm hard road.

Few mechanical operations of equal complexity, and requiring an equal amount of precision, have received so little aid from machinery as the manufacture of carriage-wheels; but an extensive factory has been recently opened at Pimlico, near London, for making wheels by machinery, and although the nature of the operations is kept strictly secret, they appear to be of a most satisfactory character; the wheels produced being very superior in truth, firmness, and durability to any others. We have been informed, but have no satisfactory proof of the statement, that in addition to the superiority occasioned by the application of machinery to the fitting of the several parts, the wheels produced at these works are put together by pressure only, without the aid of percussion. In ordinary wheels the neatness and strength is increased by the application of a hoop of iron to each end of the nave, to enable it the better to resist the strain of the spokes. The spokes, which are usually formed of oak saplings, are wrought into the proper form after being driven into the nave, and are usually cut to a narrow edge in front to lighten their appearance. Wheels have been made with the periphery in one or two pieces, bent into the required form after being softened by boiling or steaming; but the plan has not been found successful, because, among other disadvantages, the wood is injured by the long boiling required. In ordinary coach-wheels, from 4 feet 3 inches to 4 feet 8 inches high, there are 14 spokes; and in fore-wheels, which are about a foot lower, there are commonly 12 spokes; and the usual arrangement is to have half as many felloes as there are spokes. The felloes are dowelled together, and are further secured by inserting wedges in the ends of the spokes, and by the iron tire. The introduction of solid or hoop tires is an immense improvement upon the former system of wheel-making, as it affords the means of binding the whole of the wheel together with irresistible force. The tire is made very hot, and the wheel is made of such a size as only just to receive it when it is thus expanded; but so soon as the hoop is brought into its proper place, water is thrown upon the wheel to cool the tire, and to prevent the wood-work from catching fire, and the result of the sudden contraction of the hoop is to compress the felloes, and to force each spoke into a slightly curved form, so that when complete the wheel forms a flat dome-shaped figure, admirably adapted, by its combined strength and elasticity, for the purpose for which it is designed. The tire is further secured, after cooling, by a few pins driven through it and the felloes, and riveted inside the latter.

While the importance of a certain degree of elasticity in wheels cannot be too much insisted on, it is an error to suppose that any advantage can arise from placing the springs of the carriage in the wheels, as several ingenious inventors have proposed. On this point see SPRING-CARRIAGE, vol. xxii., p. 388.

Having found during his experiments on steam locomotion upon common roads, that wheels of the ordinary construction were not strong enough for his purpose, Mr. Hancock contrived and patented a wheel in which the nave is abandoned altogether, and the inner ends of the spokes are formed into wedges which abut against each other, and form a kind of arch surrounding the axle-box. They are firmly secured in their places by an iron plate on each side of the wheel, and a bolt passing through each spoke. Though too rigid for very rapid motion, this wheel is exceedingly strong, and its simplicity of construction forms a great recommendation.

The rapid motion of railway carriages, coupled with their great weight, so greatly increases the effect of such concussions as must occur on even the smoothest road, that wooden wheels have been found utterly unsuitable for them. Cast-iron wheels have been much used on colliery railways, and in some cases where rapid motion is required; but while they may be made abundantly strong, as far as direct pressure is concerned, their brittleness renders them very unsuitable for passenger carriages. Many ingenious plans for the combination of wrought-iron and cast-iron in the same wheel have been devised; but while some of these have been brought into operation, wheels entirely composed of wrought-iron have been by far the most generally adopted. The facility with which that material may be worked into any form has led to an endless variety of plans, some of which are highly ingenious, for combining the requisite degree of strength and elasticity. In some wheels the annular space between the central boss or nave and the rim is filled up by a series of elliptical loops, formed of thin bars of iron, abutting against each other; in others there are spokes, but instead of consisting of single rigid bars, each consists of two halves, having a slight degree of curvature. By these and similar contrivances elasticity is insured without dishing the wheels, which would, for railway carriages, be inconvenient. In some cases a portion of the annular space above described is filled with segmental blocks of wood, resembling the felloes of a common wheel; but while this arrangement claims some advantages, its appearance is very inferior to that of the light and often truly elegant wheels formed entirely of wrought-iron. One kind of iron wheel which claims special notice is that patented by Mr. Theodore Jones, which has been used on common roads, as well as, to a limited extent, upon railways. These wheels may be compared to double-dished wheels in general appearance, but their principle is very different. They consist of an iron rim pierced at intervals with conical holes, the largest apertures of which are on the outside; two sets of round rods or spokes, with pyramidal heads to fit in the conical holes of the rim, the two sets radiating or inclining alternately inwards and outwards, like the spokes of a double-dished wheel; and a cast-iron nave, which is formed hollow, with holes to receive the inner ends of the spokes, which are secured by nuts screwed on to them within the nave. The peculiarity of this construction is, that instead of the weight resting almost entirely, as in a common wheel, upon those spokes which happen to be below the nave, it is as it were suspended by means of the rods or spokes which are above the nave, from the top of the wheel, the rim of which is considered as an inflexible arch. On this account the wheels are called *suspension-wheels;* and as the strength of wrought-iron to resist tension is far greater than its strength to resist compression, a wheel on this principle may be made to bear a much greater load in proportion to its bulk and weight, than any other. For heavy carriages it is, notwithstanding its extremely light appearance, very suitable; but as the principle of tension precludes the existence of much elasticity, it is not so suitable for carriages running at a rapid speed.

(Buchanan's *Practical Essays on Mill-work and other Machinery;* Barlow's *Treatise on Machinery and Manufactures*, in the *Encyclopædia Metropolitana;* Gregory's *Treatise of Mechanics*; Willis's *Principles of Mechanism;* Adams's *English Pleasure-Carriages;* Hebert's *Engineer's and Mechanic's Encyclopædia*, &c. &c.)

WHEELS, TEETH OF. The parts of a wheel between notches cut in its circumference, or the pegs inserted in its surface, for the purpose of enabling it to be turned on its axis by the rotation of another wheel having similar projections, are called the cogs or teeth of the wheel; and the determination of the form which their acting surfaces should have, in order that the rotation may be as steady and as uniform as possible, is a subject of considerable importance in practical mechanics. It is not known what kind of teeth the Greeks or Romans employed in the construction of their machinery. Vitruvius, speaking of the hydraulæ, or water-mills, for grinding corn, mentions (lib. x., cap. 10) that on the axle of the water-wheel, consequently in a vertical position, is a toothed-wheel (tympanum dentatum), and adjoining this a larger wheel, also toothed, in a horizontal position. On the axle of the latter was fixed the millstone, and this was turned with the horizontal wheel, which was impelled by the teeth of the former; but neither in this place nor in the fourteenth chapter, where he describes a chariot, said to be a contrivance of the antients, in which was an apparatus for measuring the distances travelled, does he give any indication of the manner in which the teeth were formed.

Wheels sometimes are now made to turn each other by means of straps or chains passing over their circumferences; in which case the mere friction of the materials enables them to act without sliding; but in general, the circumferences are cut so as to form teeth which press against each other as at the extremity of a lever. It is very probable that the earliest teeth were short cylindrical pegs placed on the circumference of a wheel, and were made to work in teeth similarly formed on a circumference of a second wheel: when the teeth of one wheel were in the direction of its radii, and those of the other were fixed perpendicular to the plane of the latter wheel, the two wheels would revolve in the same plane, or in two parallel planes; and if the teeth of both were perpendicular to the planes of the wheels, it is evident that the wheels might revolve on axes at right angles to each other. This construction is even at present in use for some kinds of machinery; occasionally also the teeth consist of small blocks of wood let into the circumference, or the face of the wheel, and having the edges cut off diagonally, so that each block has the form of half an octagonal prism. A small wheel having cylindrical staves, or spindles, fixed between two circular boards or plates of metal, in positions parallel to the axis of rotation is called a lantern-wheel: and when a wheel acts with one which is smaller in diameter, whatever be the form of the teeth, the latter is usually called a pinion. Wheels having the teeth formed on their circumferences so as to project from thence in the direction of the radii are called spur-wheels: but when the teeth are perpendicular to the plane of the wheel, the latter is called a crown or contrate wheel. If the teeth are cut on the circumference of a wheel, in a direction oblique to its plane, the wheel is said to be bevilled; and two wheels may have their teeth so bevilled as to revolve in planes making any angles with one another.

The least attention to the manner in which the teeth on the circumferences of two wheels act against each other, must make it evident that by giving a certain curvature to the acting faces of the teeth some advantages would be gained in respect of the steadiness of the rotation; and La Hire, in his 'Traité des Epicycloïdes,' mentions that he had seen at a place near Paris a machine executed with curved teeth by a person named Desargues, but the nature of the curve which was employed is not explained. Montucla offers a conjecture that the Danish astronomer Römer was the first who made the remark that the epicycloidal form is the most proper for the acting faces of the teeth of wheels, and he states that such a remark occurs in a memoir which was read at a sitting of the Académie, in 1675. This conjecture is supported by a passage in the works of Wolfius (tom. i., p. 684), and by the evidence of Leibnitz, in the 'Commercium Philosophicum,' tom. ii., p. 178: the latter observes that while he resided at Paris the merit of the discovery was ascribed to Römer. La Hire however asserts, in the work above mentioned, that he had discovered this property of the epicycloid in 1674, and had communicated it to several mathematicians.

Besides a uniformity of action which the teeth of wheels should exert upon one another, their figure should be as little as possible liable to derangement; they should consequently be made of metal rather than wood. It has been thought however that in the larger kinds of machines the action is more gentle if the teeth of one wheel are made of hard wood, and those of the other of cast-iron; both the wheels being of the latter metal. The irregular shocks to which a toothed wheel badly constructed is liable, are the causes that a considerable part of the moving power on a machine is lost, and this evil is diminished by having the teeth in each wheel as numerous as possible; the number will however depend on the magnitude which each tooth must necessarily have in order that it may possess the requisite strength. When a wheel drives or gives a rotatory motion to a pinion, the ratio between the radii of both will depend upon the power or the velocity which may be required; but the disposition of the wheel and pinion should be such that the resultant of the pressures which they mutually exert against each other is the least possible; and the form of the teeth should be such that the moving power at the circumference of the wheel may bear a constant ratio to the resistance at the circumference of the pinion.

When a wheel is employed to drive a pinion, the pressure on the pivots of its axle is the resultant of the weight of the wheel and whatever is attached to it, the pressure of the moving power applied at its circumference, and the pressure of the teeth of the wheel against those of the pinion: it is evident therefore that if the pinion is placed on the same side of the axle of the wheel as the moving power, the latter acting vertically, and if the axles of both wheel and pinion are in the same horizontal plane, the resultant of the three forces will be the least possible: for it will be equal to the weights of the wheel together with the difference between the downward pressure of the power and the upward re-action of the teeth of the pinion against those of the wheel at the place of contact. But if the pinion and the moving power are on opposite sides of the axle of the wheel, the pressure upon this axle will be the greatest possible; for it will be equal to the weight of the wheel together with the sum of the moving power and the re-action of the teeth of the pinion, all of which in this case act downwards. The pressure on the supports of the axle of the wheel will be less when the wheel and pinion are in the same plane, than when they are perpendicular or inclined to each other; for in the first case the pressures are perpendicular to the axis, but in the other the obliquity of the action produces a considerable strain on the wheel: and when the same wheel drives two pinions, the most favourable positions for these last are those in which their axes are in the same plane as the axis of the wheel. When however the latter axis has a great burthen to support, it may be advantageous to dispose both the pinions on one side of a vertical line drawn through the axle of the wheel; for then the re-action of the pinions upwards will tend to diminish the pressure on the supports of the axle.

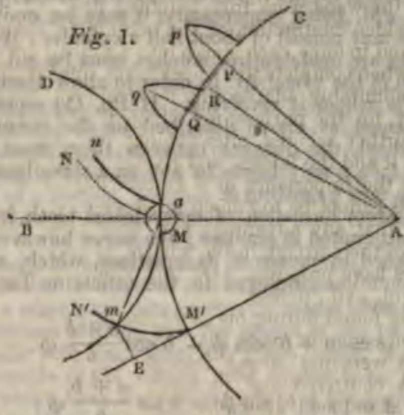
The ratio between the circumferences, or the radii, of two circles which are to act upon each other like a wheel and pinion, is known from the power, or velocity, which is to be obtained: the distance between the centres of the two circles is also given. Therefore if a line as AB be drawn joining the centres, this line may be divided in M so that AM shall have to BM the given ratio. The circles whose radii are AM and BM are called the *pitch* or *primitive* circles; and by these the places and forms of the teeth are determined.

If the number of teeth for a wheel or pinion is given, and also the distance PQ between their middle points, supposed to be measured as a chord of the primitive circle, the radius of that circle may be found; for if n be the number of teeth, $\frac{360°}{2n}$ or $\frac{180°}{n}$ will give the angle PAR subtended by half that chord, and, by trigonometry,

$$\text{rad.}\ (=1) : \text{cosec.}\ \frac{180°}{n} :: \text{PR} : \text{AP},$$

and AP is the required radius of the primitive circle.

Fig. 1.



When it is required to produce a considerable angular velocity with the smallest quantity of wheel-work, the diameter of each wheel should be three or four times as great as that of the pinion on which it acts, and a pinion should have not less than six or eight teeth. It is recommended also that the number of teeth in a wheel be not an exact multiple of the number in the pinion; since then each tooth of the wheel will act successively on different teeth of the pinion, and thus the latter teeth will be less worn than if the same teeth were constantly met in each revolution.

One of the most simple ways in which a wheel may impel another is that in which the teeth of the first wheel work between the cylindrical staves of a lantern; and it may be easily shown that, in this case, an epicycloidal form is the most advantageous for the acting faces of the teeth. For let A in the above figure be the centre of the first wheel and B the centre of the lantern; also let AM and BM be the radii of the primitive wheels, or of such as would be constructed to produce the required power if one of the wheels moved the other by means of a strap passing over their circumferences, or by the friction of their circumferences at the point of contact. Then, if the diameters of the staves in the lantern are supposed to be infinitely small, and if MN represent a side of a tooth coming first in contact with such a stave at M in the line AB; by the motion of the wheel in the direction CM the arc MN will be brought into the position M′N′, for example, when the lantern being turned about B in the direction DM, the stave at M is impelled forward to some point m, so situated that the circular arcs MM′ and Mm are equal to one another. Let now the arc M′m be such as would have been described by the point m if the circle BD had rolled on the circumference of AC from the time that m was in contact with M′ till the centre B came to the position which it has in the figure; then it is evident that M′m or MN will be a portion of an epicycloid, of which BD is the epicycle, or generating circle, and AC the deferent [TROCHOIDAL CURVES], and it is a property of such curve that a normal to it at m (any intersection of the generating circle with the curve) will pass through the point of contact M of the two circles, and a straight line Mm will be the radius of curvature for the point m. Hence if one face of a tooth on the wheel AC have the form of such epicycloid, the pressure exerted on the stave of the lantern will be always in the direction of a line drawn through M and the stave in contact with the tooth: the action of the tooth on the stave is therefore direct, or without any sliding movement; and because the arc Mm is always equal to the arc MM′, the angular motions of the circles will be to one another in the inverse ratio of the circumferences or radii, or the rotation of the pinion will be uniform when that of the wheel is so.

Since the staves in the lantern BD must have a certain radius, as Ma, a curve equal and similar to M′m or MN, and passing through a, will serve for the form of the tooth. Such curve may be traced by dividing the epicycloidal arc MN into any number of equal parts, and from the points of divisions as centres drawing arcs with radii equal to Ma; a line as an touching all those curves will be the required curve. If it be intended that a tooth of the wheel AC should not act upon a stave of the lantern till *a* arrives at M in the line AB, the centre of the stave should be placed so that *a* may be where M is; and then about half the stave, on the right hand of the diameter passing through *a*M, being unnecessary, it may be omitted, and the stave may consist of about half a cylinder: if however the staves are made entire, notches must be cut between the teeth of the wheel AC in order to allow them to pass while the wheel is revolving. If P*p*, Q*q* represent two teeth formed as above described on the circumference of the wheel, the distance between them must be such that the face *p* may begin to act on a stave immediately upon the face *q* quitting it.

The correct formation of epicycloidal teeth is perhaps seldom attempted in practice; the curve however may be easily traced by means of its equations, which, agreeably to the notation employed in the article on TROCHOIDAL CURVES, are

$$x = (a + b)\cos\phi - b\cos\frac{a+b}{b}\phi,$$

and $$y = (a + b)\sin\phi - b\sin\frac{a+b}{b}\phi;$$

where $a = \text{AM}$, $b = \text{BM}$, the angle $\text{M}'\text{AB} = \phi$; and $m\text{E}$ being let fall perpendicularly on AM′ produced, $x = \text{AE}$, $y = \text{E}m$.

If it were required to turn a pinion by the revolution of a wheel, the teeth of both having like forms, and it were also required that the teeth of the wheel should commence acting on those of the pinion at the instant when the point of contact is in a line joining the centres A and B of the wheel and pinion; it may be easily shown that, in order to produce uniform movement, the acting faces of the teeth should have the form of epicycloids. Thus, let AC, BC be the radii of the primitive wheels, and let CD be an epicycle of any convenient magnitude: let also C*m*, C*n* be epicycloidal arcs, the former supposed to be described by the point C in the circle CD, as this circle revolves on the exterior circumference of the deferent circle AC in the direction CE, and the latter by the same point, as the same epicycle revolves in the interior circumference of the circle BF in the direction CF, the line CB being a tangent to both arcs. Again let P and Q, on the circumferences of the circles AC and BC, be two situations of the point *a* in the epicycle, at an instant when the three points are in contact at P; and let P*a*, Q*a* be arcs similar and equal to C*m* and C*n*: these will be described by the point *a* while the epicycle rolls on one circle over the arc PC and on the other over the arc QC. Now it is demonstrated by mathematicians that a normal to an epicycloid at the point where it is cut by the circumference of the generating circle passes through the point at which this circle is in contact with the deferent; therefore the straight line *a*C will be a normal to both the arcs P*a* and Q*a*, or those arcs have the same tangent at the point *a*; that is, the arcs are in contact with each other at every point *a* in which they meet: and since the equal arcs CP, CQ are described in the same time, it is evident that, as in the former case, the wheel and pinion move uniformly.

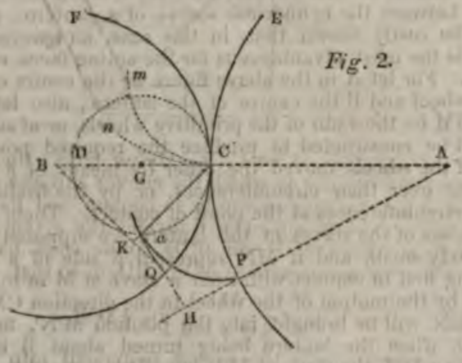


Fig. 2.

A wheel and pinion formed in this manner would be such as is represented in the annexed cut: the point C in in a tooth of the wheel begins to act at the point C′ of a tooth in the pinion; and in moving from C to P the former tooth drives C′ to Q, where these teeth cease to act *on one another*. During this movement the surface C*m* or P*m*′ is in contact with C′*n* or Q*n*′ in one p consequently no friction takes place between th or only that which arises from the imperfect fo the teeth.

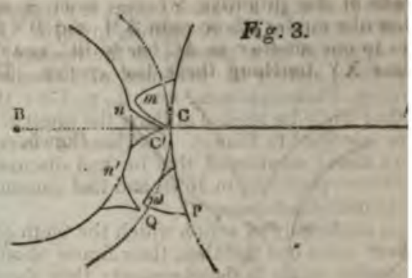


Fig. 3.

The arc C*n* or Q*a* in the preceding figure, o C′*n*, Q*n*′ in the present figure, are called hyp but as the generating circle CD above may magnitude, let CD, its diameter, be equal to CB of the pinion; then the hypocycloidal arc straight lines in the directions of diameters of CB; in which case the teeth of the wheel shoul cycloids described by a generating circle whose is CB, and the acting faces of the teeth of should be planes passing through B, as in the cut.

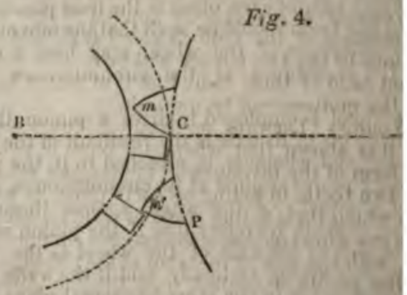


Fig. 4.

The uniformity of action can however only between the faces near the line AB which centres of the wheels; any other teeth which contact at the same time will be subject to smal rities and a certain amount of friction.

If it be intended that the teeth of the wheel s to act on those of the pinion before the point on a tooth arrives at the line AB, and shall when it comes to that line, the reasoning before be applied; it being necessary merely to consi the larger wheel, and AC as the pinion, so th faces of the teeth in the wheel are hypocycloida the corresponding faces of the teeth on the p cycloidal: then Q (*Fig*. 3) must be considered point of contact, and C the point at which the the tooth on P*m*′ or C*m* terminates. The acting the teeth of BC, considered now as the whee planes tending to the axis of that wheel, as in which case the diameter of the generating circle the faces of the teeth on AC are formed must b the radius CB of the larger wheel. The labou formation is much diminished by this dispositi teeth on the wheel and pinion; for the lar contains the greater number of teeth, and these plane faces.

In forming the epicycloidal arc P*a*, *Fig*. 2, from equations, it must be observed that $\text{AC} = a$, CG $= x$, and $\text{H}a = y$. The hypocycloidal arc Q*a* m described by means of its equations, which are th the equations for the epicycloid, except that for *a* be read $a - b$, and the sign of the second term in of x is positive. Here $\text{BQ} = a$, $\text{GC} = b$, the angl ϕ, $\text{BK} = x$, and $\text{K}a = y$.

The involutes of circles which were propose Robison for the form of teeth, have some advant the constructions above mentioned, inasmuch as number of such teeth can be made to act at time, and thus the pressure on each is diminis order to describe these involutes, let A be the the wheel and B that of the pinion; let also AC of the primitive wheels: from A and B as ibe circles whose radii AM and BN have the one another as AC has to BC, and draw the XY touching these last circles. Then if a

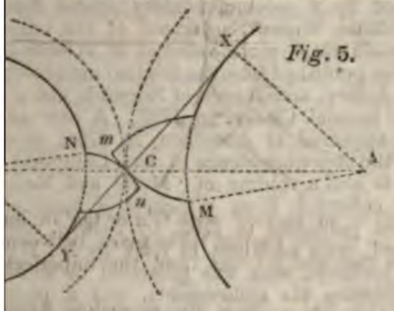


Fig. 5.

coinciding with the circumference of the circle apped so that its extremity M may describe m, and another such line coinciding with the e of the circle BN be unwrapped so that its may describe the curve N*n*; those curves will be the required forms for the acting faces and the faces will be always in contact with in a certain point C in the line XY, which ure of the curve is a common normal to both: of the teeth against each other will always ection of that line (which is a common tangent cles) as if they were applied in that direction ities of the radii AX and BY; and the an- s of the two circles will be to one another in ratio of those radii, that is of AC to BC: con- motions will be uniform.

ng's 'Lectures on Natural Philosophy' (vol. is shown that when the teeth of two wheels m of the involutes of circles, the relative ve- o teeth in acting on each other, or the velo- ich their acting surfaces slide on each other, e wheel moves on the exterior circumference of ith the sine of the sum of the two angular dis- points of contact from the line joining the two circles. If one wheel moves in the con- rence of another, the relative velocities vary of the difference between the angular dis- added, that the mechanical effect of friction e motion of a machine is so much the greater velocity is greater.

the teeth of a wheel AC are made to act on pinion BC before the place of contact arrives ning the centres of the circles, and to con-

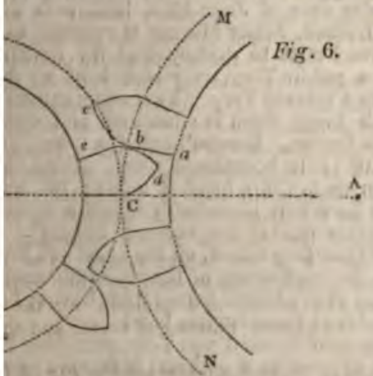


Fig. 6.

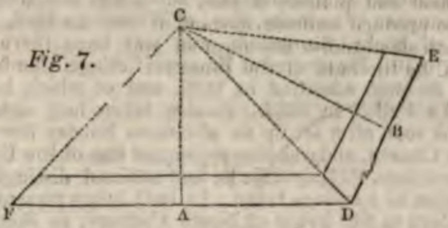
on for some time after that arrival: in this ent, from what has been before said, that *ab* t of a hypocycloid formed by any generating on the concave circumference MN of the el, and *bc* should be part of an epicycloid y generating circle rolling on the convex of the same wheel. The portion *bd* of a inion should be part of an epicycloid formed enerating circle revolving on the convex cir- S of the primitive pinion, and *be* part of a rmed by the second generating circle rolling ve circumference of the same pinion. To r the trouble of forming the face of every tooth with two different curves, La Hire recommends that the parts *ab* and *be* be plane surfaces, as if the diameter of the generating circle for describing the former had been equal to the radius AC, and the diameter for describing the latter had been equal to BC. This is also the construction recommended by Buchanan, in his 'Treatise on Mill-work.'

Since a straight line may be considered as part of the circumference of a circle whose radius is infinite, an epicycloid formed by a generating circle rolling on a straight line becomes a cycloid; and hence it is evident that if a piece of rectilinear rack-work be employed to give motion to a pinion, its teeth should have their acting faces cut in the form of a cycloid, whether the teeth of the pinion be small cylindrical staves, or have plane faces tending to the axis; but in the former case, the radius of the generating circle should be equal to that of the pinion, and in the latter it should be equal to half that radius.

When a wheel is to turn another by means of teeth in the circumferences of both, and the planes of the two wheels are to make with each other any given angle, the acting circumferences of the wheels must evidently be frustums of cones which have a common vertex at the point where the mathematical axes of the wheels would meet if produced. The numbers of revolutions which the two wheels are to make in the same time are supposed to be given; and, by mechanics, the radii of the wheels must be inversely proportional to the numbers of revolutions: therefore these radii are known.

Let A and B be the centres of the wheels, CA and CB the axes of the revolving cones, of which C is the common vertex; and let AD, BD, perpendicular to CA and CB, be the radii of the wheels on their exterior faces; then CD will represent the line in which the convex surfaces of the two cones may be supposed to be in contact, and its position may be determined, since it divides the given angle ACB into two parts ACD and BCD, whose sines have to one another the given ratio of AD to BD, or so that

Fig. 7.



$$\text{sin. } \tfrac{1}{2}\text{ACD} = \frac{\text{AD}}{\text{AD} + \text{DB}} \text{ sin. } \tfrac{1}{2}\text{ACB}.$$

The conical surfaces of the wheels being cut into teeth having directions tending to the point C, the wheels will mutually act upon each other to produce revolution.

For simplicity, let it be supposed that the teeth of the wheel DE are in the form of small conical staves or spindles whose axes and convex surfaces tend to the point C: then if a spindle were supposed to be a mathematical line, the conical surface described by such line in its revolution about CB, from the time that it is in contact with the oblique surface of DF, would be the form to be given to the acting sides of the teeth on the latter surface; and a curve surface of like form imagined to be situated under the surface so described, at a distance from it, at every point, equal to the semidiameter of the conical spindle at that point (the spindle having a given magnitude) will be the required figure of the acting surfaces. The curve line traced by either extremity of the axis of a spindle during the movement is called a spherical epicycloid, being on the surface of an imaginary sphere having C for its centre.

In the formation of some machines a perfectly equable motion is not required; and in such cases the wheels are either divided by the teeth unequally on the circumference, or the axles on which they revolve are placed at certain distances from the mathematical centres of the wheels.

The principal writers on the mathematical principles of the teeth of wheels are, La Hire, 'Traité des Epicycloïdes;' Camus, 'Cours de Mathématique;' and Euler, 'Novi Comment. Petrop.'

WHETSTONE, a smooth flat stone used for *whetting* or sharpening edged instruments by friction. Whetstones, which are sometimes called *hones*, are made of various kinds of hard close-grained stone, and are moistened, when in use, with either oil or water. The latter is preferred by some, for giving a keener edge to cutting instruments; but as it allows closer contact between the stone and the metal, it does not appear so well adapted for producing a very smooth surface. The proper use of a whetstone involves a degree of skill and dexterity which can only be obtained by much practice. To enable those who are inexperienced in the use of a common whetstone to set or sharpen razors, pen-knives, &c. with facility, Mr. Fayrer, of Pentonville, contrived some years since a hone consisting of a flat smooth bar of brass, of convenient length, the ends of which are filed into round pivots, which rest in bearings attached to the mounting of the hone. One side of the bar is made smoother than the other, and in order to use the hone, the roughest side is first turned uppermost and smeared with a little oil and powdered oil-stone. The razor or other instrument is then applied as to an ordinary whetstone; but as the bar which forms a substitute for the stone is pivoted, it will apply itself accurately to the face of the instrument, although that may not be properly held. After a few strokes on the rough side, the bar is turned over, and the operation repeated upon the smoother side, with finer powder of either the same kind of stone or of that known as water of Ayr stone. As the whetting proceeds, the powder becomes finer and finer, and therefore tends gradually to increase the fineness of the edge. For convenience, the mounting of the hone is provided with two small boxes to contain a supply of powdered stone.

WHEY. [CHEESE.]

WHICHCOTE, BENJAMIN, D.D., was the sixth son of Christopher Whichcote, Esq., of Whichcote Hall, in the parish of Stoke, Shropshire, and was born there 11th March, 1610. He studied at Emanuel College, Cambridge, where he was admitted in 1626, and of which he was elected a Fellow in 1633. Having taken holy orders in 1636, he soon after set up an afternoon Sunday lecture in Trinity Church, and was also appointed one of the University preachers. Meanwhile he had attained distinguished reputation as a college tutor. In 1643, being presented by his college to the living of North Cadbury, in Somersetshire, which vacated his fellowship, he went to reside there, and married; but early in the next year, on the ejection of Dr. Samuel Collins from the provostship of King's College by the parliamentary visitors, Whichcote, whose principles were less rigid or uncomplying, though scarcely a greater friend to the existing order, or disorder, in church and state, was appointed to succeed him. Having taken his degree of D.D. in 1649, he was in that year, or soon after, on the death of Dr. Collins, presented by his college to the rectory of Milton, in Cambridgeshire, on which he resigned his Shropshire living. At the Restoration Dr. Whichcote was removed from his provostship by the new government, rather to mark their disapprobation of the circumstances of his induction than from dislike of the man or his conduct; for he had never signed the Covenant, nor taken part in any of the violent proceedings of the times. He retained his rectory of Milton, and, coming up to London, was chosen minister of St. Anne's, Blackfriars. From this church he was burned out by the great fire in 1666; but two years after he was presented by the crown to the vicarage of St. Lawrence, Jewry, on the promotion of Dr. Williams to the bishopric of Chester. He died while on a visit to Cambridge, at the house of his friend Dr. Cudworth, master of Christ's College, in May, 1683.

Dr. Whichcote is regarded as one of the heads, if not the chief founder, of what is called the Latitudinarian school of English divines, as holding those views of Christianity which attribute least importance to minute points of doctrine, and are favourable to the largest comprehension of such as hold a few principles conceived to be alone fundamental and essential. But it was principally by his preaching and other oral teaching that Dr. Whichcote diffused his opinions while alive. An 8vo. volume of his 'Observations and Apophthegms,' taken down from his own mouth by one of his pupils, was published in 1688, and passed at least through two editions. The first selection of his sermons was published, in 8vo., in 1698, by the third earl of Shaftesbury, the author of the 'Characteristics,' with a preface in which he recommended them as making religion to consist rather in natural goodness of disposition than in anything either divinely revealed or having respect to the rewards and punishments of another life. This collection was reprinted at Edinburgh in 12mo., in 1742, preceded by a recommendatory epistle from the Rev. Dr. William Wishart, principal of the university there. Meanwhile three more volumes of Whichcote's sermons had been published from the original manuscript, in 1701-3, by Dr. Jeffery, archdeacon of Norwich, and a fifth volume by Dr. Samuel Clarke, in 1707. A new edition of the whole appeared at Aberdeen, in 1751, in 4 vols. 8vo., under the superintendence of Drs. Campbell and Gerard. There is also a volume of 'Moral and Religious Aphorisms,' collected from Whichcote's manuscripts, which was first published in 1703, by Jeffery, and which was re-edited, with additions, in 1753, by Dr. William Salter. Dr. Whichcote, who was possessed of considerable property besides his endowments, was a person of much active benevolence and charity, and was eminently distinguished for his command of temper, and general excellence of character.

WHIG. In the article TORY (xxv. 82) is quoted the account of the origin of that term, given by Roger North, in his 'Examen.' In his Life of his brother, the Lord Keeper Guildford, subsequently written, North says:—'I have heard his lordship discourse much of ignominious distinctions, and particularly that of Whig and Tory. I have given the history of this party distinction in the "Examen;" where I have showed that the faction began the game, and not the loyal party, as some now would persuade us; so shall say only, that when the Exclusion Bill, to disinherit the Duke of York, was brought forth, all the factious people and their libels chimed in to defame the duke; and among other topics, that of entertaining the Irishmen was one. Whereupon his friends were termed bogtrotters, wild Irish, or, which means the same thing, Tories. And there was such a pregnancy of contempt in that word as made it current; and the loyalists had it at every turn, with the epithets of damned, confounded, and the like. His lordship observed that the loyalists were not at all ashamed of the name, but took and owned it as their honour; which he said was the best way to frustrate the wicked intent of the other side, which was to cast an ignominy upon them. And so the primitive Christians did; for that which the heathen cast in their faces as the greatest reproach, they accounted their glory, which was the cross. But it was not long before the Tories made full payment by the term Whig' (vol. i., 404-407).

To this we may add that *Tory* is said to be the Irish word *Toree*, that is, *Give me*, which was the summons of surrender used by the banditti to whom the name was originally applied. In Burton's 'Parliamentary Diary' (ii. 210), under date of June 10th, 1657, in a debate on the state of Ireland, Major Morgan is reported as saying, 'We have three beasts to destroy that lay burthens upon us. First is a public Tory, on whose head we lay 200*l*., and 40*l*. upon a private Tory. Your army cannot catch them; the Irish bring them in; brothers and cousins cut one another's throats. Second beast is a priest, on whose head we lay 10*l*.; if he be eminent, more. Third beast, the wolf, on whom we lay 5*l*. a head, if a dog; 10*l*. if a bitch.' By a public Tory here is probably meant a leader or captain; by a private, one of the common banditti. It seems not unlikely that Tory island, on the coast of Donegal, and another at the confluence of the rivers Shannon and Fergus, may have derived their names from having been haunts or strongholds of these lawless bands.

Of the two terms, it was Tory, according to North, that was first applied as a political nickname; and this is probably a correct statement in so far as regards their employment in that sense in England after the Restoration. It is commonly stated to have been in 1679, after the prorogation which defeated the first exclusion bill (27th May), that the two parties called at first Petitioners and Abhorrers (that is, petitioners for parliament being reassembled and signers of counter-petitions expressing abhorrence of the proceedings of the exclusionists), were soon after designated derisively or contumeliously by one another Whigs and Tories. After various other epithets had been adopted and abandoned, as not sufficiently bitter or contemptuous, the Tories retorted upon their opponents, who had given them that name, by the term Whig, 'which,' says North, in the 'Examen,' 'was very significative, as well as ready, being vernacular in Scotland (from whence it was borrowed) for corrupt and sour whey.' In point of fact, *whig*, according to the Scottish lexicographers, is not whey, but the slightly acidulated serum of butter-milk.

Quite a different account from this however is given by Burnet. In his 'History of his Own Time' (i. 43), under the year 1648, that writer says, 'The south-west counties of Scotland have seldom corn enough to serve them round the year; and the northern parts producing more than they need, those in the west came in the summer to buy at Leith the stores that come from the north; and from a word *whiggam*, used in driving their horses, all that drove were called *whiggamors* and shorter, the *whiggs*. Now, in that year, after the news came down of Duke Hamilton's defeat, the ministers animated their people to rise and march to Edinburgh; and they came up marching on the head of their parishes, with an unheard-of fury, praying and preaching all the way as they came. The Marquis of Argyle and his party came and bearded them, they being about 6000. This was called the whiggamors' inroad; and ever after that all that opposed the court came in contempt to be called *whiggs*; and from Scotland the word was brought into England, where it is now one of our unhappy terms of distinction.'

There can be little doubt that this is the true origin of the name Whig, and that it was really its previous application to the Scotch Covenanters that led to its revival as a designation for the opponents of the court in England in 1679. Kirkton, in his 'History of the Church of Scotland from the Restoration to 1678' (edited by C. K. Sharpe, Esq., 4to., Edinb., 1817), says, under the year 1667, 'The poor people, who were in contempt called Whiggs, became name-fathers to all that owned one honest interest in Britain, who were called Whiggs, after them, even at the court of England: so strangely doth providence improve man's mistakes for the furthering of the Lord's purposes.' It may be indeed, as has been sometimes stated (Laing's *History of Scotland*, iii. 381, note; and Lingard's *History of England*, x. 251, note), that the original Scotch Whigs were so called, not, as Burnet says, from the word they used in driving their horses, but from their common drink being whig, or sour milk; and the term may also have seemed to the English Tories of 1679 to carry a peculiar significancy and appropriateness in reference to the sour and rigid temper which they attributed to their opponents, and the want of cordiality and substance with which they changed their principles, independently of its previous application to the Covenanters. There may have appeared to the common feeling, too, to be something of fitness in giving an Irish name to the reckless and warm-blooded assertors of the royal prerogative, and a Scotch one to the more cool and argumentative wranglers for popular rights. It may be said with considerable truth that, nationally or generally, the Irish are Tories and the Scotch are Whigs by temperament or mental constitution.

With regard to the party opinions of the Whigs, it is scarcely necessary to add anything to what has been stated under the word TORY. The Whigs of the last century and a half are generally viewed as the representatives of the friends of reform or change in the antient constitution of the country, ever since the popular element became active in the legislature, whether they were called puritans, nonconformists, round-heads, covenanters, or by any other name. Down to the Revolution of 1688 the object of this reform party was to make such change; since that event, at least till recently, it has principally been to maintain the change then made. Of course however this party, like all other parties, has both shifted or modified its professions, principles, and modes of action within certain limits from time to time, in conformity with the continual variation of circumstances, and has seldom been without several shades of opinion among the persons belonging to it in the same age. These differences have been sometimes less, sometimes more distinctive; at one time referring to matters of apparently mere temporary policy, as was thought to be the case when the Whigs of the last age, soon after the breaking out of the French revolution, split into two sections, which came to be known as the Old and the New Whigs; at another, seeming to involve so fundamental a discordance of ultimate views and objects, if not of first principles, as perhaps to make it expedient for one extreme of the party to drop the name of Whig altogether, and to call itself something else, as we have seen the Radicals do in our own day. All parties in politics indeed are liable to be thus drawn or forced to shift their ground from time to time; even that party whose general object is to resist change and to preserve what exists, although it has no doubt a more definite course marked out for it than the opposite party, must still often, as Burke expresses it, vary its means to secure the unity of its end; besides, upon no principles will precisely the same objects seem the most desirable or important at all times. But the innovating party, or party of the movement, is more especially subject to this change of views, aims, and character: it can, properly speaking, have no fixed principles; as soon as it begins to assume or profess such, it loses its true character and really passes into its opposite. Accordingly, in point of fact, much of what was once Whiggism has now become Toryism or Conservatism, the changes in the constitution which were formerly sought for being now attained; and, on the other hand, as new objects have presented themselves to it, Whiggism has, in so far as it retains its proper character, put on new aspects, and even taken to itself new names. The expression, an Old Whig, is almost self-contradictory; it means, if anything, one who was once a Whig, but is so no longer.

WHIMBREL, *Numenius phæopus*, Auct., *Scolopax phæopus*, Linn.; genus *Phæopus*, Cuv. [SCOLOPACIDÆ.]

Description.—All the plumage bright ash-colour; longitudinal brown spots on the neck and breast; on the middle of the head a longitudinal band of yellowish-white, with another twice as wide and brown on each side; belly and abdomen white; feathers of the back and scapulars very deep brown in the middle, and bordered with brighter brown; tail ashy-brown, streaked with brown bands disposed obliquely; bill blackish, but reddish at its base; iris brown; feet lead-colour. Length of *male* sixteen inches, bill three inches; of *female* eighteen inches, bill three inches and a half.

Young of the Year.—Bill short, hardly an inch and a half long: this organ curves in proportion as the bird grows older.

This is *Le petit Courlis* or *Courlieu* of the French; *Chiurlo Piccolo*, *Chiurlo Minore*, and *Mengotto* of the Italians; *Regen Brachvogel*, *Kleine Art Brachvogel*, *Regenvogel*, and *Kleiner Goisser* of the Germans; *De Kleine of Regenwulp* of the Netherlanders; *Mellum-Spove*, of the Danes; *Smaae Spue* of the Norwegians; *Curlew Knot*, *Curlew-Jack*, *Jack-Curlew*, *Half-Curlew*, *Titterel*, *Chikerel*, and *Tang-Whaup* of the modern British; and *Coeg ylfinhir* of the antient British.

There can be little doubt that *Whimbrels* were the 'Curlew Knaves' of the old Household Books. [SCOLOPACIDÆ, vol. xxi., p. 80.]

Geographical Distribution.—Very wide. Denmark, Sweden, Norway, Lapland, Faroe Islands, Iceland, Germany, Holland, France (but more common in Holland than in France or Germany), Italy, Spain, Provence, Madeira, and the line of North Africa. Asia—Caucasus, Himalaya Mountains, Bengal, and Japan.

In the British Islands (it is found in Orkney and Shetland, and has been known to breed in the latter locality) the Whimbrel occurs most plentifully in May and autumn, the periods of its northward and southward migration; but they have been seen occasionally on our shores in winter.

Habits, Food, &c.—Their food consists of insects, small crustaceans, and worms: they breed in the north: the nest is exposed on wild heaths and moors, and the number of eggs, which are dark olive-brown, blotched with darker brown, pear-shaped, and strongly resembling those of the Curlew, but smaller, is generally, four: they are sought as delicacies. In habits and manner the Whimbrel resembles the Curlew, but the two species do not appear to associate, though the nests of both have been found at no very great distance from each other. The note of the Whimbrel resembles, according to those who have attended to it, the syllables *tetty, tetty, tetty tet*, rapidly repeated.

In the *Portraits d'Oyseaux*, the following quatrain appears under the figure of the *Curlew*, which was highly esteemed for the table:—

'De son crier le Corlis a le nom,
Duquel le bec est tourné, et voulté,
De demi pied long. Il est appresté
Es grands banquets, comme oyseau de renom.'

Whimbrel.

WHIN. [ULEX.]

WHINCHAT, *Saxicola rubetra*, Auct., *Motacilla rubetra*, Linn.

Description.—Old Male.—Top of the head, sides of the neck, and upper parts of the body, blackish-brown; each feather with a wide border of rusty-yellow; above the eyes an elongated streak of white, reaching to the occiput; throat and longitudinal streak on each side of the neck pure white; front of the neck and breast fine bright rusty; a great spot on the wings and tail of pure white; extremity of tail, as well as the two middle quills, and all the shafts, blackish-brown. Length nearly five inches.

Female.—With yellowish-white wherever the male has pure white; the white space on the wing less, and all the feathers with a small brown spot; the rust of the breast is less pure, and the lower parts, as well as the upper part of the tail, are rusty white.

The Young have white and greyish spots all over their plumage.

This is the *Grand Traquet*, *Traquet*, *Groulard*, *Tarier*, *Thyon*, *Semel* (in Lorraine), of the French; *Grosser Fliegenfanger*, *Gestettenschlager*, and *Braunkehliger Steinschmätzer*, of the Germans; *Salta-bastone con la gola bianca* and *Stiaccino* of the Italians; *Furzechat* and *Blackberry-eater* of the modern British; and *Clochder yr eithin* of the antient British.

Geographical Distribution.—Norway, Sweden, temperate Russia, but not Siberia: all southern Europe to the Mediterranean shore: common in Smyrna in winter (Strickland). In the British Islands they are generally, but not numerously, diffused in the summer; have been seen in the Hebrides, but are not recorded as having visited Orkney or Shetland. They arrive here about the middle of April; but, unlike the STONECHATS, always, as a general rule, depart in autumn. Mr. Yarrell observes that the similarity in various points between the two species has induced a partial belief that the Whinchats, as well as the Stonechats, remain here during the winter, but he is not aware of more than two authentic instances of the Whinchat being seen here in that season: Mr. Nevill Wood records one, on the authority of Mr. H. Barlow, of Cambridge, in the mild winter of 1833. The last-named observer saw it hopping about near some furze-bushes in his neighbourhood, on the 15th of January and 20th of February, but only on those two occasions, though the common was visited on every clear day in those two months. The Rev. Robert Holdsworth, of Brixham, gave Mr. Yarrell the other instance: in a path near his residence at the entrance of the river Dart, in one of the warmest spots in England, the reverend gentleman found a Whinchat dead during a very severe frost on the 20th January, 1829. The wind was north-east.

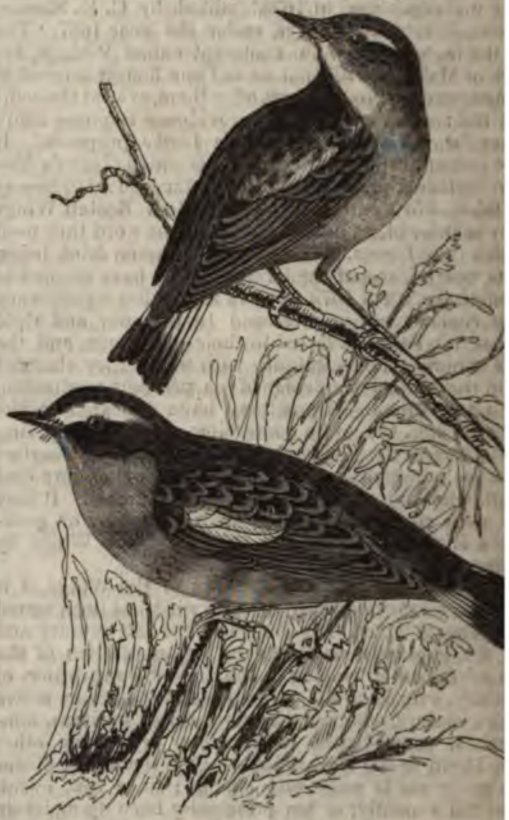
Habits, Food, &c.—The flight of the Whinchat is undulating, and it flits from bush to bush, perching on one of the topmost twigs. Furze commons are its favourite haunts. Worms, insects, small shell-mollusks, and slugs form its principal food, but it also eats berries. The nest resembles that of the Stonechat, and is formed of dry grass stalks and [illegible] lining being finer bents or stalks. It is usually placed on the ground; Mr. Sweet says that th birds cover it with dry grass, so that it is impossible to without watching them. The eggs are five or six in ber, bluish-green, with a few small dull reddish- specks. There are generally two broods, the first ap ing towards the end of May.

The song is very pleasing, and resembles, accordi Bechstein, that of the Goldfinch; and the bird wil not only during the day, but in the evening, and some at night. Mr. Sweet says, that such as are caught may be taught any tune, or will learn the song of an they hear, but he does not think their own good. On he bred from the nest learnt the song of the Whitet Redstart, Willow Wren, Nightingale, and Missel T which it frequently heard singing in a neighbouring g Of this latter song it was so fond, that Mr. Sweet w quently obliged to put his favourite out of the room being able to bear its loud notes. He speaks of it best bird he ever kept of any kind: it sang the whole through, and varied its song continually; its only fau its strong voice.

Whinchats become, like the Wheatear, very fat i gust, and, though smaller, are equally delicate fo table.

In the *Portraits d'Oyseaux* the following quatr printed under the figure of this species:—

> 'Es summitez des buissons hoche l'ælle
> Incessamment le Traquet ou Tarier;
> Et le voyant sans cesse varier,
> Comme un traquet de moulin on l'appelle.'



The Whinchat: upper figure, female; lower, male.

WHIP-POOR-WILL, *Caprimulgus vociferus*, genus *Antrostomus*, Gould.

Description.—Bill blackish; mouth very large, flesh-colour within, armed along the sides with num long, thick bristles, the longest extending more tha an inch beyond the point of the bill. Eyes bluish- Plumage above variegated with black, brownish- and rust colour, sprinkled and powdered with nu minute streaks and spots. Upper part of the head brownish-grey, marked with a longitudinal stripe of with others passing out from it. Back darker, streaked with lighter colour. Scapulars very light y ish-white, variegated with a few oblique black spots. rounded (ten feathers, external 1¼ inch shorter than in the middle), the three outer feathers on each side ish-brown for half their length, and thence white to their extremities; the exterior feather edged with deep brown with paler spots; the four middle feathers without white at the ends, but with herring-bone figures of black and pale ochre finely powdered. Cheeks and sides of the head brick-colour. Wings spotted with very light and dark brown. Chin black with small brown spots. Across the throat a narrow white semicircle; breast and belly irregularly mottled and streaked with black and ochre-yellow. Legs and feet light purplish flesh-colour, seamed with white, feathered nearly to the feet, middle claw pectinated. *Male* 9½ inches long—across the expanded wings 19 inches; *Female* about an inch less. (Nuttall.)

This is the *Wecodlis* of the Delaware Indians; and *Whippoo-Will* of Lawson, 'so named,' says the latter, 'because it makes those words exactly. They are the bigness of a thrush, and call their note under a bush, on the ground, hard to be seen, though you hear them never so plain.'

Geographical Distribution.—America. Nuttall says that this species arrives in the Middle States about the close of April or beginning of May, proceeding in its vernal migration along the Atlantic States to the centre of Massachusetts, being rare, and seldom seen beyond lat. 43°; and yet, he adds, in the interior of the continent, according to Vieillot, they continue as far as Hudson's Bay, and were heard by Mr. Say at Pembino, in lat. 49°. 'In all this vast intermediate space,' continues Nuttall, 'as far south as Natchez on the Mississippi and the interior of Arkansas, they familiarly breed and take up their residence. About the same time that the sweetly echoing voice of the Cuckoo is first heard in the north of Europe issuing from the leafy groves, as the sure harbinger of the flowery month of May, arrives amongst us, in the shades of night, the mysterious *Whip-poor-Will*.'

Dr. Richardson states, that he observed this bird on the southern shores of Lake Huron only, the fiftieth parallel being probably the limit of its range: it arrives, he adds, in Pennsylvania about the middle of April; the elevated dry 'Barrens of Kentucky' are its favourite resorts, and it is very seldom heard in low marshy tracts of country.

Habits, Food, &c.—*Phalænæ* and other large nocturnal insects, beetles, grasshoppers, ants, &c., form the food of this night-jar. The two eggs, which are greyish white, almost covered by irregular and confluent umber-brown blotches, mixed with lines and spots of bluish grey, and dense at both ends, are deposited about the second week in May in the Middle States, but considerably later in Massachusetts. There can hardly be said to be any nest, but the female selects some secluded spot in the forest, 'near a pile of brush, a heap of leaves, or the low shelving of a hollow rock, and always in a dry situation,' according to Nuttall, who remarks, that this deficiency of nest is amply made up by the provision of nature, for, like partridges, the young are soon able to run about after their parents; and, until the growth of their feathers, they seem such shapeless lumps of clay-coloured down, that it becomes nearly impossible to distinguish them from the ground on which they repose.

Mr. Clayton gave the following account of the bird, writing probably from Virginia, to Catesby:—'These birds visit us about the middle of April, from which time till the end of June they are heard every night, beginning about dusk and continuing till break of day; but it is chiefly in the upper or western parts that they are so very frequent. I never heard but one in the maritime parts, although my abode has been always there; but near the mountains, within a few minutes after sunset they begin, and make so very loud and shrill a noise all night, which the echoes from the rocks and sides of the mountains increase to such a degree, that the first time I lodged there I could hardly get any sleep. The shooting them in the night is very difficult, they never appearing in the day-time. Their cry is pretty much like the sound of the pronunciation of the words *Whip-poor-Will*, with a kind of chucking noise between every other or every two or three cries, and they lay the accent very strong upon the last word *Will*, and least of all upon the middle one. The Indians say these birds were never known till a great massacre was made of their countryfolks by the English, and that they are the souls of departed spirits of the massacred Indians. Abundance of people here look upon them as birds of ill-omen; and are very melancholy if one of them happens to light upon their house, or near their door, and set up his cry (as they will sometimes upon the very threshold), for they verily believe one of the family will die very soon after.'

Mr. Clayton further states, upon credible information, that they lay only two eggs, of a dark greenish colour, 'spotted and scrawled about with black, in the plain beaten paths, without the least sign of any nest, upon which they sit very close, and will suffer a very near approach before they fly off.'

Mr. Nuttall remarks that, in the lower part of the State of Delaware, he found these birds troublesomely abundant in the breeding-season, so that the reiterated echoes of *whip-whip-poor-will, whip-peri-will*, issuing from several birds at the same time, occasioned such a confused vociferation, as, at first, to banish sleep. This call, he adds, is continued, except in moonlight nights, usually till midnight, when they cease until again aroused, for a while, at the commencement of twilight. They pass the day in repose, retiring to the deepest and darkest woods, usually those in elevated situations.

Whip-poor-Will. Antrostomus vociferus.

Chuck-Will's-Widow, Caprimulgus Carolinensis, Carolina Goatsucker, is another species of Mr. Gould's genus.

Description.—The whole body-plumage sprinkled and mottled with brown, rufous, black, and white; on the tail are zig-zag and herring-bone figures of black. A slight whitish band goes across the throat; breast, black powdered with ferruginous; belly and vent, lighter. Length, 12 inches; across the expanded wings, 26 inches.

Geographical Distribution.—Seldom to the north of Virginia, but in the interior extending up the banks of the Mississippi to the 36th degree. Arrives in Georgia and Louisiana about the middle of March, and in Virginia early in April. Retires from the United States, probably to winter in some part of the tropical continent, about the middle of August.

Habits, Food, &c.—Flying low and skimming a few feet above the surface of the ground, it settles on logs and fences, from which it pursues the flying moths and insects on which it feeds; sometimes sailing nearer the earth, it alights to pick up a beetle, or flutters round the trunk of a tree in search of any insect that may be crawling on the bark. Mr. Nuttall, who thus describes its mode of taking its prey, adds, that, like the species above described, it commences its singular serenade of *Chuck-Will's-Widow* in the evening soon after sunset, continuing the cry with short interruptions for several hours, and renewing it towards morning till the opening dawn. The tones are slower, louder, and more full than those of the *Whip-poor-Will*, and may be heard on a still evening for half a mile. 'The species,' says Mr. Nuttall in continuation, 'is particularly numerous in the vast forests of the Mississippi, where, throughout the evening, its echoing notes are heard [illegible] in the solitary glens, and from the [illegible] of the hills, becoming almost incessant during moon; and at the boding sound of its elfin voice, when familiar and strongly reiterated, the thoughtful, superstitious savage becomes sad and pensive.'

The same author states that in rainy and gloomy weather these birds remain silent in the hollow log which affords them and the bats a common roost and refuge by day. When discovered in this situation, they ruffle their feathers, open their enormous mouths, and utter a murmur, almost like the hissing of a snake, to intimidate the intruder.

The eggs, two in number, are laid on the ground, in the woods generally: they are dark olive, sprinkled with darker specks, oval in shape, and rather large in size. If they or the young be handled, the parents remove them to another place.

Chuck-Will's-Widow, Antrostomus Carolinensis.

'If,' says Mr. Nuttall, 'superstition takes alarm at our familiar and simple species, what would be thought by the ignorant of a South American kind, large as the Wood Owl, which, in the lonely forests of Demerara, about midnight breaks out, lamenting like one in deep distress, and in a tone more dismal even than the painful hexachord of the slothful Aï. The sounds, like the expiring sighs of some agonizing victim, begin with a high loud note, *ha, ha, ha ha ha! ha! ha!* each tone falling lower and lower, till the last syllable is scarcely heard, pausing a moment or two between this reiterated tale of seeming sadness. Four other species of the Goatsucker, according to Waterton, also inhabit this tropical wilderness, among which also is included the *Whip-poor-Will.* Figure to yourself the surprise and wonder of the stranger who takes up his solitary abode for the first night amidst those awful and interminable forests, when, at twilight, he begins to be assailed familiarly with a spectral equivocal bird, approaching within a few yards, and then accosting him with *who-are-you, who-who-who-are-you?* Another approaches and bids him, as if a slave under the lash, *work-away, work-work-work-away;* a third mournfully cries *willy-come-go! willy-willy-willy-come-go!* and as you get among the highlands, our old acquaintance vociferates *whip-poor-will, whip-whip-whip-poor-will!* It is therefore not surprising that such unearthly sounds should be considered in the light of supernatural forebodings issuing from spectres in the guise of birds.' (*Manual of the Ornithology of the United States and of Canada.*)

WHIRLING-MACHINE is an apparatus invented by Mr. Robins for the purpose of determining the resistance of the air against bodies moving with velocities less than those for which the resistance can be determined by the Ballistic pendulum.

It consists of a brass cylinder, two inches diameter and about six inches long, which is fitted in a frame so as to be capable of turning freely with its axis in a vertical position between the base of the frame and a horizontal plate of [illegible] metal which is supported above the base by four small pillars. The axle of the cylinder, which is of steel, passes through that plate, and terminates about four inches above it. To this is attached horizontally, and immediately upon the plate, a thin arm of wood or metal about four feet long, and formed with what is called a feather-edge on each side: to the extremity of this arm is affixed the object which is to be used in the experiment, and a wire proceeding from the top of the steel axle to the extremity of the arm serves to prevent the latter from bending by its weight.

A silk line made fast at one end to the surface of the cylinder is in part wound round the latter; the line then passes over a pulley fixed in a vertical position at the opposite extremity of the machine, and to its lower end is attached some given weight: the descent of the weight causes the cylinder, and consequently the object at the extremity of the arm above mentioned, to revolve about the vertical axis during the experiment. The weight at the end of the line being acted on by gravity descends at first with an accelerated motion, and consequently the circular movement of the object at the extremity of the bar is also accelerated; but after a few revolutions the resistance of the air against the object becomes very nearly equal to the weight of the descending body, and from that time the descent of the weight and the revolving motion of the object become, as to sense, uniform. When this uniform or terminal velocity is obtained in any experiment, the descending weight evidently expresses the amount of the air's resistance together with the inertia of the machine.

An instrument of this kind was much used by Dr. Hutton, of Woolwich, during the years 1786 and 1787, in his researches concerning the resistance experienced by military projectiles in passing through the air; and the objects which this mathematician applied at the extremity of the revolving arm were hemispheres of pasteboard. Any one of these he could at pleasure dispose so that either its convex or plane surface might be resisted by the air: there was also provided a flat plate of lead equal in weight to the hemisphere employed, which could be fixed to the arm when the hemisphere was removed, for the purpose of ascertaining the resistance opposed by the air to the motion of the arm itself.

The radius of the circle described by each hemisphere in its revolution is measured from the axis of the cylinder to the centre of the sphere, of which the revolving object is the half, and the radius of the cylinder is measured from the same axis to the middle of the silk line passing round the surface: let the latter radius be represented by r, and the former, when any one of the hemispheres is applied, by R. The time is marked by a stop-watch at the end of each revolution, and the differences between them are taken for the times of the revolutions. After a few revolutions the differences are very nearly constant; and a mean of ten or twelve of these nearly constant differences may be considered as the time of revolution, when the motion is uniform in consequence of the equality of the resistance and inertia to the weight of the descending body; let this weight be represented by W.

In order to discover the resistance due to the inertia of the machine and the action of the air upon the arm (the plate of lead, with its plane in a horizontal position, being fixed at the end of the arm), different weights are attached to the silk line, till some one is found which causes the arm to revolve uniformly in the same time as the hemisphere may have been observed to revolve when its motion was uniform. This weight, which may be represented by w, is evidently the equivalent of that resistance and inertia; and the difference $W - w$ is the value of the air's resistance against the anterior surface of the revolving hemisphere only. The velocity of the latter is measured by the length, in feet, of the arc described by its centre in one second, and the weight or resistance $W - w$ is supposed to be applied at the circumference of the cylinder, to which the silk line is a tangent. This term must consequently be multiplied by $\frac{r}{R}$, in order to reduce it to the value of that which would be equivalent to it if applied at the centre of the revolving object.

From a mean of numerous experiments with a hemisphere whose diameter was 6·375 inches, and which revolved with velocities varying from 3 feet to 20 feet per second, Dr. Hutton found that the resistance of the air against the flat side was to the resistance against the convex side as 2·48 to 1: by theory it should be as 2 to 1 only. From experiments made with hemispheres of different magnitudes, also with a whole sphere, a cone, and a very short cylinder, it was found that the resistance experienced by similar surfaces (the velocities varying from 10 feet to 20 feet per second) were nearly proportional to the surfaces, increasing a little above that proportion with the greater surfaces; and that the resistances on the same surface varied, at a mean, with the 2·04 power of the velocity, gradually increasing with the increasing velocities. When a hemispherical or conical surface was acted on by the air, the resistance was less than that which was experienced by a plane surface of equal diameter; but the sharper surface had not always less resistance than one which was round: the convex surface of a hemisphere, for example, experienced less resistance than that of a cone, contrary to the result of theory. The resistance on the base of a cone was to the resistance on the convex surface as 2.3 to 1: by theory it should be as 4 to 1. The resistance on the base of a short cylinder was less than that on the base of a cone, though the areas were equal; also, on account of the different manner in which air acts on the posterior surfaces, the base of a hemisphere experienced less resistance than that of a cone, and the convex surface of a hemisphere less than that of a whole sphere of equal diameter.

The whirling-machine invented by Ferguson is a frame or box of wood, containing a wheel about 2 feet diameter, on each side of which is a pulley about 6 inches diameter; the axes of all are in vertical positions, and, by strings passing over the wheel and pulleys, the latter are made to revolve on turning the wheel by means of a handle. The machine was intended to exhibit, in a popular manner, the principal effects of centripetal or centrifugal forces, when bodies revolve in the circumferences of circles.

On the axle of each pulley there is fixed, at its middle point, a bar of wood in a horizontal position, and on this a small plate or carriage of brass is made to slide easily along two horizontal wires extending from the centre to one extremity of the bar: a silk line attached to this plate passes under a small brass pulley near the centre of the bar, and over a similar pulley fixed in a brass frame, about 6 inches above the first pulley; the line is afterwards attached to a brass plate or carriage, which is capable of sliding up or down in the brass frame, according as the first plate moves from or towards the centre, along the wires on the horizontal bar. A given weight is placed on this first carriage at any distance from the centre, and the pulley, to whose axle the bar is fixed, is made to revolve by turning the handle on the axle of the wheel: then, on placing such a weight on the carriage in the brass frame as will just allow the former weight to recede in consequence of the centrifugal force which that weight with its carriage acquires by the revolution, the weight in the frame, including that of its carriage, is to be considered as the equivalent of the centrifugal force.

For example, let the two pulleys be of equal diameters, and let each be made to carry on its axle a horizontal bar with a sliding plate or carriage: then if a weight of 6 ounces, including the carriage, be placed at 3 inches from the centre of motion on one bar, and 2 ounces, including the carriage, on the other bar, at 9 inches from its centre of motion; upon making the two bars revolve rapidly, the centrifugal forces will cause any equal weights on the carriages in the two brass frames to rise to the tops of those frames at the same instant. Here the velocities of rotation are represented by 3 and 9, and the weights by 6 and 2, so that the ratio compounded of the velocities and masses is one of equality; and this is considered as verifying the proposition that if bodies revolve in circular orbits, the centrifugal forces are equal when the products of the masses and velocities are equal. Again, let the diameter of one of the pulleys be twice as great as that of the other, so that when the bars are placed on the axles and are made to revolve by turning the wheel, the angular velocity of one may be half the angular velocity of the other: then if any equal weights, for example, be fixed on the carriages which slide on the two bars, at equal distances from the centres of motion; and if there be placed on the carriages in the brass frames above those centres, weights, including those of the carriages, such that the weight above the larger pulley may be one-fourth of that which is above the smaller pulley; the centrifugal forces arising from the revolutions will allow these weights to be raised at the same instant, proving that both the revolving bodies are retained in circular orbits. Here the angular velocities of the revolving bodies are as 1 to 2, and the weights in the frames, which represent the centrifugal forces, are as 1 to 4; and the experiment shows that when equal bodies revolve in equal circular orbits, the centrifugal or centripetal forces are to one another as the squares of the angular velocities.

It is easy to understand that such experiments may be varied so as to exhibit all the phenomena of circular movements.

WHIRLPOOL, a place in a river, or in the sea, where, in consequence of obstructions from banks, rocks, or islands, or the opposition of winds and currents, the waters acquire a revolving motion.

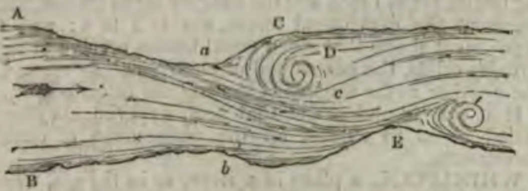
The agitation of the waters which is constantly observed near Messina, and which is usually designated the whirlpool of Charybdis, is now well known to be unaccompanied by any vortiginous motion by which vessels might be absorbed, and is, rather, an incessant undulation of the water. The agitation is said to exist in several different places at the same time, within the circumferences of circles whose diameters, when the wind is moderate, do not exceed 100 feet, and is caused by the wind acting obliquely on the rapid current which sets towards the faro, or lighthouse, from the north during six hours, and from the south during the next six hours, and so on alternately; the changes taking place respectively with the rising and setting of the moon. Spallanzani, who was rowed over the spot when the wind was light, experienced no danger, though the boat was much tossed by the waves: he was informed however that when the wind is high, the swelling of the waves is more violent and extensive, so that small vessels which are driven within the limits of the agitation may be sunk by the waves breaking over them, and large ones may be driven on the Italian shore, where they are sometimes wrecked on the rock of Scylla. The dashing of the waves on the hollow rocks about Cape Peloro produces a noise which is said to resemble the barking of dogs; and it is probable that these sounds gave rise to the fable that a female monster surrounded by ferocious dogs and wolves lay there in wait to devour the mariners who might be wrecked on the coast.

The Maelstrom between the islands of Mosker and Warae on the coast of Norway appears to be of a similar nature: the tide there forms a current which runs with violence alternately from north to south, and in a contrary direction; and when this is opposed by the winds, there is created an agitation of the water, the sound of which is heard at sea to the distance of many leagues. At high and at low water, in moderate weather, ships pass through the strait without danger; but during strong gales they keep at a considerable distance in order to avoid being drawn into the current, in consequence of which they might founder among the waves, or be otherwise destroyed. Whales and other fish, it is said, are often found dead on the shores, against which they have been dashed by the violence with which the waters rush through the channel.

Whirlpools are produced among the Orkney Islands by the actions of winds and currents; but boats, it is said, pass over the spots in safety, a log of wood or a bundle of straw previously thrown into the water being sufficient to arrest its revolving motion.

The circular or spiral motion of the water, which constitutes a whirlpool or eddy in a river, is produced by flexures of the banks or contractions of the bed; in consequence of which the current, instead of continuing parallel to the general direction of the river, is turned obliquely towards the middle: the particles of water between this oblique current and the bank by which the waters from the upper part of the river are reflected, are acted upon by forces in different directions; and the centrifugal force resulting from the curvilinear motion causes the centres of the whirlpools to be on a lower level than the general surface of the water in the river.

Let A B be the distance between the two banks of a river at a part where a contraction of the bed begins to take place, and let $a\,b$ be the narrowest part of the channal, in the vicinity: the water, in part arrested by the bank A a, rises above the general level of the water in the river at that place, and being reflected, will be made to take an oblique direction as $a\,c$; at the same time the velocity of the contracted section becomes, by the laws of hydrodynamics, greater than that of the river above A B. Then the particles of water within the space *a* C *c*, rushing towards *a c*, in consequence probably of vacuities between the particles which are advancing with an accelerated motion along that line, the surface within that space becomes depressed, and the particles about D descend into the space by their gravity. It follows that there is a constant tendency of the waters from D towards C *a*, and from C towards *a c*, besides the current in the direction *a c*; and by the action of the forces in these directions the revolving motion takes place. Whirlpools are continually being formed in this manner, and are carried to some distance down the river by the general current.



Whirlpools may in like manner be formed at the same time, below *b*, on the opposite bank of the river, if this should have a similar form to the bank between A and C: or the stream *a c* may be reflected from E, should there be a contraction at that place, and whirlpools may be formed in the enlargement beyond, as shown in the diagram. Precisely in like manner are formed the whirlpools or eddies at the shoulders of the piers of a bridge, when the breadth of the river is so much contracted as to cause its surface above the bridge to be considerably higher than the surface below.

Under these whirlpools the bed of the river must evidently sustain less pressure than takes place on the parts about them: consequently the water under the bed, acting hydrostatically upwards, may lift up the earth and stones, and thus undermine the piers; or it may blow up the piles driven for the formation of dams. By this cause the accidents which occur in hydraulic operations are frequently produced.

Inequalities in the depth of the bed of a river must evidently give rise to vertical whirlpools by the reflexion of the water from the ascending slopes; the particles then take an oblique direction upwards, so as to rise like a wave above the general surface: also a sudden depression of the bed will produce a vertical whirlpool in the lower part, nearly as the horizontal whirlpools before mentioned are supposed to have been formed.

WHIRLWIND is a violent movement of the atmosphere in a circular or spiral direction about an axis, the latter having at the same time, as is now generally believed, a progressive motion, rectilinear or curvilinear, on the surface of the land or sea.

The tornados of North America and the coasts of Africa, as well as the typhoons in the sea of China, have long been known as violent tempests in which the wind has a revolving motion about certain axes; but these terms are commonly applied to such storms as are of short duration and comparatively of small extent, the diameters of the vortices varying from a few hundred yards to one or two miles. It is now ascertained, by such evidence as leaves scarcely any doubt of the fact, that in all or most of the great storms which agitate the atmosphere the wind has a rotatory movement, and that the diameter of the circle within which the gyration is performed is sometimes equal in extent to several hundred miles: in great whirlwinds the axis appears to be either vertical or nearly so, but in those of small extent its inclination is often inconsiderable, and it is sometimes parallel to the horizon.

As early as the middle of the seventeenth century the revolving motion of the wind, during the great hurricanes which take place in the West Indies, appears to have been noticed; and in a description of them, which was given at that time in the 'Philosophical Transactions,' it is stated that, after a cessation of the trade-winds, the storm begins from the north; that the wind afterwards goes round to the north-west and then to the south, the storm subsiding when the wind comes to the south-east: and in Colonel [illegible] work on the 'Winds and Monsoons,' which was [illegible] 1801, the gyratory nature of the storms in [illegible] seas is inferred from the recorded changes in the directions of the wind during the storms of 1760 and 1770. Whirlwind storms appear however to have been then considered as local and temporary; and we owe to Mr. Redfield, of New York, the discovery that they have a progressive as well as a revolving motion. Dr. Franklin ascertained that the storm which he witnessed at Philadelphia in 1743, took a certain time to arrive at Boston, but he did not pursue the subject, and, from a mistaken estimate of the distance between those cities, his opinion of the rate of movement is now known to be erroneous.

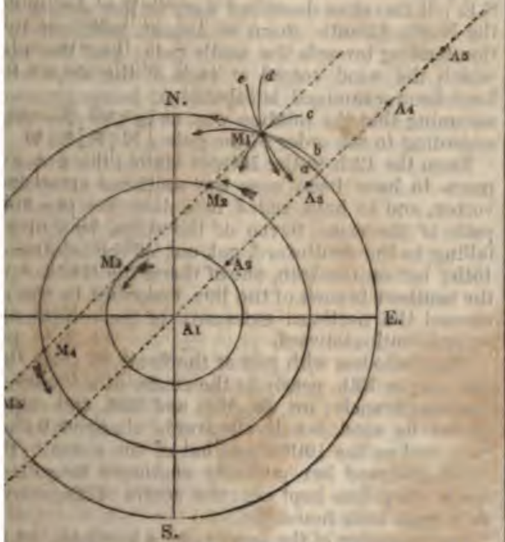
Though the fact of a revolving motion of the air in great storms may now be considered as established, it must be admitted that the cause of the rotation is still in obscurity. Dr. Hare, of the University of Pennsylvania, who considers the rotatory movement as accidental, suggests that electrical discharges between the earth and clouds are the immediate causes of storms by giving rise to an extrication of heat and a precipitation of aqueous vapours: partial rarefactions are thus supposed to be produced in the upper part of the atmosphere, in consequence of which currents of air ascend from the surface of the earth and other currents rush from different parts of the horizon to supply the deficiency at the spots from whence the air ascended. The agency of electricity is frequently manifest in storms; but, whatever be the cause, currents of air are frequently, as at the changes of the monsoons in the East Indian seas, impelled obliquely against each other, and thus rotatory motions in the atmosphere may be produced, exactly as eddies or whirlpools are formed in currents of water. [WHIRLPOOL.]

Mr. Redfield, in his 'Observations on Storms,' in the 'Transactions of the American Philosophical Society,' 1841, offers an opinion that generally during a gale there is, in the lower part of the atmosphere, a spiral motion inclining downwards and towards the centre; and in the higher regions a like spiral motion inclining upwards and towards the exterior. He adds that, in storms of great extent, there is sometimes found a considerable area within which the winds are moderate and blow in various directions. These characters of a revolving storm appear to be verified by the manner in which trees were prostrated during the hurricane which occurred in New Brunswick in June, 1835; when, about the centre, bodies of great weight were carried spirally upwards, and, on opposite sides of the storm's path, the trees were thrown in contrary directions. It is observed that when a storm rages violently, the doors and windows of houses are often forced outwards, either from the centrifugal force caused by the revolving motion, or from the expansion of the air within, when a temporary rarefaction takes place on the exterior; and from the movements of the clouds it appears often that a storm, in passing over a place, is in activity at a considerable altitude before it descends to the earth's surface.

That a whirlwind may have a progressive as well as a revolving motion may be easily understood if it be observed that, as the atmosphere in the tropical regions moves from east to west with respect to the surface of the land or sea, it may, after crossing the Atlantic and Pacific oceans, be arrested in its progress westward by the continents of America and Asia, and deflected from thence towards the poles of the earth: the whirlwinds formed by electricity or otherwise in the general current of air will consequently be carried with the deflected branches into high northern and southern latitudes; and it may occasionally happen that, from the nature of the deflecting forces, the path of the axis of a revolving storm in either branch is a curve line like a segment of a circle or parabola. Sir John Herschel, at the meeting of the British Association in 1838, suggested that the Gulf-Stream may be the cause of the nearly parabolic curves assumed by the paths of the storms on the coast of North America: the paths nearly coincide with the course of this stream; and the warmth of the water, by increasing the temperature of the air above it, must disturb the equilibrium of the atmosphere, and maintain the storms which had their origin in a lower latitude.

It is evident that the velocity of the wind in a revolving storm must be the greatest and the least respectively on opposite sides of the axis of rotation, in a diameter which is perpendicular to the path of that axis; for on one side the direction of the revolving current conspires with that progressive motion of the storm, and on the other it ary to it. In other parts within the limits of the he direction and velocity of the wind must be com- d of the rotative and progressive motions; and it ppen frequently that a temporary calm is experi- at each point on the earth's surface at which the the storm successively arrives.

phenomena of tropical storms are not precisely such would be if the air had a simple movement of ; the particles of air, while revolving, are probably to. undulatory motions in spiral curves, and local tions cause sudden and irregular changes in the n of the wind, so that it appears sometimes to shift rent points all round the compass. Mr. Redfield that, in small whirlwinds, the axis of rotation at times to describe gyrations in looped curves ts mean place in the line of progressive motion; like gyrations probably take place in those of an e kind: but in order to simplify the explanation henomena of whirlwinds, it is usual to assume that icles of air revolve in the circumferences of circles entres are in the axis; the latter having at the ne a movement of progression in a rectilinear or ear direction. Now, if the plane of the paper re- the surface of the sea, and a line through A_1, per- lar to it, represent the axis of a whirlwind whose



d south diameter is N.S., and in which the par- air are supposed to revolve (for example) in the indicated by the order of the letters N. W. S. E.; ressive movement of the axis being also supposed m A_1 through N., or from south to north: then, N. a tangent to the circle lies due east and west, ent that a ship at that point would experience a wing from the east when the centre of the storm and if the ship remain stationary, the wind will to blow from the same quarter till A_1 arrives at angents to the concentric circles supposed to be d by the particles being due east and west at the points of the circumferences as they successively N., and the wind in all the northern half of the volving in the direction E.N.W.: but after this wind blowing in the direction W.S.E., must be . as a west wind till the remaining half of the s passed over that point. In like manner, if the he storm were to move from A_1 towards W., a ship d to be stationary at the latter point would feel from the north till A_1 arrives at W.; after which, stern semicircle passes over that point, the ship xperience a wind from the south.

, if the axis were to move from A_1 towards A_5, that outh-west to north-east, for example, the direction hirlwind being as before according to the order of s N.W.S.E. and the ship being supposed to remain y at some point, as M, till the storm has passed then, the line of direction in which the points of lwind successively overtake the ship being M_1M_5, to A_1A_5, the arcs aM_1, bM_1, &c. will represent the several directions in which the wind will successively be felt at the ship during the continuance of the storm. Thus the axis of the whirlwind being at A_1, the convex surface of the storm has just reached the ship, and the wind blows in the direction aM_1, or in the circumference of the circle whose centre is A_1, that is, nearly from the east-south-east: next, the axis being at A_2, the point M_2 in the circumference of the circle whose radius is A_1M_2, is at M_1; and then, at the ship the wind is felt in the direction bM_1, or in the circumference whose radius is A_2M_1, or its equal A_1M_2, that is, nearly from the east by south. Again, the axis being at A_3, the point M_3 in the circumference whose radius is A_1M_3, is at M_1; and then at the ship the wind is felt in the direction cM_1, or in the circumference whose radius is A_3M_1, or its equal A_1M_3, that is, from the north-east: when the axis is at A_4 and A_5 the points M_4 and M_5 arrive at M_1, and the wind there is felt successively in the directions dM_1 and eM_1, that is, nearly from the north by west, and from the north-north-west. When the axis has advanced beyond A_5, it is evident that the whirlwind ceases to have any effect on a ship at M_1. If tangents were drawn at M_1 to the arcs bM_1, cM_1, &c., they would evidently be parallel to tangents at the corresponding points M_2, M_3, &c.; therefore the directions in which the circumference of the concentric circles meet the line of direction M_1M_5 will be those in which the wind is felt at the ship during the storm. In like manner the successive directions in which the wind blows in a revolving storm may be exhibited, whatever be the situation of the ship and the movement of the axis of rotation.

The hurricanes or whirlwinds of the Atlantic commence in a part of the ocean which is frequently designated the region of variable winds, and is situated between 10° and 20° N. lat. and between 55° and 60° W. long., and their progress along the coast of the United States is marked by the devastation they so often produce. They are felt between July and October, but they are most frequent and violent in August and September; and being on the great line of communication between Europe and the west, the phenomena which they present have been more attentively observed than those of the storms in any other region of the earth. The valuable publications of Mr. Redfield contain nearly all the details which have yet been collected concerning them, while the work of Colonel Reid, entitled 'An Attempt to develope the Law of Storms,' contains almost all that is known of the whirlwinds in the southern hemisphere.

In the 'American Journal of Science,' vol. xx., it is shown that the storm which took place in September, 1821, began in the West Indies, and arrived off the coast of the United States, in lat. 35° N., at day-light, September 3rd, when the wind blew from E.S.E.: on the same day, at 11 A.M., the storm commenced at Cape Henlopen, with the wind in the same quarter, but it afterwards shifted to E.N.E., and blew during nearly an hour: a calm of half an hour succeeded, when the wind shifted to W.N.W., and blew with great violence. At New York the storm commenced at 5 P.M. from the east and north-east, the wind blowing with fury for three hours, and then it changed to the west. At Boston the hurricane commenced at 10 P.M., but beyond this city it was not traced. All the phenomena just mentioned indicate, agreeably to the principles above explained, a revolving hurricane in which the direction of the rotation was according to the order of the cardinal points N., W., S., E., while the progressive movement of the axis was about north by east. The temporary calm at Cape Henlopen seems to show that the centre of the vortex was then near that place.

In the same work it is stated that, during the hurricane of 1830, at the Bahama Islands, the wind veered almost round the compass in the night of August 14th. The storm appears to have passed from the island of St. Thomas, near Porto Rico, to the south-east coast of Nova Scotia, in about six days, consequently it must have moved at the rate of about 17 miles per hour; and by the positions of the different points at which its effects were at the same time felt, its diameter must have been about 150 or 200 miles.

A movement of progression combined with a movement of rotation in the direction of the points N., W., S., E., is also indicated by the phenomena of the Barbadoes hurricane in August, 1831, in July, 1837, and of the hurricane at Antigua, August 2nd of the latter year. But of the North Atlantic storms, that which presents the most remarkable phenomena is one which raged between the 12th and [illegible] of August, 1837. Details of the circumstances attending it have been given at length, with a chart of its course, by Col. Reid, in his work on storms; and it appears that it was first felt in lat. 17° 30′ N., about 400 miles eastward of Antigua, though it may have had its origin still farther eastward.

By the effects experienced at different points on the ocean, Col. Reid concludes that the centre or axis of the storm advanced at first from east to west nearly; and after moving in that direction about two days, it turned towards the north-west, as if the storm had been abruptly deflected from the land; and when the whirlwind ceased to be noticed, it was passing eastward across the Atlantic to the south of Newfoundland. On the 18th of August, a ship, named the Rawlins, was becalmed for an hour in lat. 30° 30′ N. nearly; at that time another, named the Calypso, above three degrees northward of the Rawlins, was thrown on her beam ends with the wind successively at N.W., W., and S.W.; and a ship, named the Sophia, situated about as far towards the north-east of the Rawlins, evidently eastward of the storm's centre, experienced the hurricane from the E.N.E., E., and E.S.E. Previously to the temporary calm, the wind at the place of the Rawlins had been N.E. by E. and N., and afterwards it suddenly changed to the S.W. These circumstances sufficiently indicate that the whirlwind had then a progressive motion towards the north-west, and at the same time a rotation in the direction of the points N., W., S., E. On the 20th of August the wind at the point occupied by the Sophia appeared to veer back, first to the east, and subsequently to the north; and since at this time the progressive movement of the hurricane had changed from a south-west to a north-east direction, the veering of the wind admits of being explained on the supposition that the Sophia had then fallen into the western semicircle of the whirlwind, while the latter, still revolving in the same direction, passed over her.

That independent whirlwinds occasionally interfere with each other may be inferred from the circumstances attending the voyage of the Castries from St. Lucia to England in the same year (1837). This ship, between the 14th and 25th of August, sailed nearly from south to north on the chord of the arc described by the centre of the great hurricane just mentioned. On the 14th and 15th, in about the 18th degree of north latitude, where the wind usually blows from the east, she felt a gale, which at first came from S.S.W., and afterwards changed to S.E., as if she had crossed the eastern side of a storm revolving in the direction N., W., S., E., and whose centre was moving nearly from east to west: this was in fact the said hurricane near the place where it was first observed. The Castries then sailed northward with fair weather till August 24th, when, in lat. 35° 46′ N. and in long. 57° 40′ W. nearly, she was overtaken by a whirlwind which passed over her. Now this could not have been the great hurricane before mentioned, since at that time the latter had passed beyond the spot towards the N.E., and the rotation at its southern extremity must have caused at the place a west wind to be felt; whereas the direction of the wind at the ship was at first from E.S.E., subsequently changing to N.E., N., and N.W.: the ship must evidently therefore have been then in the north-eastern side of a whirlwind coming up from the S.E., and revolving, like the others, in the direction N., W., S., E. This whirlwind must have fallen into the track pursued by the former, and probably both became afterwards blended together.

Mr. Redfield, of New York, Professor Dove, of Berlin, and Colonel Reid, in England, independently of each other, and nearly at the same time, ascertained, from the accounts of persons who had navigated the southern hemisphere, that in the whirlwind storms of those regions the rotation takes place in the order of the cardinal points N., E., S., W., or contrary to that in which the rotations are made in the North Atlantic; the axis of the storm having also a progressive motion from the equator obliquely towards the south pole. Such appears to have been the nature of the storm near the isle of Rodriguez, February, 1807, in which the Blenheim, the flag-ship of Sir Thomas Troubridge, foundered: for it is observed by Col. Reid, that the Harrier, brig of war (one of the squadron), by scudding before the wind from the 1st to the 4th of Fe- v. described about three-quarters of the circum- a circle in the order just mentioned. And since the ships first received the wind from the north-east, it may be inferred that, by sailing south-westward faster than the storm advanced, they actually overtook it at its south-east side. A like circumstance occurred to the ship Neptune during its voyage from Calcutta to the Cape in 1835. From a French account of the hurricane which was felt at the Mauritius in March, 1818, it appears that the wind began early in the morning to blow from S.S.E. and S.; but in about an hour it changed to the east; and at daybreak it became N.N.E. and N., and when the storm ceased it blew from the N.W. These circumstances indicate a rotation in the order N., E., S., W., about an axis passing a little way to the north of the island, from nearly east to south-west.

But the most remarkable storm which Colonel Reid has investigated is that which occurred in the Indian ocean, in March, 1809, when the fleet, under the convoy of the Culloden and Terpsichore, suffered severely. The fleet, homeward bound from India, had got in lat. 21° south, when, on March 14, the hurricane became so violent that the ships were dispersed. By tracing the courses which they pursued, and also those of four ships which had sailed from the Cape to cruise near the Mauritius, Colonel Reid found that the general movement of the storm from long. 80° E., where it was first felt, to long. 55° E., was from N.E. to S.W. nearly; from thence the path turned abruptly, and its direction afterwards was from N.W. to S.E.; it therefore described a curve line similar to that of the North-Atlantic storm in August, 1837, but in a direction tending towards the south pole; and the manner in which the wind veered at each of the ships whose logs have been examined is capable of being represented by assuming that the rotation was, as in the preceding cases, according to the order of the points N., E., S., W.

From the 12th to the 15th of March, the whole fleet appears to have been near the southern extremity of the vortex, and to have sailed in a direction parallel to the path of the axis. Seven of the ships, by *lying to* and falling to the southward, got out of the hurricane on the 15th; but on the 18th, one of them, the Huddart, fell into the southern branch of the line described by the axis, and crossed the northern extremity of the vortex as that axis moved south-eastward.

The Culloden, with part of the fleet, by sailing eastward, got, on the 15th, nearly to the centre of the vortex in the northern branch; on the 15th and 16th, this ship scudded before the wind, but it afterwards changed its course to S.E., and on the 19th it got out of the storm. The ships which followed her probably continued to go before the wind; they thus kept near the centre of the storm, where they must have foundered.

In November of the same year, a hurricane which commenced in lat. 5° S. and long. 90° E. appears to have had little progressive motion; all the ships which were exposed to it experienced a temporary calm in the midst of the storm, and on the afternoon of one day, November 21, the wind veered rapidly quite round the horizon in the order N., E., S., W.

The whirlwinds in the Sea of China appear to differ in no respect from those which take place on the coast of North America. During a hurricane on the coast near Canton, August, 1829, when the East India Company's ship Bridgwater was driven on shore, the changes of the wind were successively from N. to E., and to E.S.E., ending at S.E.; therefore if it be supposed that the course of the storm was nearly from east to west, and that the ship was to the north of its centre, the rotation must have been in the order N., W., S., E.: it has been ascertained that the rotations took place in the same order during the hurricanes of 1832 and 1835.

Little is known of the storms in the Pacific ocean, but that they are of a rotatory character, Colonel Reid infers from the relation given by Mr. Williams, the missionary, of one which took place at Rarotonga, one of the Hervey Islands, in December, 1831. It is stated that during the storm the east end of the chapel was blown in, and therefore the wind must have been in the east; when the gale ended the wind is said to have been in the west.

In higher latitudes the storms are irregular, probably because the vortices follow each other in the same direction and interfere with each other's gyrations; the great storm which, in 1838, was felt on the south coast of Ireland, and proceeded from thence along the west coast of

Scotland, had all the characters of a whirlwind. It is stated by Colonel Reid that on the 14th of February, while at Cape Clear, the wind blew from S.E.; off Oporto the gale was from S.W.; at the same time, at the bottom of the Bay of Biscay, it was felt from S. and S.W.; and at the Shetland Islands, from the 16th to the 20th of February, the wind blew successively from S.E., S., and S.W. At Cadiz between the 7th and 12th of February the wind blew from S.W. and W.; and on the 16th, off Lisbon, there were heavy gales from S.W. to W.N.W. All these circumstances indicate a storm revolving in the order N., W., S., E., while its centre advanced in a line nearly from south to north. Professor Dove of Berlin has remarked, that in Prussia all storms are great whirlwinds, which continue during one or several days, sometimes as many as twenty; the rotation of the wind being generally in one direction. (*Lond. and Edin. Phil. Mag.*, Sept. and Oct., 1837.)

The variations in the height of the column of mercury in a barometer are thought to afford, within the tropics, indications of the approach and the state of a whirlwind; the column has been observed to fall gradually during part of the time that the storm continues at a place, apparently till the centre of the vortex has passed over, and then to rise as gradually. The depression of the column continues also during the movement of a storm from one region to another; the centrifugal tendency of the revolving particles probably opposing that of gravity, by which the particles would otherwise move towards the axis of rotation. Proofs of these circumstances are given by Colonel Reid from observations made at the Mauritius, during the hurricanes in March, 1819, and in February, 1824; but before reliance can be entirely placed on such indications, a greater number of observations on the oscillations of the mercurial column than have yet been made are required.

A knowledge of the laws of the motions of storms would be of the highest importance to mariners, for if a commander of a ship could, from the barometer, obtain timely notice of a coming tempest, and, from the direction in which the wind is blowing, he could ascertain in what part of the margin of the vortex he is when overtaken by the whirlwind, he might put his ship on such a course as would enable her, if she can carry sail, to escape its fury by getting beyond its circumference, or to encounter it with the least possible risk of endangering her safety. If, for example, while a ship is *lying to* in a revolving storm, the wind should veer aft, as it is called, or change its direction, so as to blow from the part of the horizon behind the stern, no other inconvenience would be incurred than that the ship might be urged on the sea, which the wind (having been previously blowing in an opposite direction) had raised; but if it should veer forward, the ship might be driven stern foremost among the waves, and she might founder before she could be brought before the wind; whereas, if the quarter to which the wind will veer could be foreseen, the ship might be manœuvred so as to avoid the danger.

WHISKEY. [Distillation, vol. ix., p. 23; Wine and Spirit Trade.] The word whiskey is the Irish word *uisgue*, 'water.' The name which the Irish give to the distilled spirit is *uisgue beatha*, 'water of life.' Usquebaugh, the name of a cordial at one time in request, is the same two words in a compound form.

WHISPERING PLACES are vaults or galleries in which the sound of words uttered with a low voice is augmented, so as to become audible at a considerable distance from the speaker.

When the air is agitated by any impulse, as the utterance of a word at some spot, the undulations extend spherically in every direction, and thus give rise to perceptions of sound which diminish rapidly in intensity as the distance of the auditor increases; but if the impulse is given at one of the extremities of a tube, it is evident that the undulations will be prevented from spreading laterally, and the whole effect, augmented in consequence of the condensation of the particles of air in the tube, will be experienced: in this manner may be explained the increase of the intensity of sound in a trumpet or a speaking-pipe. [Pipe.] A like effect takes place in a less degree when sound ascends from the bottom of a deep well, or when words are uttered at one extremity of a long corridor or passage in a building. It is said that if a pin be dropped into the well in Carisbrooke Castle, in the Isle of Wight, the sound produced when it strikes the water is distinctly heard at the mouth: the well is above 200 feet deep. The sound of words spoken near the surface of any long wall is similarly augmented in the direction of the length of the wall; the latter, in some measure preventing the undulation from being diffused in the atmosphere: the effect in a corridor is frequently increased when the corridor has bends in its length, or when it is smaller at one extremity than at the other.

When the place is in the form of a dome, the undulations of the air, which are produced by a sound emitted near the concave surface, at any part of the base of the dome, are, by continual deflections from every part of the concave surface, transmitted to a point in the base diametrically opposite to that from whence the sound proceeded; and there the waves are concentrated so as to cause the perception of a sound many times louder than that which was emitted.

The whispering gallery in Gloucester Cathedral, which is described in Birch's 'History of the Royal Society,' vol. i., is a passage leading from one aisle to the opposite, behind the east window of the choir: it is three feet wide, and about six feet and a half high, its whole length is about 75 feet, and its form on the plan is half an irregular octagon: the walls and ceiling are of freestone, and the latter, which is flat, is unevenly wrought. If two persons are placed, one at each end, near either wall, and one converses with the other in the lowest whisper, the words are as distinctly heard as if the persons were close together.

The whispering gallery in St. Paul's Cathedral, London, is that which surrounds the base in the concave surface of the interior dome: here a person speaking in a whisper near the surface of the vault is heard distinctly by a person also near the surface and at the opposite extremity of a diameter, persons in any other part not being able to hear the sound. The like effect is said to take place on the exterior of the same dome if the persons speaking and hearing are at the opposite extremities of a diameter; the waves of sound being apparently deflected on the convex surface. For an account of the ancient whispering-place called the 'Ear of Dionysius' see Syracuse.

WHISTON, WILLIAM, was the son of Josiah Whiston, rector of Norton, near Twycross, in Leicestershire, and was born at that place, December 9, 1667. The materials for his Life are mostly contained in his singular autobiography, published in 1749; and from these the account given in the 'Biographia Britannica' is mostly taken. These memoirs, like others of the same kind, are to be read with allowance for the character of the author, in which there was much of vanity combined with unsuspected integrity. There never was a writer of his own life who laid his weaknesses more plainly before the reader, unless it were Boswell. Whiston was educated by his father (who was blind in the latter part of his life, and employed his son largely as an amanuensis) till the age of seventeen. He was then sent as a pupil to Mr. Antrobus at Tamworth, whose daughter he afterwards married. At the age of nineteen he was entered at Clare Hall in Cambridge, where he applied himself to the study of mathematics and the Cartesian philosophy. He took his degree in Lent, 1689-90, was elected a fellow of his college in the following June, and received ordination in 1693. In 1694 his health obliged him to give up his pupils, and he was made chaplain to Dr. More, Bishop of Norwich. In this year he became acquainted with Newton, whose 'Principia' he had already studied. In 1696 he published his first work, the celebrated 'Theory of the Earth,' which went through six editions. His fancies on this subject, particularly his management of the comet for the production of the deluge, are well known: there was a joke against it, which was not without foundation, namely, that he had covered the whole earth with water, without providing any means of drawing it off again. In 1698 he got the living of Lowestoft in Suffolk, and by his subsequent marriage vacated his fellowship: during his tenure of this preferment he performed his duties with singular disinterestedness and industry. But his connection with the university was soon revived, for in 1701 Newton made him his deputy in the duties of the Lucasian chair, and in 1703 resigned the chair itself, and procured Whiston to be appointed as his successor: on this he resigned his living, and settled at Cambridge. In 1702 he published an edition of Tacquet's

Euclid, which was several times reprinted. He had also some clerical duties, obtained the character of an eminent preacher, and was fairly in the road to higher preferment, when his theological studies, in which he was most assiduous, brought about a gradual change in his opinions, which ended in his becoming an Arian: he finally added the rejection of infant baptism to his system. His views on the matter were much influenced by a conviction which he obtained that the Apostolic Constitutions [Constitutions, Apostolic] were not only genuine books, but equal if not superior in authority to any of the books of the ordinary canon. The change of his opinions soon appeared in his sermons and in his writings, which came out with great rapidity and were very numerous. The list was too long even for the 'Biographia Britannica.' Very wide varieties of doctrine were common enough at that time in the Church of England; and, if not made too public, views which were called heresies were connived at. The bishop of Ely (Dr. Patrick), even when Whiston had gone so far as to omit part of the Litany, and had consequently been cited, contrived to break up the court before the promoter made his appearance; and subsequently contented himself with desiring Whiston not to do the duties of a lectureship which he held at Cambridge, promising that the salary should be continued. But Whiston, whose whole life was one uncompromising act of maintenance of his own opinions, and defiance of his opponents, immediately resigned both office and salary. It is not always that a person who differs from established doctrine is described without an attempt to throw odium even upon his most reasonable acts. To what an extent this can be carried may be seen in the following instance:—A young candidate for a fellowship at Clare Hall, while Whiston was in that society, thinking that the majority of the fellows were hard drinkers (and it seems that he was pretty nearly right), took to drinking by way of recommending himself. As the election drew near, he thought himself mistaken, and therefore applied to Whiston for his vote, confessing that he had become drunken through policy, and promising sobriety in future. Whiston indignantly refused the request, telling the young man that he had sacrificed his integrity to his preferment. To this the writer of the Life in the 'Biographia Britannica' applies the terms 'fanatical disposition' and 'puritanical rigour.'

In October, 1710, the storm burst upon the heretic. The heads of houses, after several hearings, to which they would not allow Whiston to bring a single friend, banished him from the University, after the usual offer of leave to recant. A year afterwards they declared his professorship vacant. Both proceedings, as being done by the heads without a public trial in the vice-chancellor's court, were highly irregular, if we may trust the opinions given in subsequent affairs of the same kind; but the Court of Chancery confirmed them. Whiston was now thrown upon the world, but he had a small patrimony, and with this, his writings, his public lectures, and the occasional liberality of those who admired his unflinching character, particularly (towards the end of his life) of his son-in-law, he never was in want. His trials however were not yet over, and the heads of them will show how difficult, then as now, it was to define and prosecute heresy in the Church of England. The lower house of convocation censured his writings in 1711, but the censure happened to get mislaid before it was brought to the queen. Whiston, nothing daunted, published his 'Primitive Christianity' in November, whereupon the lower house applied to the upper house for a censure, but without effect. Further steps were thought of, and the judges were applied to for information on the extent of the powers of convocation: four were of opinion that there was no power to cite a heretic, but the rest were the other way. Still the convocation did not move, and in 1713 a private incumbent in London delated Whiston of heresy before the Dean's court of St. Paul's. The commissary of this court would not assume jurisdiction, but referred the matter to the Dean of the Arches, who in his turn objected to hear it except as an appeal. The delator thereupon applied to the Chancellor, who appointed a court of Delegates, which decided that the Dean of the Arches ought to have heard the case, but proceeded to treat it as an appeal made to themselves. Whiston was accordingly cited, and appeared, but not until the court had managed to dissolve the sitting, after declaring him in contempt. This sort of thing happened so often, that we cannot but suspect the courts liked in such cases to take advantage of some party being a few minutes behind his time, and to escape the discussion. The lay delegates subsequently declared they would not proceed without a court of adjuncts to determine what heresy was. One of the delegates (a judge) affirmed that he would not take heresy on his shoulders nor on his conscience, and another kept whispering Whiston's counsel (Sir Peter King, afterwards lord chancellor), to move for a prohibition. Finally, in the court of adjuncts the Chief Justice declared he would not be a judge of heresy; and so proceedings were delayed till 1715, when all heresy was pardoned by an act of grace; and neither excommunication nor degradation ever followed. Whiston declares that he never lost more than two or three hours' sleep during the whole five years; he handed about his 'Proposals for finding out the Longitude at Sea by Signals' at the door of the court, and on one occasion presented each of his judges with a sheet, wet from the press, which they supposed was a petition, but which on being opened displayed the following title: 'The Cause of the Deluge demonstrated.' During the remainder of his life Whiston had no serious annoyance for his opinions. He was preached against and refused the communion by the clergy, foremost among whom was the famous Dr. Sacheverell, but he was never averse from controversy, and would have been anything but pleased if he had not excited attention. He was also refused admission into the Royal Society. According to his account, Sloane and Halley one day asked him (in 1720) why he was not a Fellow: he replied, that they durst not choose a heretic; upon which Halley proposed Whiston, and Sloane seconded him. When Newton heard this, he said that if Whiston were chosen a member, he would not be president. The reason of this could not have been disapprobation of Whiston's opinions, for even supposing that Newton was not himself an Arian (which is a disputed point), his most particular friend Dr. Clarke was one, and we can hardly suppose that he would not endure in a Fellow of the Society the opinions of his own most intimate associate. Whiston states as follows:—'Now if the reader desire to know the reason of Sir Isaac Newton's unwillingness to have me a member, he must take notice that as his making me first his deputy, and giving me the full profits of the place, brought me to be a candidate; [and] as his recommendation of me to the heads of colleges in Cambridge, made me his successor: so did I enjoy a large portion of his favour for twenty years together. But he then perceiving that I could not do as his other darling friends did, that is, learn of him without contradicting him when I differed in opinion from him, he could not, in his old age, bear such contradiction, and so he was afraid of me the last thirteen years of his life.' This and other remarks upon Newton's character passed for prejudice or misconception till a few years ago, when the disclosures made as to Flamsteed [Flamsteed] obliged many persons to adopt a somewhat lessened estimate of the social character of the greatest of mathematicians. Those who then endeavoured to vindicate Newton passed off the corroboration of Whiston's testimony by representing it as that of a 'vain and shallow' person. Vain he was beyond a doubt, and the simplicity of his vanity reminds us of the character of Oliver Goldsmith (who had however the sense to keep all signs of his foible out of his writings): but shallow he was not, though his learning was not of the deepest character. It is hardly to be imagined that Newton would have made a shallow person his deputy, or, after trial in that capacity, his successor: and in truth no one can read Whiston's writings without seeing a good portion of shrewdness mixed up with his vanity. Some of his retorts deserve to be celebrated in the history of such things. Talking with Chief Justice King, he says, 'We fell in debate about signing articles which we did not believe, for preferment, which he openly justified, and pleaded for it, saying, "We must not lose our usefulness for scruples." I replied, that I was sorry to hear his lordship say so; and desired to know whether in their courts they allowed of such prevarication or not. He answered, they did not allow of it. Which produced this rejoinder from me: "Suppose God Almighty should be as just in the next world as my lord chief justice is in this; where are we then?" To which he made no answer; and to which the late Queen Caroline added, when I told her the story, "Mr. Whiston, no answer was to be made to it.”’ On another occasion (and this story does not come from Whiston himself, but from the ‘Biographia Britannica,’ in which the writer assures us he has it from undoubted authority), being in company with Pope, Addison, Walpole, Craggs, and others, they appealed to Whiston on the subject they were debating, namely, whether a secretary of state could be an honest man. Whiston's reply may be imagined; on which Craggs said, ‘It might do for a fortnight, but not longer.’ To which Whiston replied: ‘Mr. Secretary, did you ever try it for a fortnight?’ To which Craggs answered nothing, and Mr. Walpole said he could not answer. The story of his telling Queen Caroline, at her request, one of her faults, talking during public worship, and refusing to tell another till she had amended that one, is well known. Such readiness in conversation, it may easily be supposed, was invaluable to a person in Whiston's position.

There are various circumstances of Whiston's life which it is not necessary to do more than name: his formation of a religious society which met at his own house—his various philosophical lectures, oral and printed—his multifarious speculations on prophecy, particularly his decision that the Jews were to be restored and the millennium to commence in 1766; his speculations on finding the longitude, whether by attempting to moor fixed light-vessels in the sea (which he thought everywhere fathomable), by the dipping-needle, or by Jupiter's satellites, &c.; his survey of the coasts of England by subscription, which produced a useful chart, &c. He died August 22, 1752, in London, at the age of eighty-five, having never remitted his efforts for the diffusion of his opinions, nor forfeited in the smallest point his character for courageous consistency. He left several children, one of whom, John Whiston, made a fortune as a bookseller, and published many of his father's later works.

The titles of Whiston's writings, up to 1737 only, are fifty-nine in number. Only one has lasted, the translation of Josephus, published in 1737. This book has been reprinted a great many times. The Puritans have always had a sect lineally descended from them, who make it almost a point of duty to read little except the Bible. This sect subdivides into two, the second books of the subdivisions being Bunyan's ‘Pilgrim's Progress’ and Whiston's ‘Josephus.’ Of this translation the general opinion, as a translation, is favourable.

If what the ‘Edinburgh Review’ asserts be correct, namely, that the recent discovery of Milton's Arianism has diminished the sale of ‘Paradise Lost,’ we may almost wonder that Whiston's ‘Josephus’ gained so firm a footing among sects of the most rigorous orthodoxy.

To what has been said of the character of Whiston, we may add that his spirit, though benevolent, was, we strongly suspect, not much inclined to toleration. His ideas of ecclesiastical discipline and authority were so high, that we should be inclined to think his heterodoxy lost the church a bishop who would have led his clergy the lives of slaves, and been far from showing towards heretics the indisposition to prosecute which Hooper, Burnet, and others showed towards him. Almost his first act upon leaving Cambridge after his banishment was to set a parish priest upon making inquiries with reference to refusing the communion to a lady who was suspected of not being married to the man whose name she bore, though the matter was by no means certain, gave no scandal, and came to Whiston's knowledge as a visitor at the house, to which he was introduced by his respectable friend Dr. Clarke. His perfect simplicity is displayed in his manner of telling this story (*Memoirs*, p. 183) and many others; as also in the otherwise unjustifiable openness with which he enters upon the concerns of others. He seems not to have had the smallest idea of the proprieties of private intercourse; perhaps his incapability of concealing his own foibles belonged to a temperament which also prevented his seeing what he was doing with those of others. His vanity has reference more to the supposed importance of what he had done or was to do, than to his own power as the doer of it. He does not hold himself up as a great scholar, or divine, or mathematician. When Cotes, a very young man, was candidate for the Plumian professorship, to which he, as Lucasian professor, was an elector, the election was managed thus, according to Whiston: ‘I was the only professor of mathematicks directly concerned in the choice, so my determination naturally had its weight among the rest of the electors. I said that I pretended myself to be not much inferior in mathematics to the other candidate's master, Dr. Harris, but confessed that I was but a child to Mr. Cotes: so the votes were unanimous for him.’ Whiston seems to have been more vain of his sincerity than of anything else: and certainly the number is not small of those who would be much the better even of a double portion of his weaknesses, if they could thereby gain one-tenth part of his goodness and honesty. To none more does this remark apply than to a certain dignified clergyman of his own day, whose writings were a disgrace to his profession, and who in a certain epigram, of which decorum forbids the repetition, applied the epithet ‘wicked’ to the subject of this article, accompanied by expressions of contempt which the lowest of our day do not venture aloud in the street without first looking to see that no policeman is in hearing. What could have been the meaning of the now common phrase, ‘the decent part of society,’ in the age in which Swift was allowed to cast a stone at Whiston?

WHITAKER, REV. JOHN, was born at Manchester about 1735, and studied at Oxford, where he took his degree of M.A. in 1759, and B.D. in 1767: he was also a Fellow of Corpus Christi College. In Reuss's ‘Register of Living Authors of Great Britain,’ 8vo., Berlin, 1791, there is attributed to Whitaker a ‘Survey of the Doctrine and Arguments of St. Peter's Epistle, with a paraphrastical Exposition,’ published in 1751; but this is probably a mistake. His first publication appears to have been the first volume, in 4to., of ‘The History of Manchester,’ which appeared in 1771, and which was followed by a second volume in 1775; the first having been reprinted, with corrections, in 2 vols. 8vo., in 1773. Meanwhile also he had published, in an 8vo. volume, in 1772, his ‘Genuine History of the Britons asserted,’ in answer to James Macpherson's ‘Introduction to the History of Great Britain and Ireland,’ which had appeared the preceding year. Macpherson (already made famous by his ‘Ossian’), and the Rev. Dr. John Macpherson of Skye, whose ‘Dissertations on the Caledonians’ James Macpherson had published, with a preface, in 1768, had maintained that the modern Scotch Highlanders were the descendants of the antient Caledonians spoken of by Tacitus and other Roman writers; Whitaker endeavoured to show that they were sprung from an Irish colonization subsequent to the Roman invasion of the country. Whichever of the two opinions may be true, or nearest to the truth, it will now be admitted that neither the Macphersons nor Whitaker threw much light upon the subject, and that the speculations of both have been superseded and made quite valueless by subsequent investigations.

In November, 1773, Whitaker was appointed morning preacher of Berkeley Chapel, London; but the person, Mr. Hughes, who had given him the situation, thinking proper to remove him in about two months after, Whitaker published a statement, under the title of ‘The Case between Mr. Whitaker and Mr. Hughes, &c.,’ in which, his biographer in Chalmers (a personal acquaintance) tells us, ‘he expressed himself so indiscreetly that his “Case” was considered as a libel by the Court of King's Bench.’ This would seem to mean that the publication had been made the subject of an indictment or an action. Having soon after this given substantial proof of his scrupulous orthodoxy by refusing a living in the church which was offered to him by a Unitarian patron, he remained with nothing but his fellowship till 1778, when he succeeded, on the presentation of his college, to the valuable rectory of Ruan-Langhorne in Cornwall. Taking up his residence here, he became involved in a contest with his parishioners about his tithes, which appears to have almost wholly occupied him for some years; but he proved finally victorious in the courts of law, and after a time, we are told, he had also ‘the satisfaction to perceive a visible alteration in the behaviour of the principal parishioners, and a mutual good understanding was established between the pastor and his flock.’ He was an animated and impressive preacher, and in all respects an attentive and zealous clergyman. His principal publications after this were, an octavo volume of ‘Sermons upon Death, Judgment, Heaven, and Hell,’ in 1783; ‘Mary Queen of Scots vindicated,’ in 3 vols. 8vo., 1787, of which a second edition, much enlarged, appeared, in the same number of volumes, in 1790; Gibbon's ‘History of the Decline and Fall of the Roman Empire Reviewed,’ 8vo., Lon., 1791; ‘The Origin of Arianism disclosed,’ 8vo., 1791; ‘The Course of Hannibal over the ead terminated his own life during a tem- on of intellect, on the 6th of July, 1815. previously been liable to attacks of a under which he imagined himself the and the object of public ridicule or ressure on the brain, discovered unt sufficiently for this malady, id of excessive devotion to busi-

of 1806-7; *Annual Register*, 1815; *Debates; Annual Biography.*)

parliamentary borough and seaport, 243 miles from London, in the North Riding of York- 28′ N. lat. and 35′ W. long. The parish is chiefly by Strand Liberty, but a small part of it is in burgh Liberty. The town is situated on both of the river Esk, where it falls into the German Ocean, the larger and better part being on the west side of the river. A drawbridge connects the two parts of the town, and allows ships to pass into the inner harbour, which is formed in the river, and is capacious and secure, with dry docks for building and repairing. The harbour has ten feet of water in ordinary neap-tides, and fifteen feet and upwards in spring-tides. The east pier and west pier, which protect the outer harbour, run out into the German Ocean, and two inner piers break the force of the waves in stormy weather. The ground on each side of the river rises rapidly, especially on the east side, where the ridge is so steep as to have stopped the building of houses in that direction, and the town on this side is continued southwards in a narrow column of houses along the bank of the river. The ridge is less steep on the west side, and the streets have been carried over the crown of the hill, and there the best houses are situated. The streets are very narrow in both parts of the town, but they are well paved, and lighted with gas. The oldest houses have been built quite close to the river and sea.

There is a town-hall, a custom-house, a news-room, a dispensary, and a seamen's hospital for widows and children of seamen. The theatre was burnt in 1823, and we have no authorities who mention the rebuilding of it. The church stands on the summit of a high cliff to the east, and a flight of 190 stone steps leads to it from the town below. The living is a curacy, in the gift of the archbishop of York, of the net annual value of 206*l*. The ruins of Whitby Abbey are near the church, overlooking the sea at the height of 240 feet. The beautiful central tower fell in 1830; the existing remains consist of the choir, the north transept, nearly entire, and part of the west front. There are two or three chapels-of-ease in the lower part of the town and neighbourhood, and there are places of worship for Methodists, Quakers, Presbyterians, and Unitarians. There are Lancasterian and other schools for children of both sexes.

In 1837 an act was passed 'for better paving, cleansing, lighting, watching, and improving the town of Whitby,' and in 1841 another act was passed 'to alter and amend' the above act. In 1833 an act was passed for making a railway from Whitby to Pickering, which is distant about 20 miles south by west. This railway was opened in May, 1836, for passengers and general traffic: it has only one track, and is worked by horses and two inclined planes. A branch railway goes to the freestone-quarries, which are about three miles from Whitby.

The population of Whitby, in 1821, was 8697; in 1831 it had fallen to 7765. The number of depositors in the savings'-bank, Nov. 20, 1842, was 1157. The smallest sum on which interest is allowed is 15*s*.

Whitby returns one member to the House of Commons. The electors are householders of 10*l*. and upwards. The number on the register in 1835-6 was 431; in 1839-40 the number was 445. The population of the parliamentary borough, which includes the townships of Ruswarp, Hawkser, and Stainsacre, was, in 1831, 10,399; in 1841 it 7862.

Whitby is an antient place: it seems to have arisen originally from the neighbourhood of an abbey founded by Oswy, king of Northumberland, in 867; but both abbey and town were utterly destroyed by the Danes, and lay in ruins till after the Norman conquest, when the abbey was rebuilt, and the town became a considerable fishing town, in which state it continued several centuries. It did not rise in commercial importance till towards the end of the reign of Queen Elizabeth, when the working of the alum-mines in the neighbourhood was greatly extended, the harbour was improved, and ship-building was carried on. Alum was exported to France and other parts of the continent. During the late war seven dockyards were in full employ in ship-building and repairing, and manufactures of sailcloth, ropes, and other necessaries for shipping were carried on to a great extent. In 1819 twelve ships were employed in the whale-fisheries. The export of alum to the continent has ceased, and it is now sent chiefly to London and other British ports. The port has nearly if not entirely ceased to employ its ships in the whale-fisheries. The manufacture of sailcloth has diminished, and only three or four of the dockyards are now used. The foreign exports are inconsiderable: the chief imports are timber, and hemp and flax from the Baltic. The chief article sent coastwise is freestone from the quarries in the neighbourhood.

Whitby is still a very considerable seaport. There are only seven in England which exceed it in the number of registered ships (London, 2405 ships, 598,554 tons; Newcastle, 1143 ships, 259,571 tons; Liverpool, 1097 ships, 307,852 tons; Sunderland, 803 ships, 174,202 tons; Whitehaven, 341 ships, 55,501 tons; Hull, 323 ships, 67,795 tons; and Yarmouth, 315 ships, 34,676 tons). According to a parliamentary return, dated March 23, 1842, the number of registered vessels above 50 tons was 291, the burthen of which was estimated at 47,837 tons; and, according to another return, the gross receipt for customs' duty in 1840 was 6654*l*. 18*s*. 7*d*., 3914*l*. 14*s*. 10*d*. having been remitted to the receiver-general after payment of expenses.

(*Boundary Reports*, 1832; *Parliamentary Documents*; Young's *History of Whitby*, Whitby, 1817.)

WHITBY, DANIEL, D.D., an English divine of great celebrity in his own day, and some of whose works are still in considerable repute, was born in 1638, at Rushden, or Rusden, in Northamptonshire. In 1653 he was admitted of Trinity College, Oxford, of which he was elected a scholar in June, 1655: he took his degree of B.A. in 1657, and that of M.A. in 1660, and was elected Fellow of his college in 1664. Having taken holy orders, he found a zealous patron in Dr. Seth Ward, bishop of Salisbury, who made him his chaplain, and collated him in October, 1668, to a prebend in his cathedral, and in November following to another. In September, 1672, he was admitted chantor or precentor of the same church, and immediately after accumulated the degrees of B.D. and D.D. About the same time he was presented to the rectory of St. Edmund's church, in the city of Salisbury; but, although his life lasted for more than half a century longer, this was the last of his preferments. He died at Salisbury, at the age of eighty-eight, on the 24th of March, 1726, having, it is said, been at St. Edmund's church (one account makes him to have preached) the day before.

The early date at which, after so promising a commencement, his professional progress was stopped, is explained by the history of his literary performances, which forms all the rest of his biography. His first publications were a series of attacks upon popery, in the course of the active controversy upon that subject which was kept up almost without intermission in England from the Restoration to the Revolution:—'Romish Doctrines not from the beginning,' 4to., Lon., 1664, an answer to Serenus Cressy; 'Δὸς πȣ̃ στῶ, or an answer to *Sure Footing*' (an anonymous work by a Popish missionary called John Sergeant, alias Smith), 8vo., Oxford, 1666; 'A Discourse concerning the Idolatry of the Church of Rome,' 8vo., Lon., 1674, in defence of Stillingfleet, and against his popish assailant Dr. Thomas Godden, alias Browne; 'The Absurdity and Idolatry of Host-worship proved,' 8vo., Lon., 1679; 'A Discourse concerning the Laws, ecclesiastical and civil, made against Heretics by Popes, Emperors, &c.,' 4to., Lon., 1682, reprinted at London in 8vo. in 1723, with an Introduction by Bishop Kennet, in which it is erroneously ascribed to Dr. Maurice. In 1671 he also published at Oxford, in 8vo. 'Λόγος τῆς Πίστεως, or the Certainty of the Christian Faith and of the Resurrection of Christ.'

In 1683, unfortunately for his peace and his reputation, he turned aside from attacking the Papists to defending the Dissenters, publishing in that year, at London, an 8vo. volume entitled 'The Protestant Reconciler, humbly pleading for condescension to Dissenting Brethren in things indifferent and unnecessary, for the sake of peace, and showing how unreasonable it is to make such things the necessary conditions of communion.' The book (which was anonymous, but the authorship of which appears to have been soon discovered) was immediately attacked with great fury from various quarters: the University of Oxford, in a congregation held on the 21st of July, condemned it to be burnt by the hands of the marshal in the Schools Quadrangle; and at length Whitby, on the requisition of his diocesan and patron, Bishop Ward, signed on the 9th of October a strong expression of his sorrow and repentance for having 'through want of prudence and deference to authority' caused it to be printed and published, and his distinct retractation of its two main principles—that it is not lawful for superiors to impose anything in the worship of God not antecedently necessary, and that the duty of not offending a weak brother is inconsistent with all human right of making laws concerning indifferent things—both of which he now professed to have discovered to be false, erroneous, and schismatical. The same year he also published a second part of the 'Protestant Reconciler, earnestly persuading the Dissenting laity to join in full communion with the Church of England, and answering all the objections of non-conformists against the lawfulness of their submission unto the rites and constitution of that church.'

He now, after publishing a Latin compendium of ethics, 'Ethices Compendium in usum academicae juventutis,' 8vo., Oxon., 1684, returned to his old subject, the errors of popery, and published 'A Treatise in confutation of the Latin Service in the Church of Rome,' 4to., Lon., 1687; 'The Fallibility of the Roman Church demonstrated,' 4to., Lon., 1687, a treatise against the worship of images; 'A Demonstration that the Church of Rome and her Councils have erred,' 4to., Lon., 1688, on communion in one kind; and 'Treatise of Traditions,' part i., 4to., Lon., 1688; part ii., 4to., Lon., 1689.

He next came forward in defence of the Revolution, in two treatises: the first entitled 'Considerations humbly offered for taking the Oath of Allegiance to King William and Queen Mary,' 4to., Lond., 1689; the second, 'An Historical Account of some things relating to the Nature of the English Government, &c.,' 4to., Lond., 1690. These were followed by 'A Discourse confirming the Truth and Certainty of the Christian Faith, from the Extraordinary Gifts of the Holy Ghost vouchsafed to the Apostles,' 4to., 1691; a treatise in Latin against Arianism and Socinianism, 'Tractatus de Vera Christi Deitate,' 4to., Oxf., 1691; and 'A Discourse of the Love of God,' 8vo., Lond., 1697.

In 1703 appeared, in two volumes folio, his principal work, 'A Paraphrase and Commentary on the New Testament.' This has been often reprinted, and is still held in much esteem by the adherents of the Arminian system of doctrine. The best edition is that of 1760, in 2 vols. fol.; and the work was reprinted so recently as 1822, in one volume, royal 4to. In connection with it he afterwards published 'A Discourse of the Necessity and Usefulness of the Christian Revelation, by reason of the Corruptions of the Principles of Natural Religion among Jews and Heathens,' 8vo., Lond., 1705; 'Reflections on some Assertions and Opinions of Mr. Dodwell, &c.' 8vo., Lond., 1707; 'A Discourse concerning the True Import of the words *Election* and *Reprobation*,' 8vo., Lond., 1710 (commonly called 'Whitby on the Five Points,' and often reprinted; the best edition is that of 1735; there is one of so late a date as 1817); 'Four Discourses' (on Election and Reprobation), 8vo., Lond., 1710; a treatise against the doctrine of Original Sin in Latin, 'Tractatus de Imputatione Divina Peccati Adami Posteris ejus, &c.,' 8vo., Lond., 1711. Whitby had been bred a Calvinist, his teachers at the university having been all of that persuasion; and, as he states himself in a preface to one of the above tracts, his own investigations and reflections had gradually brought him round to the opposite opinions.

But his views afterwards underwent a still further change. Dr. Clarke's 'Scripture Doctrine of the Trinity,' which appeared in 1712, made him a convert to Arianism, and he afterwards published the following tracts in defence of his new creed:—'Dissertatio de S. Scripturarum Interpretatione' (against the authority of the Fathers in the controversies about the Trinity), 8vo., 1714; 'A Discourse showing that the Expositions which the Ante-Nicene Fathers have given are more agreeable to the Interpretations of Dr. Clarke, &c.' 8vo., Lond., 1714; 'A True Account and Confutation of the Doctrine of the Sabellians,' 8vo., Lond., 1616; and a disquisition, in Latin, on the difficulties which attend the study of the doctrine of the Trinity, under the title of 'Disquisitiones Modestae in Bulli Defensionem Fidei Nicenae,' 8vo., 1720. This last tract involved him in a controversy with the great Trinitarian champion, Dr. Waterland. Whitby defended himself in two additional pamphlets, published this same year, and retained his Arian principles to the end of his life, as appears from his posthumous work entitled 'Υστέραι Φροντίδες, or the Last Thoughts of Dr. Whitby: containing his Correction of several passages in his Commentary of the New Testament; to which are added Five Discourses, published by his express order;' 8vo., Lond., 1728.

Meanwhile he had published another tract on the Romish question, entitled 'Irrisio Dei Panarii Romanensium; the Derision of the Breaden God, &c.,' 8vo., Lond., 1716; and he had also taken part in the Bangorian controversy, by two pamphlets in defence of Bishop Hoadly; the first, 'An Answer to Dr. Snape's Second Letter to the Bishop of Bangor,' 8vo., Lond., 1717; the second, 'A Defence of the Propositions contained in the Lord Bishop of Bangor's Sermon,' 8vo., Lond., 1718.

To this long list are still to be added six single sermons published at different times between 1671 and 1714; 'Thirty-three Sermons upon the Attributes of God,' 2 vols., 8vo., Lond., 1710; 'Sermons on Several Occasions,' 8vo., Lond., 1720; 'Twelve Sermons preached at the Cathedral Church of Sarum,' 8vo., Lond., 1726; besides an anonymous pamphlet, entitled 'A Short View of Dr. Beveridge's Writings,' 8vo., Lond., 1711—a severe attack on Bishop Beveridge—of which he is supposed to be the author.

WHITCHURCH. [Hampshire.]

WHITCHURCH. [Shropshire.]

WHITE BEAM-TREE. [Pyrus.]

WHITE CANONS. [Premonstratensian Order.]

WHITE LAKE, or BIELOE OZERO. [Russian Empire.]

WHITE LEAD. [Lead, p. 370.]

WHITE MOUNTAINS. [New Hampshire.]

WHITE RIVER. [Mississippi River.]

WHITE SEA, a large gulf of the Arctic Ocean, which enters deeply into the northern parts of European Russia, between 64° 30′ and 68° 30′ N. lat. It rather resembles a sound of large dimensions, than an open sea, and has nearly the shape of a semicircle, whose opening is directed towards the north-west, and which is separated from the open sea by a large peninsula, which takes its ordinary name from the town of Kola, built not far from its northern shore. The entrance to the White Sea is between Kanin Noss, on the peninsula, or rather island, of Kaninskaïa Zemlia, which lies to the east, and Swatoi Noss, a projecting cape of the peninsula of Kola. These two places are about 100 miles distant from each other. The gulf gradually grows narrower, and where it turns to the south-west it is hardly more than 40 miles wide. That portion of it which lies east and west is nearly twice as wide, and expands towards the south into two large gulfs, the Dwinskaïa Guba, or Gulf of the Dwina, on the east, and the Onezkaïa Guba, or Gulf of the Onega: both bays have received their names from the rivers which fall into their most south-eastern recesses. West of the Onezkaïa Guba the White Sea terminates with an inlet, which is about 100 miles long, but has only a mean width of 25 miles and runs to the north-west. It is called Kandalaskaïa Guba, or the Gulf of Kandalask, from a small place of that name which lies near its innermost recess. The area of this sea is said to be about 44,000 square miles.

The White Sea is so far favourable to navigation, that it has a considerable depth of water, and yet within soundings, with the exception of a sandbank which lies before the mouth of the Dwina, and occupies the greater part of the Dwinskaïa Guba. This sandbank approaches the eastern shore within about a mile, and remains about three miles distant from the southern shore. Large vessels therefore must keep near the shore, which is generally rocky and of moderate height, but may be safely approached, as the depth is seldom less than 20 fathoms. A bar lies across the entrance of the river Dwina, which at low-water has only 12½ feet of water, and at high-water from 14½ to 15 feet; at spring-tides it rises to 17 feet. But the sea is frequently covered with fogs, which are thick at a distance from the shore, but much less so as the coast is approached, which circumstance renders them less dangerous to shipping. The navigation generally lasts six months, as the ice in the Dwina begins to appear at the end of October, and before the beginning of May the river cannot safely be entered by vessels. Some account of the trade of this sea is found under ARCHANGEL, vol. iii., p. 267.

Fish is more abundant in the White Sea than in any of the closed seas of Europe. Seals are very frequently met with on the shores. The white fish, as it is called by the whalers of Spitzbergen, or the beluga, or white whale, of authors and navigators, yields a valuable oil, and is met with in large shoals. Cod is taken in great quantities along the coasts of the peninsula of Kola. Herrings are as numerous as along the coast of Norway. The salmo autumnalis of Pallas enters, towards the end of the summer, the small lakes along the coast, and is much esteemed for its flavour. It appears that the White Sea is the most western part of the Arctic Ocean where this fish is found. Other kinds of fish which abound are the Gadus æglefinus, Gadus callarias, and the flat fish which is called Pleuronectes glacialis. But the fishery carried on by the population on the shores of the White Sea is not limited to that sea. From Archangel, Mesen, and Onega many vessels are annually sent to the coasts of the Polar Sea, and especially to Spitzbergen and Nova Zemlia, where they take whales, the narwhal, the Physeter macrocephalus, or white whale, seals, and the walrus. The walrus is called in the Russian language *morsh*, from which the English *morse* is derived, as the teeth of that animal were first brought to England from the White Sea.

The whole eastern coast of America, from the mouth of the St. Lawrence river to the Strait of Magalhaens, had been discovered before the existence of the White Sea was known to the seafaring nations of Europe. It appears that before 1553 the farthest point known in these parts was Vardöehuus in Norway. In that year however Richard Chancelor, with his ship belonging to the squadron of Sir Hugh Willoughby, who had been sent to discover a north-east passage to Cataia, or China, arrived at St. Nikolaus, not far from the present town of Archangel, and by this voyage, and the negotiations which followed it, the empire of Russia was opened to English enterprise. A company which had been formed in England for the purpose of carrying on the trade in these parts, pushed its enterprises beyond the limits of Russia, and sent its delegates even to Bokhara. The commerce of the White Sea rapidly increased; towards the close of the sixteenth century the Dutch and Hanseatic towns began to send vessels to New Kholmogory, as Archangel was then called, which was built in 1584. It was less active during the seventeenth century. The civil wars, which laid waste the empire after the death of Boris Godoonoff, and the plague and the ill-will which Alexei Michailowitch showed towards the English after the death of Charles I., frequently interrupted and almost annihilated the English commerce with Archangel. Towards the end of the century it became more steady and began to increase, but the advantages which the English had enjoyed over other sea-faring nations had been taken from them, and their profits were greatly reduced. After the foundation of St. Petersburg the commerce of Russia was diverted from the White Sea to the Baltic, and this was in a short time completely effected by the energetic measures of Peter the Great. During the whole of the last century the commerce of Archangel was in a languishing state, so that between 1761 and 1763 not more than 40 vessels on an average visited the port, whilst at the beginning of the century their number had annually amounted to 150. The empress Catherine II. did little to raise it, but Paul I. and Alexander took off the restrictions under which Peter had laid its commerce, and since the beginning of this century it has continually been increasing.

(Lütke's *Reise durch das Nördliche Eismeer*; Storch's *Geschichte des Russischen Handels*.)

WHITE SWELLING, a disease of the joints, so called on account of the unaltered colour of the skin. Under this term are included nearly all those diseases of the joints which are the result of chronic inflammation in the bones, cartilages, or membranes constituting the joint. These inflammations are constantly attended with swelling, which is circumscribed; the part is sometimes hard, resisting the pressure of the fingers, and thus leading to the impression that the bone is swollen and diseased; or it may be elastic, and yielding to pressure; or so soft as to produce the impression of the presence of fluid. Sometimes these swellings are attended with no pain, at other times pain is one of the earliest symptoms, and is constantly present, and greatly aggravated by the motion of the limb. In some cases the motions of the joint are but little impeded, whilst in others they are entirely destroyed. These general symptoms however admit of distinction, and several forms of white swelling can now be traced to different parts of the joint as their seat.

Amongst older writers these diseases have been described under the names of *spina ventosa*, *fungus articuli*, lymphatic tumor, and other names. A common division of these diseases is also into rheumatic and scrofulous, according as they were supposed to have their origin in a rheumatic or scrofulous state of the system. The more active were referred to the former and the chronic to the latter. Many other distinctions are founded more upon the age, temperament, and constitution of the patient, than upon essential differences of the disease. The following are the diseases of the joints which are generally denominated white swellings.

1. *Inflammation of the Synovial Membranes.*—This disease may be either acute or chronic. When acute, the skin is generally red, and the joint very painful and tender. It commences with pain at one particular spot, and in a day or two after, swelling takes place. The swelling may be felt at first to undulate, from the effusion of fluid into the membrane; but this becomes less evident as the disease advances, from the thickening of the membranes and also from the effusion of lymph. The swelling always assumes the form and direction of the synovial membranes. In a few days the disease subsides altogether or assumes the chronic form. When the inflammation is chronic from the beginning, the pain and tenderness are much less, so that the patient is able to walk about without much difficulty. There is little or no fever, the skin retains its natural colour, the swelling increases only slowly, and the symptoms are rendered worse by exposure to cold and exertion. In these cases, although the effused fluid may at length become absorbed, the synovial membrane remains thickened, and swelling and stiffness of the joint are the consequence, constituting a very common form of white swelling. The causes of this disease are both constitutional and local. It may arise as an effect of phlebitis, gout, rheumatism, syphilis, or mercury; or it may be produced by sprains, contusions, wounds, dislocations, or fractures of the heads of the bones.

The treatment of this disease must vary according as it is acute or chronic, or dependent on local or constitutional causes. In the acute and local form of the disease perfect quietude must be insisted on, and general bleeding and leeches to the part should be had recourse to, with saline purgatives and diaphoretics. When the skin is tense, fomentations and poultices may be used; but where not, cold lotions will be best. In the early stage of the chronic form leeches and cold lotions to the part may be applied and perfect quietude enjoined. In the latter stages counter-irritants may be used, such as blisters, the savine cerate, ointment of tartarized antimony, &c. When persons are well enough to move about, the joint should be kept from movement by strapping it with soap-plaster, or covering it with a bandage or a cap of leather or other material made to fit tight. For the removal of the stiffness, champooing, the vapour-bath, or friction with the hand, may be employed. When the inflammation arises from rheumatism or syphilis, the treatment should be the same as for those diseases.

2. *Pulpy Thickening of the Synovial Membrane.*—This disease generally occurs in young persons between the ages of sixteen and twenty-five, and is mostly confined to the knee-joint. There is not much pain in the joint, but swelling and rigidity come on slowly. The joint on being touched appears to have fluid in it. This disease goes on sometimes for years, till at last it destroys the joint; and unless the limb is amputated, hectic symptoms ensue and destroy the patient. This disease consists in a total disorganization of the synovial membrane, which is converted into a brownish or lightish brown pulpy substance, varying from a quarter of an inch to half an inch in thickness. In its advanced stages the cartilages, bones, and ligaments of the joint become implicated in the disease.

The well-marked cases of this disease must be looked upon as incurable, and only amputation will give a chance of relief. In mild or doubtful cases the only plan that seems to offer success is perfect quietude of the joint, which may be secured by pasteboard or other splints, or by soap-plaster. The general health should be attended to, and local applications made according to the symptoms. Inflammation should be subdued by leeches, and gentle counter-irritants may be kept constantly applied.

3. *Ulceration of the Cartilages.*—This disease occurs chiefly in children or adults under the middle age. It is frequently a consequence of the preceding diseases, but often occurs alone, although in its progress it may involve the whole joint. The joint in which it is most frequently seen is the hip, producing the greater amount of the diseases known by the name of hip-joint disease. When it occurs in the knee, it differs from inflammation of the synovial membranes by the pain at the commencement of the disease being slight, and its going on increasing in intensity. The pain is also present sometimes four or five weeks before any swelling is perceived. The swelling, when it does occur, arises from inflammation of the cellular tissue outside the joint, and often appears much larger than it really is, from the previous wasting of the leg from want of use. In many cases an effusion takes place into the synovial membrane and increases the swelling. In the progress of the disease abscesses form, having fistulous connections with the synovial membrane and the surrounding inflamed tissue. As the cartilaginous tissue is renewed with difficulty, the most favourable termination of this disease is generally attended with anchylosis of the joint.

In the treatment of this disease rest is essential; whatever moves the limb affects the diseased cartilage. The limb may be placed in splints, or bandaged up with soap-plaster, or perfect quietude of the joint may be secured by M'Intyre's fracture-splint, which has the advantage of being easily removed for the purpose of making applications to the part affected. Where the joint is hot, cold lotions and leeches may be applied; but where it is cool, counter-irritants, blisters, issues, moxas, antimonial ointment, or croton oil. On the Continent the actual cautery is recommended. For the swelling and rigidity which so constantly remain, relief may be sought in the douche, champooing, or friction with the hand.

4. *Scrofulous Disease of the Joints, beginning in the Bones.*—At one time all white swellings were supposed to involve the bones, and this on account of the apparent enlargement of the bones of the affected joint. That this is not the case the existence of the above forms of disease proves, but even the fact on which the supposition was founded is not correct. So far from the bones being always enlarged in these cases, there are only a very few on record in which dissection has shown the bones to be enlarged. The bone has been supposed to be swelled from the hardness of thepart and its size: but the former arises from the natural texture of the parts, and the latter is made to appear greater by contrast with the wasting diseased limb. But the bones are subject to disease which begins in their cancellous texture. The phosphate of lime is removed from them or deposited in less quantity, and a yellow caseous substance is secreted in its place. The heads of the bones are altogether weakened and softened, and deposits of bony matter of an irregular form are found on their outside. Whilst this change is going on the patient experiences pain; the knee, which is the joint it most commonly attacks, swells; the motions of the joint are affected, and it becomes more or less contracted, so as to prevent it being straightened. In the course of time matter is formed in the cavity, and makes its way out by ulceration through the synovial membrane, or abscesses form on the outside of the joint. Sometimes sinuses occur, and run to a considerable extent from the joint under the fascia, or between it and the skin.

This condition of a limb is generally connected with a scrofulous constitution, and the more decided the scrofulous disposition, the more difficult will the disease be to treat. However, whatever may be the state of the constitution, this must be attended to primarily in the treatment of these cases. Under the article Scrofula will be found indicated the general principles on which such cases should be treated. The local treatment must be the same as for other cases of white swelling. Quietude of the joint should be secured on some of the plans previously proposed, and as there is a constant tendency to anchylosis, care should be taken if possible that the anchylosis occurs in a position most convenient for using the limb. Counter-irritants will be found of great utility in these cases, such as blisters, antimonial ointment, and croton oil. Care however must be taken that they are not employed whilst there is a tendency to inflammatory action; and, on the other hand, the means that are employed, such as leeches, cold lotions, &c., for an increased activity of the part, should be immediately abandoned when that activity ceases. When the morbid process has been arrested, champooing, friction, and pouring water on the part from a height should be had recourse to, for the purpose of strengthening it. The abscesses which form in these cases should be opened early; if left to themselves, they often leave ulcerations which are difficult to heal.

(Cooper, *First Lines of Surgery; Surgical Dictionary;* Brodie, *Pathological and Surgical Observations on Diseases of the Joints.*)

WHITE THORN, or HAWTHORN. [Cratægus.]

WHITE, ROBERT, an English line and mezzotint engraver, born in London, in 1645. He learnt drawing and etching of David Loggan, for whom he drew and engraved many buildings. He has engraved a large collection of English portraits, many of which were drawn by himself from the life in lead-pencil upon vellum. He drew also the heads of Sir Godfrey Kneller and his brother, which are engraved in Sandrart's 'Teutsche Academie,' &c. Sir Godfrey painted White's portrait in return.

White engraved the first Oxford Almanac in 1674. He was busily employed for forty years, and he had amassed about 5000*l.*; yet, says Walpole, by misfortune or waste he died indigent at last: in 1704 a printseller however, in the Poultry, who purchased his plates, made a fortune in a short time. Walpole has given a list of about two hundred and fifty of White's heads, to which he has prefixed the following observation: 'As no man perhaps has exceeded Robert White in the multiplicity of English heads, it may be difficult to give a complete catalogue of them, yet as my author (Vertue) had formed a long list, it would be defrauding curious collectors if I refused to transcribe it.'

George White, the son of Robert White, was also a clever mezzotint engraver and a painter. He was instructed by his father, and he completed some plates left unfinished by him at his death. He excelled his father in mezzotint, and the following heads in this style are very good:—the Duke of Ormond, Lord Clarendon, Sylvester Petyt, Sir Richard Blackmore, Colonel Blood, who stole the crown, and the notorious Jack Sheppard, after Sir James Thornhill. His last plate is dated 1731. (Walpole, *Catalogue of Engravers;* Strutt, *Dictionary of Engravers.*)

WHITE, GILBERT, known as the author of the 'Natural History of Selborne,' was born at Selborne on the 18th of July, 1720, and received his early education at Basingstoke, under the Rev. Thomas Warton, father of the poet of that name. On leaving Basingstoke he was admitted a student of Oriel College, Oxford, and took his Bachelor of Arts degree in 1743. He was elected a Fellow of his college in 1744, and became Master of Arts in 1746, and was made a senior proctor of the University in 1752. He exhibited when young an attachment to literature and the study of natural history; and it was to indulge in these tastes that he retired at an early period of his life to his native village. Here he lived surrounded by his friends, engrossed by his favourite pursuits during the whole of his life: he died on the 26th of June, 1793. Although he had frequently offers of preferment in the church, he declined them all: not that he was averse to the duties of the clerical profession; for during the latter part of his life he acted in the capacity of curate at Selborne, and had previously performed the same duties in the adjoining parish of Faringdon. The work on which the reputation of White as a naturalist rests, and which must ever claim for him a conspicuous position amongst the cultivators of science, as well as the classical writers of Great Britain, is his 'Natural History of Selborne.' This work was first published in quarto, in 1789, four years previous to the death of the author. In this first edition also appeared a chapter on the antiquities of Selborne, a part of the work which has not been often republished with the numerous editions of the 'Natural History.' After the death of Gilbert White, Dr. Aikin published a work entitled ‘A Naturalist's Calendar, with Observations in various branches of Natural History,’ the whole work being selected from a natural history journal which had been kept by White for twenty-five years. In 1802 the ‘Calendar’ and ‘Natural History’ were published together in two volumes, octavo. In 1813 the ‘Antiquities,’ ‘Natural History,’ ‘Calendar,’ and some poems of the author's were published together in one volume, quarto. From this time various editions of these works have appeared, edited by the Rev. John Mitford, Sir William Jardine, Captain Brown, and other editors. One of the best of the later editions was by the late Edward Turner Bennett, secretary to the Zoological Society. It contains the ‘Natural History,’ ‘Antiquities,’ and the ‘Naturalist's Calendar,’ and is enriched with copious notes by the editor, and by Messrs. Bell, Owen, Yarrell, Daniell, Rennie, Herbert, and others. The last edition of this work, by the Rev. L. Jenyns of Cambridge, has just been published in small 8vo. (1843).

The portions of White's writings devoted to natural history are written in an elegant and pleasing style, and give to the reader something of the enthusiasm of the writer. No one can fail wishing to participate in the quiet pursuits of the author in his rural solitude, after reading his letters, and they have much contributed to spread a taste for natural history in this country. But his letters and essays on subjects of natural history are not merely interesting for their style and matter; they contain a large amount of original observation which has contributed much to a knowledge of the forms, habits, and instincts of the animals that inhabit Great Britain.

White was peculiarly fortunate in belonging to a family whose members all took great delight in natural history pursuits, and with whom he was in constant correspondence. Four of his brothers are referred to in his letters, and some of them are well known for their literary labours. Most of his brothers and sisters were married, but he died single. He however took great interest in the families of his near relatives, and carefully noted down in his diary the births of his nephews and nieces, who, at the time of his death, amounted to the number of sixty-three.

In his letters White frequently mentions a tortoise which he kept; the shell of the animal was carefully preserved in the family, and on being examined by Mr. Bennett, he found reason to believe that it belonged to a hitherto undescribed species, and has accordingly named it *Testudo Whitei*.

(*Preface* to Bennett's edition of White's *Selborne*.)

WHITE, REV. JOSEPH, was the son of a poor journeyman weaver of Gloucester, where he was born in 1746. His father brought him up to his own trade, but sent him for a time to a charity-school, where the education he received, whatever it amounted to, had the effect of inspiring him with a love of reading and study, which he carried so far in his leisure hours, that his attainments at length attracted the notice of a neighbouring gentleman of fortune, who furnished him with the means of entering himself at Wadham College, Oxford. This was probably when he was about three and twenty, since he is stated to have taken his degree of M.A. in 1773. At that date the only one of the Oriental languages which he knew seems to have been the Hebrew; he now began, under the encouragement of Dr. Moore, afterwards successively Bishop of Bangor and Archbishop of Canterbury, to apply himself to the Arabic and others, and made rapid progress. In 1774 he was elected to a fellowship in his college (worth about 70*l*. per annum), and next year he was appointed Laudian Professor of Arabic in the University, from which he derived about as much more. On entering upon this office, 7th April, 1775, he pronounced a Latin oration on the utility of the Arabic tongue in theological studies (‘De Utilitate Linguæ Arabicæ in Studiis Theologicis’), which was printed, in 4to., the same year, and brought him great reputation. His next publication was an edition, with a translation and notes, of the Syriac Philoxenian Version of the Four Gospels (‘Sacrorum Evangeliorum Versio Syriaca Philoxeniana’), from a celebrated MS. belonging to New College, which appeared in 2 vols. 4to., in 1778. This was followed the same year by a sermon preached before the University, Nov. 15th, 1778, recommending a revisal of the authorized English translation of the Old Testament, which was much applauded both for its learning and eloquence. White was now appointed one of the preachers at Whitehall chapel, and, having taken his degree of B.D. in 1779, he continued to keep his name before the public by publishing in that same year, ‘A Letter to the Bishop of London (Lowth) suggesting a plan for a new edition of the Septuagint;’ and the next year, in 4to., ‘A Specimen of the Civil and Military Institutes of Timour, or Tamerlane, rendered from the Persian into English.’ The completed translation of the latter work, executed by Major Davy, appeared, in 4to., in 1783, with a preface, index, geographical notes, &c., by White.

Soon after this occurred the most remarkable passage in his life. In Easter term, 1783, he was appointed to preach the Bampton Lectures for the following year: this duty he executed accordingly with extraordinary effect; and when the sermons, the subject of which was ‘A View of Christianity and Mahometanism, in their History, their Evidence, and their Effects,’ were published, soon after their delivery, the admiration with which they had been heard from the pulpit was borne out by an equally flattering reception from the reading world, which demanded a second edition of the volume within a twelvemonth. A wealthy prebend in the cathedral of Gloucester, bestowed upon him by the lord chancellor (Thurlow), speedily rewarded the learned and eloquent author, who in 1787 took his degree of D.D., and was now looked upon as one of the chief ornaments of the University. Soon after this however a strange discovery was made. In May, 1788, died suddenly the Rev. Samuel Badcock, who had for some time been one of the most active and able writers in the ‘Monthly Review’ and other periodical publications of the day, chiefly on theological subjects; and in his pocket-book was found a promissory note from White for 500*l*., dated Wadham College, 7th August, 1786. From letters afterwards found among Badcock's papers, it was abundantly proved that this note was granted by White in payment for assistance which he had secretly obtained from Badcock in the composition of his Bampton Lectures. White, upon being applied to, first shuffled, and then tried what he could do by bullying: by his blundering management he provoked the parties in whose hands the secret was, to make an exposure of the whole affair; and then it turned out that Badcock had not been his only coadjutor—that he had also employed the services of Dr. Parr in the same way. Badcock, it would appear, was aware of Parr having a hand in the matter; Parr, much to his indignation when the truth came out, had been kept in entire ignorance of Badcock's share in it. White had meanwhile paid the money to Badcock's representatives; but in 1789, Badcock's friend, the Rev. Dr. R. B. Gabriel, preacher at the Octagon chapel in Bath, by whom the discovery had been made, published the whole story in an 8vo. pamphlet, entitled ‘Facts relating to Dr. White's Bampton Lectures.’ To this White replied the next year in another pamphlet, which he called ‘A Statement of Dr. White's Literary Obligations to the late Rev. Mr. Samuel Badcock, and the Rev. Samuel Parr, LL.D.’ This statement amounts substantially to an admission of the charges, the undeniable facts being merely attempted to be excused or apologised for. But the most complete account of this curious affair is that recently given by Dr. John Johnson, in his ‘Memoirs of Dr. Parr,’ Lon., 1828, pp. 216-290. The numerous letters which are printed by Dr. Johnson present the strangest development of the system of importunate mendicancy which White appears to have carried on, not only upon this, but other occasions. And yet it is difficult after all to assign what would seem to ordinary people an adequate motive for his conduct. He was unquestionably a man of sterling talent, and probably quite capable of writing as good lectures as those he begged or bought; and it could hardly have been indolence that induced him to take the course he did, for the trouble he gave himself in managing his scheme of complicated deception, and in fitting into the form of a continuous writing what he wrote himself and what he got from others, must have been fully equivalent to the labour of original composition. One thing is clear, that his object was of the lowest kind, the producing such discourses as would be most likely to procure him preferment or money, however he might come by them. His friends tried to pass off the way in which he had acted as proceeding from sheer simplicity of character and ignorance of the world. But there is probably more truth in what Dr. Johnson says:—‘Under the lounging and negligent exterior of a rustic, White concealed many of the qualities of a refined thinker; and, though he looked wild and weak, he was actually a man of extreme acuteness. But the slovenly habits which altered his appearance sunk into the texture of his character, and deformed the whole construction.' Parr, it may be added, who in one letter characterizes him as uniting to the darkest management the clumsiest execution, always believed that his own and Badcock's were not the only pens he had laid under contribution; his notion was, that another of White's friends, Dr. John Parsons, afterwards bishop of Peterborough, was a main auxiliary in the preparation of the Bampton Lectures from beginning to end, though 'without being let into the secret of other persons being also employed.'

White's calculation as to preferment was not disappointed. He was soon after promoted by the crown to a canonry of Christ Church; besides which, having, in 1790, vacated his fellowship by marriage, he was presented by his college to the living of Melton in Suffolk. His subsequent publications were his well-known 'Diatessaron,' or chronological arrangement of the passages in the Greek text of the Four Gospels containing the history of the Life of Christ, which appeared, in 8vo., in 1800, and has been several times reprinted; his 'Aegyptiaca, or Observations on certain Antiquities of Egypt' (containing the Arabic text, with a Latin translation of Abdallatif's Description of Egypt), 4to., 1801; a critical edition of the Greek New Testament, exhibiting the alterations proposed by Griesbach in the common text, 2 vols. cr. 8vo., 1808; and a sequel to this, in a Latin synopsis of the system of criticism adopted by Griesbach, 'Criseωs Griesbachianae in Novum Testamentum Synopsis,' which appeared in 1811. He died at his residence in Christ Church, 22nd May, 1814.

WHITE, HENRY KIRKE, was a native of Nottingham, where he was born 21st March, 1785. He was the son of John White, a butcher of that place, and of his wife Mary, whose maiden name was Neville, and who belonged to a respectable Staffordshire family. He early showed a passion for reading, and had begun to try his hand at composition in prose when he was about seven years old. His first attempts in verse appear to have been of considerably later date; the earliest that is given or mentioned by his biographer is a short poem stated to have been 'written at the age of thirteen.' He had now, in addition to writing and arithmetic, acquired an acquaintance with the French language; but up to this time it continued to be the intention of his father to breed him up to his own business, and one whole day in every week, and his leisure hours on other days, were employed in carrying the butcher's basket. At last his mother, who appears to have been a woman of some education, as well as of a superior cast of mind, and who had now, in conjunction with her eldest daughter, opened a girls' boarding and day-school, which proved very successful, persuaded her husband to give up this plan; and at the age of fourteen Henry, being taken from school, was placed in a stocking-loom, that he might learn the hosiery business. But this proved scarcely more satisfactory than his original destination; he found it impossible to give his heart, his head, or even his hand with any effect to his employment; and after a year his mother found means to have him placed in the office of Messrs. Coldham and Enfield, attorneys and town-clerks of Nottingham. To make up for the want of a premium, he was engaged to serve two years before the commencement of his apprenticeship, so that he was not articled till the beginning of the year 1802. By this time he had acquired a tolerable knowledge of Latin with very little instruction, and had begun Greek. To these languages he afterwards added Italian, Spanish, and Portuguese; chemistry, astronomy, and electricity also engaged his attention; drawing was another of his pursuits; and he played very pleasantly by ear on the piano-forte. He showed likewise a turn for practical mechanics. All this while too his time was principally occupied by the law, 'to which,' says his biographer, 'his papers show he had applied himself with such industry as to make it wonderful that he could have found time, busied as his days were, for anything else.'

By his fifteenth year he had already begun to acquire distinction as a speaker in a literary society in Nottingham, and as a correspondent of various periodical publications, the 'Monthly Preceptor, or Juvenile Library,' the 'Monthly Magazine,' the 'Monthly Visitor,' and the 'Monthly Mirror.' The encouragement of the late Mr. Thomas Hill, the proprietor of the last-mentioned work, and of Mr. Capel Lofft, induced him, about the close of the year 1802, to prepare a volume of poems for the press. It does not appear to have been published however till the end of the next year, or the beginning of 1804, when it came out, dedicated, by permission, to the duchess of Devonshire. But her grace, after giving her name, forgot to give anything more, or even to notice the poems or their author; and the volume, which was harshly treated by the reviewers, appears to have attracted little of the public attention. It was the means however of making the youthful writer known to Southey, to whom he is principally indebted for the preservation of his memory and the general interest that is still felt about him.

Before his first volume of poetry was published, a great change had been wrought in his opinions, and his whole intellectual being, by his conversion from an indifference to religion and a tendency towards infidelity, to a deep and passionate conviction of the truth of Christianity. What appears to have been most operative in drawing his mind and heart in this new direction was the circumstance of a young friend, who had been some time before suddenly struck in the same way, being about to proceed to the University, a destination which White had often looked forward to with intense desire, though with scarcely a hope. He now bent his whole soul to finding the means of following his friend to Cambridge, and getting himself educated for the church. For some time the prospect was very discouraging; but at last the matter was managed, principally by means of Mr. Simeon, of King's College, to whom he had been recommended, and who procured him a sizarship at St. John's, with additional pecuniary assistance. He quitted his employers, who very kindly gave their consent to this arrangement, in October, 1804. Mr. Southey's memoir is deficient in dates, and that at which he entered the University is not given; but we are told that, by Mr. Simeon's advice, he read for a year with the Rev. Mr. Grainger, of Winteringham in Lincolnshire, where he studied very hard, and made great progress. During his first term one of the University scholarships became vacant, for which he was advised to offer himself as a candidate. He passed the whole term in preparing for this object; but his strength and spirits sunk under his exertions, and when the day came he found himself compelled to decline being examined. He had now only a fortnight to prepare for the general college examination: in his exhausted and desponding condition he would have declined that too; but he was prevailed upon to come forward, and was pronounced the first man of his year.

He now paid a short visit to London, the excitement of which probably only accelerated the progress of his disease. The next year, at Cambridge, he was again pronounced first at the college examination. The college now offered him a private tutor in mathematics during the long vacation; but relaxation, not stimulus, was what was wanted. He paid another visit to London, from which he returned to college only to die. His death took place on Sunday, the 19th of October, 1806, when he had just passed the middle of his twenty-second year.

His papers were put into the hands of his friend Southey, who, in 1807, published a selection from his poems and prose compositions, in two volumes, accompanied with the memoir from which the above facts have been taken. A supplementary volume, consisting of additional pieces, appeared in 1822; and both publications have since been incorporated, and in that form 'The Remains of Henry Kirke White' have been several times reprinted. The edition before us, printed in 1823, is called the tenth, that is, reckoning from the publication of the first collection. The popularity which Henry Kirke White's poetry has enjoyed is owing perhaps more to the touching circumstances of his history, and the attractive picture of his disposition and character which has been drawn by his enthusiastic biographer, than to its merit. It has in its best passages considerable feeling and melody, but its general tone is feeble and sickly, and the manner and spirit decidedly imitative. Even taking into consideration the youth of the author, it cannot be pronounced to be poetry of high promise. His acquirements also, though considerable for the circumstances under which they were made, were not otherwise very remarkable, and his biographer has injudiciously magnified them.

WHITEBAIT. Until Mr. Yarrell investigated the natural history of this very popular little fish, it was sup posed to be the young of the shad. In the fourth volume of the 'Zoological Journal' that eminent naturalist published some valuable papers proving its distinctness as a species from any other member of the Herring genus, *Clupea*, to which it belongs. The whitebait is the *Clupea alba* of Yarrell, and is well figured and fully described in the admirable 'History of British Fishes.' It grows to the length of 6 inches, and its sides are uniformly of a white colour, whence it derives its name. It appears in the Thames about the end of March or early in April, and during the summer months is abundant, when it forms a dish much valued by the epicure. In the days of Pennant the higher classes of the community had not the taste to appreciate this little delicacy, as he has put on record in his 'British Zoology;' now however 'the lower order of epicures,' who, he tells us, resorted 'to the taverns contiguous to the places where the whitebait are taken,' are outbidden by the noblest and most learned of the land in the relish of a whitebait dinner. The fishery is continued until September, and the roe would seem to be deposited throughout the summer, as young ones of small size are taken to the end of the season. There are legislative enactments against whitebait fishing, on account of the necessity of using nets with small meshes, but they are now seldom if ever enforced, as it has been shown that no fry of valuable fishes swim along with them.

The whitebait was first detected in Scotland by Dr. Richard Parnell, who gave an account of it in 1838, in his valuable 'Ichthyology of the Frith of Forth,' a prize essay of the Wernerian Natural History Society. He remarks, 'I have no doubt that the whitebait will be found to exist in the Firth of Forth throughout the whole year in considerable quantity, and that the fishermen would find it a new source of income equal or superior to the sperling fishery, did they use the mode of fishing for whitebait that is practised on the Thames.' He also detected the whitebait in great quantities in the Solway Frith, in the months of June and July, where however the daintiness of the morsel is unknown to the inhabitants of its shores. The principal food of the whitebait seems to be a very minute species of shrimp, scarcely larger than a moderate-sized flea.

Dr. Parnell has shown that the roof of the mouth and tongue of the whitebait are furnished with three or more rows of very minute teeth, a character which at once distinguishes it from the shad, which has those parts destitute of teeth.

WHITEFIELD, REV. GEORGE, the founder of one of the two great divisions of Methodism, was, as well as his fellow-labourer Wesley, of clerical lineage, although his immediate progenitors were of the laity. His great-grandfather, the Rev. Samuel Whitefield, was rector of North Ledyard in Wilts, and afterwards of Rockhampton in Gloucestershire; in which latter charge he was succeeded by a son of the same name, who died without issue. Another of his sons, Andrew, probably his eldest, lived as a private gentleman on his estate. Thomas, the eldest son of this Andrew, was bred a wine-merchant, and followed that business for some time in Bristol, where he married Miss Elizabeth Edwards, a lady respectably connected; but afterwards, having probably been unfortunate, he transferred himself to Gloucester, and there took an inn. He and his wife, besides a daughter, had six sons, of whom George, the subject of the present notice, was the youngest. 'I was born in Gloucestershire,' says Whitefield himself, 'in the month of December, 1714. My father and mother kept the Bell Inn.' It appears from one of his letters that his birthday was the 16th of the month.

His father died when he was two years old; but his mother, who continued to keep the inn, did her best, in the midst of declining circumstances, to bring him up creditably, having been used to say, even when he was an infant, that she expected more comfort from him than from any other of her children. 'My mother,' says Whitefield, 'was very careful of my education, and always kept me in my tender years (for which I can never sufficiently thank her) from intermeddling in the least with the tavern business.' He has painted the perversity of his youth in dark colours, but he appears to have been nothing more than a lively and somewhat mischievous and wilful boy, with far more promise of good in him than the reverse. In his own harsh way of stating the matter, he says, 'I was so brutish as to hate instruction; and used, purposely, to shun all opportunities of receiving it [which is what most little boys are in the habit of doing]. I soon gave pregnant proofs of an impudent temper. Lying, filthy talking, and foolish jesting [these strong names Whitefield would have given when he wrote this to any light or jocular talk], I was much addicted to, even when very young. Sometimes I used to curse, if not swear. Stealing from my mother I thought no theft at all, and used to make no scruple of taking money out of her pockets before she was up. I have frequently betrayed my trust, and have more than once spent money I took in the house in buying fruit, tarts, &c., to satisfy my sensual appetite. Numbers of Sabbaths have I broken, and generally used to behave myself very irreverently in God's sanctuary. Much money have I spent in plays, and in the common amusements of the age. Cards and reading romances were my heart's delight.' It has rarely happened that an excited convert has had so poor a case as this to make out against his former self. Moreover, Whitefield is compelled to acknowledge that he had his occasional religious aspirations from his earliest years. 'Such,' he afterwards says, 'was the free grace of God to me, that, though corruption worked so strongly in my soul, and produced such early and bitter fruits, yet I can recollect, very early, movings of the Blessed Spirit upon my heart. I had early some convictions of sin. Once, I remember, when some persons (as they frequently did) made it their business to tease me, I immediately retired to my room, and kneeling down, with many tears, prayed over the 118th Psalm.' He had always in fact a good and sensitive heart, and never was capable of any hardened or deliberate wickedness. Even when he picked up the halfpence or other small change which his mother left carelessly in his way, he used to give part of the money, he tells us, to the poor. By the time he was ten years of age, too, he had formed the wish of entering the church. 'I was always,' he says, 'fond of being a clergyman, and used frequently to imitate the minister's reading prayers, &c.' Part of this ambition no doubt was inspired by the pleasure he had already begun to take in the exercise of his fine voice and power of declamation, which were among the greatest of his personal gifts.

He was placed at the grammar-school of St. Mary de Crypt in his native city, when he was about twelve, and here he made considerable progress in Latin, distinguishing himself besides in delivering the speeches at the annual visits of the corporation, and also in acting (often in girl's clothes) plays composed by the schoolmaster for the gratification of the magistrates. But after a time he got tired of this. 'Before I was fifteen,' he proceeds, 'having, as I thought, made sufficient progress in the classics, and at the bottom longing to be set at liberty from the confinement of a school, I one day told my mother that, since her circumstances would not permit her to give me a university education, more learning, I thought, would spoil me for a tradesman, and therefore I judged it best not to learn Latin any longer. She at first refused to consent, but my corruptions (?) soon got the better of her good nature. Hereupon, for some time I went to learn to write only. But my mother's circumstances being much on the decline, and being tractable that way, I began to assist her occasionally in the public-house, till at length I put on my blue apron and my *snuffers*, washed mops, cleaned rooms, and in one word became professed and common *drawer* for nigh a year and a half.'

This point of abasement to which he had got seems to be sufficient to satisfy Whitefield's own notion of the worldly humiliation and dishonour proper to form part of a history such as his. After about a year, his eldest brother having married, his mother left the inn; and Whitefield, finding that he could not agree with his sister-in-law, followed his mother in a few months. 'My mother gave me leave,' he says, 'though she had but a little income, to have a bed on the ground, and live at her house, till Providence should point out a place for me.' But it appears that neither mother nor son had given up the idea of the latter yet making his way to the university. 'Having thus lived with my mother for some considerable time,' Whitefield goes on to state, 'a young student, who was once my schoolfellow, and then a servitor of Pembroke College, Oxford, came to pay my mother a visit. Amongst other conversation, he told her how he had discharged all college expenses that quarter, and saved a penny. Upon that my mother immediately cried out, "That will do for my son!" Then, turning to me, she said, "Will you go to Oxford, George?" I replied, "With all my heart." Whereupon, having the same friends that this young student had, my mother without delay waited on them. They promised their interest to get me a servitor's place in the same college.' The result was, that he went back to school, where, he states, he now spared no pains to get forward in his book; and that he was admitted a servitor of Pembroke College in 1733. Before he had left school, the religious element in his character had been strongly developed. His own account is that for a twelvemonth he had gone on in a round of duties, 'receiving the sacrament monthly, fasting frequently, attending constantly on public worship, and praying often more than twice a day in private.' He was thus in the fittest temper of mind for joining the Wesleys and their associates, who had been already for some years known in the University by the name of Methodists, and of whose proceedings he had heard before he came up. He was introduced to them after he had been about a year at college, and soon showed that he was to be outrun in zeal by no one. It had happened that, before he and the Wesleys met, Whitefield had been nourishing his devotional temperament by the same books to which they had devoted themselves—those of Thomas à Kempis, Scougal, and Law.

Whitefield was ordained deacon by Bishop Benson, of Gloucester, 20th June, 1736. Soon after, he returned to Oxford, and took his degree of B.A. From the first his preaching made an extraordinary impression. Even the doctrine he delivered was not so novel and arousing as the manner in which he delivered it. Such earnestness, such passionate enthusiasm had never before been heard from the pulpit in England, at least by that generation. But even this vehemence lay quite as much in the voice and action as in the language of the preacher. Whitefield's voice, which is affirmed to have been so powerful as to be audible at the distance of a mile, appears by general testimony to have been in all other respects one of the most effective for the purposes of elocution ever possessed by man: capable of taking every various tone of emotion, and, whether poured forth in thunder or in softer music, making its way to the heart with irresistible force and effect. Then he gesticulated, he stamped, he wept with a tempestuous abandonment to which the most successful efforts of the counterfeit passion of the stage seemed tame and poor. He first came up to London in 1737, to officiate for a time in the chapel of the Tower; but his first sermon in the metropolis was preached in Bishopsgate church. He then officiated for a few months as curate at Dummer, in Hampshire. While he was here he received from his friends the Wesleys, who were then in Georgia, in North America, an urgent invitation to follow them to that settlement. With this he immediately resolved to comply, but before leaving England he went to pay a farewell visit to his friends in Gloucester; and in that city and Bristol, and afterwards in London, he preached to such overflowing audiences, and with such extraordinary effect, as made the whole country ring with his name. Breaking away however from all the inducements that were held out to keep him at home, he embarked for Georgia on the 23rd of December, 1737, although it was not till the end of January following that, owing to contrary winds, the vessel got fairly under weigh, about the very time that the ship which brought Wesley back to England was getting into the port from which Whitefield had sailed.

Whitefield remained in America till towards the close of the year. He then returned to England, mainly with the view of raising subscriptions for an orphan-house which he had established in Georgia, and which continued to be a principal object of attention with him during his life. Now began that course of preaching in association with Wesley, which may be said to have blown into a flame the sparks kindled by their previous separate exertions, and to have established Methodism as a popular faith. It was Whitefield who set the first example of preaching in the open air, which he did on the afternoon of Saturday, the 17th of February, 1739, on Hannam Mount, at Rose Green, to the colliers of Kingswood, near Bristol.

From this time forward his life was spent in incessant movement from place to place, and exercise of his wonderful power of exciting and swaying the feelings of all orders of persons by his peculiar pulpit oratory. He
repeatedly revisited America, and traversed the who
tent of the British possessions there; when on this
the Atlantic he generally made a yearly round th
England and Scotland; he was several times in Ir
and in 1754, on one of his voyages to America, he s
short time at Lisbon. To the end of his life his pop
as a preacher remained almost unimpaired; multitu
least, continued to crowd to him wherever he app
and to hang with absorbed attention on his lips, alt
as in the case of Wesley also, the more extravagant
which his appeals had at first in many instances pro
soon ceased to be commonly exhibited. Nor was
the unlettered that he interested and delighted. It
the year 1748 that he became known to Selina, coun
Huntingdon, who made him one of her chaplains.
connection introduced him to the highest circles
rank and literature in the metropolis; and among
mirers and frequent hearers were now to be found no
numbers of court beauties and persons of both sexes
first distinction in the world of fashion, but such
Chesterfield, Bolingbroke, and Hume. So also in A
he was listened to with wonder and complacency b
jamin Franklin.

Whitefield and Wesley were in various respect
unlike one another, and, as is well known, they d
long continue to co-operate. They quarrelled, so e
in 1741, about the great question of predestination;
ley declaring for the Arminian theology, the milder
of Whitefield, contrary to what might have been ex
standing up for the Calvinistic system of irresistib
and eternal decrees of election and reprobation.
never came to agree upon this high matter; but
flammation of feeling which their difference at first e
on both sides soon cooled down, and, although they
again acted in concert or association, their occasional
course was renewed long before they left the
Whitefield, who felt that he was likely to go the
always spoke of Wesley as the man who ought to
his funeral sermon; and Wesley actually performe
office for his old friend.

Whitefield lost his mother, in the seventy-first
her age, in December, 1751. While he was in Ame
the spring of 1740, he applied to two of his friends,
and Mrs. D. to ask if they would give him their da
to wife, at the same time telling them that they ne
be afraid of sending him a refusal; 'for I bless God
he in his singular epistle, 'if I know anything of m
heart, I am free from that foolish passion which the
calls love. . . . . But I have sometimes though
E—— would be my helpmate; for she has often be
pressed on my heart.' This attempt came to nothin
the next year, on the 11th of November, he was m
in England to Mrs. James of Abergavenny, a widow
tween thirty and forty, who, he intimates, was neith
nor beautiful, but had become religious after havin
lived like the rest of the world. When his wife b
pregnant, he announced publicly that the child woul
boy, and become a preacher of the gospel; he was
to the sex, but the infant died at the end of four m
His wife died in 1768; and one of his friends, Co
Winter, has recorded that Whitefield and she did n
happily together, that 'she certainly did not behave
ought,' and that 'her death set his mind much at re

Whitefield himself, whose health had begun to gi
about 1757, died at Newbury Port, near Boston, in
rica, on the morning of Sunday, the 30th of Sept
1770. His printed works, besides an edition of C
'Commentary on the Bible,' which he published in
consist principally of sermons, either printed from h
manuscripts or taken down by reporters as delivered
few controversial tracts and other occasional pieces
copious journal of his life and labours, and of
volumes of letters, amounting to 1465 in all, and e
ing over the time from July 18, 1734, to within a w
his death. A collection of his sermons, tracts, and
in 6 vols. 8vo., was published at London in 177
journals, like Wesley, he published in his own lif
the second edition, with considerable corrections, ap
in 1756. A life of Whitefield, by the Rev. J. Gilli
nister of the College Church of Glasgow, appeared, i
at London, in 1813; and a large volume of near
closely printed pages, entitled 'The Life and Times
Rev. George Whitefield,' by Robert Philip, was pub

The latter work is one of considerable talent, but
venience is greatly impaired by the almost entire
e of dates. Much information about Whitefield is
ound in Southey's *Life of Wesley*; Jay's *Memoirs*
Rev. Cornelius Winter, 12mo., London, 1809; and
e and Times of the Countess of Huntingdon, 2 vols.
ondon, 1840.

TEHALL, a part of the city of Westminster which
from near Charing Cross to Downing Street, and
e Thames to St. James's Park. Within this space
ated several of the chief public offices of the British
nent, as the Admiralty, the Horse Guards, the
y, the Board of Trade, and others. Whitehall was
the site of an extensive palace, which was occu-
ccessively by Henry VIII., Queen Elizabeth, James
rles I., Cromwell, Charles II., James II., and
n III.

palace was originally built by Hubert de Burgh,
y of England in the reign of Henry III. He be-
d it to the convent of Black Friars, and by them it
d, in 1248, to Walter de Grey, archbishop of York.
at time it was called York Place, and became the
of the archbishops of York, who occupied it for
hree centuries. The last archbishop who resided in
Cardinal Wolsey. He made very extensive addi-
the buildings, and lived in a style of sumptuous
icence scarcely surpassed by King Henry. The
ten visited the cardinal, and was entertained with
splendour. Wolsey however lost the king's favour,
was then ordered to leave York Place, and Henry
ossession of it himself. It was not allowed to be
York Place any longer, and it soon afterwards re-
the name of Whitehall, probably from the bright-
the recent erections of Wolsey, when compared
e old buildings. Among the additions made by
were 'divers fair tennis-courts, bowling-alleys, and a
t.'

James I. came to the throne, the greatest part of
ace was in such a state of decay that, in 1606, he
to pull down and rebuild. A stately banqueting-
ad just been completed, when, in 1619, it took fire,
s entirely burnt. James now resolved to rebuild
le. Inigo Jones was appointed surveyor-general
oyal palaces, and he made designs for a new palace,
would have been of the most extensive and mag-
description. The banqueting-house, which he
n 1619, was completed in about two years, and for-
y escaped the last and greatest conflagration, which,
destroyed nearly the whole of the rest of the build-
The ceiling was painted by Rubens, by direction of
I., who afterwards walked from one of the windows
caffold on which he was beheaded. The Banquet-
se, under the name of Whitehall Chapel, has been
a place of public worship since the time of George
ommanding height, the beautiful forms and mould-
the windows, and the rich effect of the half pillars,
s, and ornamental wreaths, render it one of the
riking of the public buildings of the metropolis.
ENT.] (Knight's *London*, vol. i.)

TEHAVEN. [CUMBERLAND.]

TEHEAD, PAUL, was the youngest son of Edmund
ead, a tailor, of Castle Yard, Holborn, London,
he was born 6th February, 1710, o.s., being St.
day, from which circumstance he is said to have
his Christian name, ludicrously unsuitable to his
er, and made more memorably ridiculous by his
satirist Churchill's well-known lines—

> 'May I (can worse disgrace on manhood fall?)
> Be born a Whitehead and baptized a Paul!'

eaving school he was placed as apprentice to a
in the city; but he afterwards found means, in
ay is not explained, to escape from this position, and
himself at one of the inns of court as a student of
. It does not appear that he was ever called to the
t in 1735 he obtained wherewithal to live in idle-
without a profession, by marrying Anna, the only
er of Sir Swinnerton Dyer, Bart., of Spain's Hall,
with whom he received a fortune of ten thousand
The lady, who did not live long, is stated to have
ung, but very homely in her person and little better
idiot. Two years before this he had published his
oem, entitled 'State Dunces,' a satire upon the
y, which he inscribed to Pope, and which brought
him both into notice with the public and into favour with the opposition, then headed by the Prince of Wales. This was followed, in 1739, by another piece, entitled 'Manners,' in the same strain, but written with so much more daring, that, on the motion of Lord Delawar, the author and his publisher, Dodsley, were ordered to attend at the bar of the House of Lords, and Whitehead found it necessary to abscond for a time. He was now, along with Ralph (upon whom he had poured unsparing abuse and contempt a few years before, in his 'State Dunces'), a Dr. Thomson, and others, one of the pack of literary lackeys kept about him by Bubb Dodington; and he distinguished himself by his zealous exertions in the cause of his patron, not only by his pen, but at elections and in other ways. Besides 'The Gymnasiad,' a diatribe against boxing, which appeared in 1744, another satire against the government, entitled 'Honour,' which he published about the same time, and 'An Epistle to Dr. Thomson,' in 1755, were the principal productions of this part of his life. Another of his patrons and boon associates was the notorious Sir Francis Dashwood, afterwards Lord le Despenser. Whitehead made one, with Dashwood, Sir Thomas Stapleton, Wilkes, and others, in the infamous revelries of Midmenham Abbey. In return Dashwood procured for him the household place of deputy treasurer of the chamber, which is said to have been worth 800*l.* a year, and which he held till his death. He spent his latter days at a villa which he formed on Twickenham Common; but he died at his lodgings in Henrietta Street, Covent Garden, London, 30th December, 1774. His collected works were published, in a 4to. volume, in 1777, by Captain Edward Thomson, with a memoir of his life; and they are also inserted in Chalmers's 'English Poets,' and in the last edition of what is called Johnson's collection.

WHITEHEAD, WILLIAM, was the son of a baker of Cambridge, where he was born in 1715. The interest of Mr. Bromley, afterwards Lord Montfort, who was one of the county members, procured him a nomination to Winchester; and after passing through that school, where he had been only two years when his father died, he was admitted a sizar at Clare Hall, Cambridge, in 1735, on one of the scholarships founded by Mr. Thomas Pyke, who had, like Whitehead's father, been a baker in Cambridge, and had directed that they should be given in preference to the sons of deceased members of that trade. The value of this scholarship was only four shillings a week; but his mother, although she had been left in very straitened and involved circumstances, managed to give him some further help; and Whitehead struggled on till he was elected a Fellow of his college in 1742. He seems to have now intended to take holy orders, as had been done by his elder brother John, who held the living of Pershore, in the diocese of Worcester; but this purpose, if it ever was entertained, was changed by his being selected, in 1745, to be tutor to the son of William, third Earl of Jersey (the same who afterwards succeeded to the title, and was the father of the present peer). About a year after this Whitehead resigned his fellowship. In 1754 he went abroad with his pupil and Viscount Nuneham, the son of Earl Harcourt. After spending a summer at Rheims and a winter at Leipzig, they proceeded to Vienna, and thence to Italy, returning through Switzerland, Germany, and Holland, and reaching home in September, 1756. During his absence from England, Whitehead had, by the interest of his noble patrons, been appointed to the patent place of secretary and registrar to the order of the Bath; and the year after his return he was nominated to the office of poet laureate, vacant by the death of Colley Cibber. Both these offices he held till his own death, on the 14th of April, 1788.

Whitehead began very early to be known as a writer of verse; and his poems, consisting of epistles, tales, essays, odes, &c., were twice collected and printed under his own direction, first in 1754 and again in 1774; a third edition was published by Mason, with a memoir of the author, immediately after his death, in 1788; and they are also inserted in Chalmers's edition of the 'English Poets,' 21 vols. 8vo., 1810. They are now however entirely neglected and forgotten. His most esteemed production is his tragedy of 'The Roman Father' (founded in part upon the *Horace* of Corneille), which was first brought out at Drury Lane in 1750, and long continued a stock play. He is also the author of another tragedy, called

'Creusa, Queen of Athens,' first produced in 1754; of 'The School for Lovers,' a comedy, in 1762; and of 'A Trip to Scotland,' a farce, brought out with considerable success in 1770.

WHITETHROAT, *Motacilla sylvia*, Linn.; *Sylvia cinerea*, Auct.; *Curruca cinerea*, Bechst.

Description.—Male.—Top of the head and space between the eye and the bill ash-colour; other parts grey, strongly tinged with rust-colour, which last predominates principally on the top of the back; wings blackish, all their coverts bordered with very bright rusty; quills edged with this colour, except the external one, which is edged with white; throat and middle of the belly pure white; breast slightly tinged with rose-colour; sides and abdomen rusty grey; tail deep brown; quills of equal length, except the most external, which is much the shortest; this last has the outside barb and the extremity pure white; the succeeding feather is only terminated with whitish. Length 5 inches.

Female.—With the tints less pure and the upper parts more clouded with rusty; white of the throat and of the external tail-feather clouded with rusty; no rosy tinge on the breast.

Young.—With more rust-colour on the upper parts; space between the eye and the bill white, and the rusty borders of the wing-coverts wider; external quill edged with rusty, instead of white.

This is the *Fauvette grise* or *Grisette* of the French; *Macchetta* and *Sterpazzola* of the Italians; *Klapper Grasmücke*, *Fahle*, *Grauliche*, *Rostgraue*, and *Grauköpfige Heckengrasmücke* of the Germans; *Kogsnetter* and *Mesar* of the Swedes; *Common Whitethroat*, *Muggy*, *Muggy-cut-throat*, *Whey-beard*, *Wheetie-why-bird*, *Muff*, *Charlie Muftie*, *Peggy*, *Peggy-white-throat*, *Churr*, and *Whautie* of the modern British; and *Y gwddfgwyn* of the antient British.

Geographical Distribution.—Denmark, Norway, Sweden, Russia, Siberia, Germany, Holland, France, Provence, Spain, Sardinia, Italy, Smyrna, Trebizond.

A regular summer visitor to the British Islands, arriving about the third week in April, and departing in autumn.

Habits, Food, &c.—The principal food of the *Whitethroat* consists of insects: it is very fond of caterpillars, and is a considerable consumer of berries and smaller garden-fruits, such as raspberries, currants, &c., among which they and their young make much havoc in July and August. A dwarf bush or a low tangled thicket of brambles, nettles, weeds, and rank grass, is generally selected for the nest, which is seldom found at a greater distance from the ground than two or three feet, and has the outside framed almost entirely of the stems of dried grass: the upper part or cup of the nest is very thin and flimsy at the sides, and the inside is lined with finer grass stalks and panicles. The eggs, which amount to four or five, are white with a greenish tinge, speckled and spotted with ashy-brown and ashy-green of two shades.

'Some of the notes of the voice of this bird,' says Mr. Yarrell, 'are rather harsh, others are pleasing, though too frequently repeated; but he always sings in earnest, erecting his crest, puffing out his throat, shaking his wings, jerking his tail, and making other movements which mark his agitation. Occasionally he sings on the wing, ascending with a peculiar flight, rapidly describing small circles, and after a few turns descending to the spot from which he arose.'

Bechstein states that the Whitethroat rises into the air as it sings, as if to be better heard, circles round as it ceases, and sinks again into its bush. The song is prolonged far into the night. The same author observes that when this bird is alone in a room its song is very melodious. Mr. Sweet considered it one of the most delightful and pleasing birds that can be imagined in captivity. If kept in a large cage with other birds, it is, he says, full of antics, flying and frisking about, erecting its crest, and generally singing all the time. He thinks a good one little inferior to a blackcap in song. Mr. Sweet had, when he wrote, one in his possession that had lived with him about eleven years, and which was then in as good health and singing as well as ever; 'and certainly,' says he, 'no song need be louder, sweeter, or more varied. It is of the same temper as a nightingale, never suffering itself to be outdone. It will indeed sing for hours together against a nightingale, now in the beginning of January, and it will not suffer itself to be outdone. When the
nightingale raises its voice, it also does the same, a
its utmost to get above it; sometimes in the midst
song it will run up to the nightingale, and stretch
neck as if in defiance, and whistle as loud as it can.
it in the face; if the nightingale attempts to peck i
it is in an instant, flying round the aviary and sing
the time.'

There is another Whitethroat, also a summer vi
these islands, and first noticed here by the Rev
Lightfoot, who found it near Bulstrode in Buckin
shire, the same who discovered the *Reed Warbler*
country.

This is the *Sylvia Curruca* of Latham and authors
ruca garrula, Brehm; and is the *Fauvette Babill*
the French; *Fichten*, *Doon*, und *Kleinschnablige*
pergrasmücke of the Germans, *Bigiarella* of the I
Lesser Whitethroat of the English.

Description.—The whole of the top of the hea
ash-colour; space between the eye and the b
feathers that cover the orifice of the ears deeper ash
mantle, and rump ashy-brown; tail blackish, e
feathers ash-colour, bordered and terminated with
but white on the whole of the external barb; the tw
feathers only terminated by a small white spot;
sides, and abdomen white slightly tinged with rust
of the lower parts pure white. Length five inches
quarter.

Female not quite so large as the male, which h
seen in two instances with a beautiful tinge of carm
the breast.

Geographical Distribution.—Denmark, Sweden,
temperate and warmer parts of Europe, Asia, the I
In these islands it is rare as far north as Northumb
and rarer in Scotland. In Ireland it does not ap
have been seen. It arrives and departs about th
time as the *Common Whitethroat*.

Common Whitethroat.

Habits, Food, &c.—The food of this Whitethroat i
the same as that of its more common congener. '
quents,' says Mr. Yarrell, 'high and thick hedges,
beries, orchards, and gardens, and is occasionally
seen and heard in lofty trees. The louder notes
bird have nothing particular in their tone to reco
them; but in a wild state, if approached with su
caution to prevent alarm, or when kept in confine
low, soft, and pleasing whistle may be heard, w
almost incessant, so much so as to have induced
plication of *garrula* and *babillard* as terms of speci
tinction. The nest is frequently placed among br
or low bushes: it is slight in structure, generally
on the outside with strong bents, lined inside wit
bents, fibrous roots, and horsehair. As this bird is
distinguished from the more common Whitethroat b
rather shorter, as well as more slender in its form, so
eggs rather smaller, measuring but eight lines in len
six lines in breadth; the ground-colour white, sp
spotted and speckled, principally at the larger en

ash-grey and light brown. The eggs in number are four or five; and Mr. Jenyns has remarked that incubation commences about May.' (*British Birds.*)

In Germany it is termed *Das Müllerchen*, or the *Little Miller*, from some of its clacking tones being supposed to resemble the noise of a mill, according to Bechstein, who remarks that as these notes are heard more distinctly than the others, they are erroneously thought to be its whole song; but the rest, he adds, though certainly very weak, is so soft, so varied, and so melodious that it surpasses other warblers. Whilst singing in this under-tone, says Bechstein, in continuation, it is continually hopping about the bushes, but when going to utter *clap, clap*, it stops and employs the whole strength of the larynx to pronounce this syllable. To enjoy the beauty of its song, Bechstein remarks that it should be alone in a room, and then no other singing-bird is more agreeable, as it rarely utters its call. Both Sweet and Blyth speak favourably of its song, though the former, who gives a very pleasing account of one which he bred up from the nest, says it is not so agreeable as that of most of the other species of warblers.

WHITGIFT, JOHN, ARCHBISHOP, the third primate of the Protestant Church of England after the Reformation, in the reign of Queen Elizabeth, was distinguished for his learning and for his zeal on behalf of the new establishment. He was born at Great Grimsby in Lincolnshire in 1530, of highly respectable parents, his father being a merchant of that town, and his mother a lady of good parentage of the same place. He was entrusted at an early age to the care of his uncle, Robert Whitgift, the abbot of a monastery of Black Canons dedicated to St. Augustine, at Wellow, or Welhove juxta Grimsby. To this circumstance the decided and consistent character of Whitgift's religious views may be chiefly attributed: for the abbot had predicted the downfall of the Roman Catholic Church, on account of its corruptions, some years before the Reformation, and had often been heard to say 'that he had read the Holy Scriptures over and over, but could never find there that their religion was founded by God.' The mind of his pupil was therefore prepared at an early age to approve and hold fast to the doctrines of the Reformation, which were then rapidly spreading both in Germany and in England. After studying for some years with his uncle, young Whitgift was sent by him to an eminent school belonging to St. Anthony's, a religious house situated between Broad Street and Threadneedle Street, London. While at this school he lodged with his aunt in St. Paul's Churchyard, a staunch Catholic, to whom he gave great offence by his aversion to the ceremonies of the church. She in vain endeavoured to persuade him to accompany her to St. Paul's and attend at mass, and at last determined to keep him no longer under her roof. On sending him home to his father in the country, she said 'that she thought at first that she had received a saint into her house, but now she perceived he was a devil.' In 1548 he was sent to the University of Cambridge, where he was entered at Queen's College. Thence he soon removed to Pembroke Hall, which had a more Protestant character, Bishop Ridley being the master, and Bradford (the martyr) and Grindal fellows, of that college.

In 1554 he commenced Bachelor of Arts, and in the following year was elected fellow of Peter-house. At this college he formed a strong attachment to the master, Dr. Andrew Perne, to whom he was indebted for much kindness and protection, which he never forgot. As he had pursued his studies at Cambridge in the reign of Edward VI., when the Protestant faith had been encouraged and protected, he made no secret of his opinions; but on the accession of Queen Mary he found himself, in common with many other members of that University, in serious danger. Cardinal Pole, then archbishop of Canterbury, and the pope's legate, ordered a visitation of the University, and, in 1557, sent commissioners to Cambridge to extirpate the Reformed religion, and to censure and punish its professors. Whitgift was so much alarmed at this visitation, that he had determined to escape it by quitting the University and going abroad. He was fortunately dissuaded from this intention by Dr. Perne, who contrived to screen him from the search of the visitors. His fears however were not exaggerated, for not only the public opinions and characters of men were canvassed, but their very books for private study were searched out, and, if deemed heretical, were burned in the market-place. The bigotry of the visitors was displayed by digging up the dead bodies of Bucer and Fagius, and burning them in the market-place: and Whitgift had good reason to be grateful for his impunity. In this perilous year he took his degree of Master of Arts, and during the remainder of Queen Mary's reign he continued his studies at the University, maintaining a cautious reserve as to his religious views. The accession of Elizabeth opened to him the happy prospect of preaching the gospel conscientiously, as a minister of the Protestant Reformed Church of England, and in 1560 he entered into holy orders, and preached before the University, at St. Mary's. He continued his residence at Cambridge for upwards of fifteen years, being distinguished for his learning and talents, and holding many high offices and preferments. His lectures as the Lady Margaret's professor of divinity obtained him much distinction. In 1567 he was chosen master of Pembroke Hall, but only remained in that situation for three months; for his fame as a preacher having obtained him the honour of preaching before the queen, he acquitted himself so well that she made him her chaplain, and shortly afterwards master of Trinity College, Cambridge. In the same year also he took his degree of D.D., and succeeded Dr. Hutton as Regius professor of divinity. In 1568 the bishop of Ely, Dr. Cox, whose chaplain he had been for some time, conferred upon him a prebend in his cathedral.

Meanwhile Dr. Whitgift was taking an active part in the government of the University, for which purpose he drew up, with the vice-chancellor and some of the heads of colleges, a body of new statutes. He was very strict in enforcing discipline and close conformity with the established church; and his activity in restraining any laxity of doctrine or practice in the University, while it brought him into much contention and raised him many enemies, may be regarded as the main cause of his future advancement in the church. Mr. Cartwright, the Lady Margaret's professor of divinity, having in his lectures attacked episcopacy, the Church Liturgy, and other institutions settled at the Reformation, Dr. Whitgift challenged him to a public disputation, which was refused by him; and while the judicial proceedings against Cartwright were pending, which ended in his expulsion, he wrote an elaborate confutation of these schismatic opinions, and laid it before archbishop Parker. In 1571 he filled the office of vice-chancellor of the University, and in the following year was elected prolocutor of the Lower House of Convocation. At this time a book was published, called 'An Admonition to the Parliament,' being a violent attack upon the whole constitution of the Reformed church, its sacraments, its Liturgy, its dignitaries, and ministers. It was looked upon by the whole church as a most dangerous book, and Dr. Parker, then archbishop of Canterbury, who had already had many opportunities of judging of Whitgift's zeal and capacity, desired him to undertake an answer. This he accordingly did, under the immediate inspection and with the constant advice and assistance of the archbishop. His answer was published in the same year as the Admonition, and was an able work, of great learning, and evincing much skill in controversy. He treated the doctrines of his opponents with severity, but in a manner temperate, dignified, and lofty; and in his vindication of the compilers of the Liturgy, and other eminent churchmen who had been assailed in the Admonition, his zealous and reverential feelings are expressed in a tone of worthy eloquence. The Admonition had been supported by other pamphlets, to all of which Dr. Whitgift addressed replies in his *Answer to the Admonition*. Cartwright, who had now been expelled from the University, published a *Reply to Dr. Whitgift's Answer to the Admonition*, to which Whitgift prepared a *Defence*. His labours in this controversy met with the approbation of all those who were well affected to the established church, and obtained for him the deanery of Lincoln from the queen. Nor did his preferment rest here long, for on a vacancy occurring in the see of Worcester in 1576, he was promoted to be bishop of that diocese.

Here also his activity and zeal were conspicuous. His diocese was very full of Roman Catholics, at a time when their discovery and punishment were enjoined as the duty of the church and of the civil magistrate. He now acted in both capacities, having been appointed vice-president of the Marches of Wales in the absence of Sir Henry Sidney, the lord-president, then lord-lieutenant of Ireland. He exerted himself to repress papacy on the one hand, and dissent or Puritanism on the other, and repeatedly obtained the thanks of the Privy Council for his success. At the same time he protected the rights and interests of the clergy of his diocese. The strictness of his orthodoxy and the severity of his discipline were displayed at a time most favourable for his further promotion. Grindal, then archbishop of Canterbury, had given great offence to the queen by his leniency to schismatics, and at length, on refusing to obey the queen's orders in suppressing prophesyings (or meetings of the clergy for worship and the discussion of religious subjects in private houses), he was suspended from his office by the Star Chamber, and confined to his own house. Grindal, a meek and timid man, was anxious to resign at once his office and its cares; and Elizabeth offered the archbishopric to Whitgift, which he however declined to accept during the life of Grindal. That prelate soon afterwards died, and in 1583 Whitgift succeeded him.

The queen's zeal for orthodoxy was now at its height, and her new archbishop lost no time in proving his determination to enforce conformity. He immediately required all the clergy to subscribe to three articles before they were permitted to execute any ecclesiastical function, viz.:—1, That the queen was the supreme head of the church; 2, that the Ordinal and Book of Common Prayer contained nothing contrary to the Word of God; and 3, that the Thirty-nine Articles were to be admitted as agreeable to the Holy Scriptures. He suspended all the clergy who refused to subscribe to these articles, introduced greater strictness in the admission to holy orders, and exacted compliance with all the forms and ceremonies of the church. He also obtained from the queen a new ecclesiastical commission, with greater powers than any of the preceding commissions—which he never flinched from exercising. Henceforward, from his high station in the church and his personal influence with the queen and her councillors, his biography may be said to be the ecclesiastical history of England during the remainder of the reign of Queen Elizabeth. Religious persecution was the spirit of that age, and though cruelty does not appear to have been part of Whitgift's character, he was a stern disciplinarian—inflexible in his principles, and resolute in their application. Doubt was unknown to him, and he would not allow it in others. Thus he addressed the lords of the council, in the case of the Kentish ministers, 'And here I do protest, and testify unto your lordships, that the three articles, whereunto they are moved to subscribe, are such as I am ready by learning to defend, in manner and form as they are set down, against all mislikers thereof in England or elsewhere.' With this strong conviction of right, he regarded all dissentients as obstinate schismatics unwilling to be convinced of their errors, and therefore deserving of punishment. His chief object, however, was to exclude non-conformists from the church, rather than to seek out and punish heretics. To this duty he repeatedly affirmed that 'her majesty moved and earnestly exhorted him, with strait charge, as he would answer the contrary;' and he would listen to no solicitation to bend him from his purpose. Having heard of threats against his person, he writes to Lord Burghley, 'And if there be no other remedy, I am content to be sacrificed in so good a cause: which I will never betray, nor give over; God, her majesty, the laws, my own conscience, and duty, being with me.' The lord treasurer Burghley, who had always been his firm friend, often expressed his disapprobation of Whitgift's severity, and contended wisely, as well as humanely, that the ministers of the church ought not to be questioned upon minute points of doctrine, unless they were 'notorious offenders in papistry and heresy,' and 'wished that the spirit of gentleness might win, rather than severity;' yet in spite of the remonstrances of that great man, and even of the council, Whitgift persisted in maintaining an inquisition in the church which drove many pious men into dissent.

Whether convinced of the evils of such inquisition, or at length overcome by the persuasion of others, we find him, in 1585, assenting to the advice of Secretary Walsingham, and agreeing to require subscription of those only who were hereafter to enter into livings or the ministry, leaving unmolested the clergy already in the enjoyment of benefices, provided they read the Book of Common Prayer according to the appointed ritual.

In order to secure uniformity of opinion, he obtained from the court of Star Chamber, of which he was a member, a decree to restrain the liberty of the press.
decree, of June 23, 1585, no printing-presses were
anywhere but in London, Oxford, and Cambridg
number of these was to be settled by the archbish
the bishop of London: no book was suffered to be
without having been perused by them, and all
selling, uttering, or even binding unauthorised boo
liable to three months' imprisonment.

Notwithstanding the strictness of his views in ma
ecclesiastical discipline, his natural character w
from harshness or severity. His old friend the
Salisbury indeed attested, 'that there was nothing
be feared in his government, especially towards h
time, than his mildness and clemency. Pregnant in
whereof were his earnest solicitations to the queen
pardoning of Udal, and others condemned to die
sedition: and for the dismission of Cartwright and
other contentious ministers from the Star Chamber
divers other gentlemen had the like favour obtai
them, and pardoned from both fine and imprisonm
entertaining the presses and printers of most m
virulent books, secretly printed and dispersed.'

His respect for learning and learned men was evi
various occasions. Hooker dedicated his 'Eccle
Polity' to the archbishop, not only on account of
office in the church, but in gratitude for previous
and encouragement. That learned divine had b
pointed Master of the Temple, London, through
fluence of Whitgift, and being desirous of more leis
retirement, in order to accomplish his great work,
by the same kind patron removed to the living of B
in the diocese of Salisbury, and afterwards to the
of Bishopthorp near Canterbury. Nor was Whitg
tention confined to works of a religious characte
learned antiquary Stow dedicated to him his 'An
1600, and said 'that his grace's great love and affe
all good studies in general, and to antiquities in par
had been so singular, that all who liked and love
studies justly esteemed him their principal and
patron.'

The archbishop always took a lively interest
management of public charities, and contributed
ficently to their foundation and support. In 1584
stored the antient hospital of Eastbridge, for the
the poor, in the city of Canterbury, enlarged its
ments, and placed it upon an improved foundatio
also built and endowed, entirely from his own reve
hospital, free-school, and chapel at Croydon in Sur
completion of which was accomplished during his
time. His liberality gave rise to exaggerated acc
his wealth and of the revenues of his see; to corre
the archbishop drew up an exact statement of all
chases and of the yearly income of the archbishop
steward also stated in the House of Commons, ab
same time, that the net income of the archbishop
exceed 2200*l*.

On the death of Queen Elizabeth Whitgift wa
lest King James should make alterations in the
ment and Liturgy of the church; and in order to c
him he deputed Dr. Nevyl, dean of Canterbury,
upon his majesty in Scotland, and to recomme
Church of England to his favour and protectio
king's answer was favourable to the stability of the
but the tenor of Whitgift's correspondence from
shows him to have been in continual apprehen
change. He had been so long accustomed to r
certainty upon the firm friendship of the queen,
accession of a stranger to the throne, while it enc
those who were disaffected to the church, perple
aged prelate with doubts and misgivings as to the
In October, 1603, the king issued a proclamation fo
ference of the clergy upon the state of the church.
January following this conference was held, in wh
archbishop took a prominent part in explaining
fending before the king the doctrines and practice
church. The result was a commission to the arc
and to certain bishops and lords of the council for
gulation of matters in the church. The most im
subjects submitted to them were, 'that care be tak
one uniform translation of the Bible be printed, a
in the church, and that without any notes;' and 't
sideration be had what chapters, both of the Ap
and canonical scripture, are meetest to be read in ch

t however did not live to assist in the consultations
commission. Soon after the conference, he caught
le sailing to Fulham in his barge, and on the fol-
Sunday, after a long interview with the king, he
ed with a fit, which ended in an attack of palsy
of speech. The king visited him at Lambeth, and
'that he would pray for his life; and that if he
tain it he should think it one of the greatest tem-
essings that could be given him in this kingdom.'
on the 29th of February, 1603-4, in the seventy-
ar of his age, and was buried in the parish church
lon. His death was said to have been accelerated
ars or grief for the prospects of the church. His
er was for the church of God, and one of his last
tions declared his joy 'that he should die at a time
he had rather give up to God an account of his
than any longer to exercise it among men.'
t the bitter contentions of his time, it is not sur-
that his high station and his zeal and activity in
ting the Reformed church should have exposed
any calumnies; but his integrity, his piety, and
ing gained him the esteem of the best men of his
d long after his death he was pronounced, by
his 'Church History,' to have been 'one of the
men that ever the English hierarchy did enjoy.'
e's *Life and Acts of John Whitgift, D.D.; Life*
gift, by Sir George Paule, 8vo., 1699; Fuller's
History of Britain.)
HORN. [Wigtonshire.]
ING, the *Merlangus vulgaris* of Cuvier, *Gadus*
us of Linnæus, a valuable fish on account of its
and lightness as an article of food, in which pro-
surpasses all the other fishes of its tribe. It is
tinguished from the cod, haddock, and bib by the
f the barbule on the chin; and from the coal-fish,
and green-cod by having the under jaw shorter than
r, a black spot at the base of the first ray of the
, and the tail even at the end. It abounds on all
h coasts, and comes in large shoals towards the
the months of January and February, for the pur-
epositing its spawn. It feeds on mollusca, worms,
, and small fishes indiscriminately, and sometimes
veral pounds, though usually it does not exceed
d and a half. (Yarrell's *British Fishes.*)
LOW is an inflammation affecting the phalanges
gers, and generally proceeding to suppuration.
attacked however is not confined to the fingers;
disease may also appear in the toes. *Paronychia*
chia are terms which are used to express the
ase. Surgical authors describe several forms of
or paronychia, according to the textures which
mation attacks. Thus it may be situated in the
cellular tissue under the skin, the tendons or
he fingers or toes, in the periosteum, or it may be
the cellular tissue under the nail. When the in-
on is confined to the skin, vesicles appear, which
dvance to suppuration, and the case requires
ntion. When the subcutaneous cellular tissue is
he case is more serious, though it seldom extends:
robbing pain of the part, and there may be severe
onal disturbance, and suppuration is a less or
ngth of time in taking place. The whitlow under
iffers from this form only in situation. In these
the cellular tissue under the cutis is affected,
great danger or mischief is to be apprehended
whitlow. When however the inflammation ex-
he tendons, periosteum, and bone, then the symp-
very severe; and by extending from the finger
up the arm, and involving a large extent of sur-
l consequences have sometimes been the result.
nencement of this form of whitlow is indicated
ing, shooting, throbbing pain of the finger, with
degree of constitutional disturbance. Sometimes
e symptoms are very violent; and when the arm
ed, delirium and other alarming symptoms come
first there is no perceptible change in the part
at length however slight swelling comes on,
ay extend up the arm, even to the axilla. In
es a small quantity of matter is collected under
tendon of the finger, or under the periosteum, in
ter case the bone is mostly affected with caries.
ws may be caused by some external injury, such
k from a needle, pin, thorn, or other pointed object, or they may arise spontaneously. The latter not unfrequently occurs in young persons who are apparently in a good state of health.

In the treatment of whitlow the inflammation can rarely be subdued before it proceeds to suppuration. It may however be tried, and cold lotions and local bleeding, with general antiphlogistic treatment, will sometimes subdue the inflammation. When matter is formed, the best thing that can be done is to get rid of it as soon as possible, and this must be done by cutting down quite upon the seat of inflammation and pain. When matter is formed, ease is immediately given by its being discharged; and even should an incision be made before suppuration has taken place, it will alleviate the symptoms. Where matter is formed extensively under the tendons, free incisions should be made wherever it is collected. Where caries of the bone exists in whitlows, it may be sometimes a question as to whether amputation is not the most effectual treatment. Where whitlow occurs under the nail, the matter may be discharged either by an incision under the nail from the side, or by scraping the nail and making the incision from above.

WHITSTABLE. [Kent.]

WHITSUNTIDE is probably a contracted form of White Sunday tide or time. In the early ages of Christianity the favourite seasons for administering the rite of baptism were Easter Sunday, the anniversary of the resurrection of Christ, and Whitsunday, that of the Jewish feast of Pentecost, when the apostles were 'baptized with the Holy Ghost and with fire,' and they themselves commenced their public ministry by baptizing three thousand persons. As emblematic of the spiritual purity which the rite of baptism is supposed to confer, those who received it were clothed in white, and the day is hence conjectured to have received its name of White Sunday (Dominica alba). Other etymologies more remote and less probable have been given. The rite of baptism was performed in early times on Easter Sunday eve and Whit Sunday eve, that is, on the preceding Saturday evening, when there was a special ceremony of hallowing the font. In a volume of manuscript homilies in the Harleian Library, in the British Museum, No. 2371, it is stated, that 'in the begynnyng of holy chirch, all the children weren kept to be crystened on thys even, at the font hallowyng; but now, for enchesone that in so long abydynge they might dye without crystendome, therefore holy chirch ordeyneth to crysten at all times of the yeare; save, eyght dayes before these evenyns, the chylde shalle abyde till the font hallowing, if it may savely for perrill of death, or ells not.' Our ancestors seem to have indulged to excess in the season of Whitsuntide in all kinds of exercises and amusements, for which many of the parishes provided the needful stimulus, and out of which they claimed their due share of profit: for this purpose a house or barn, which was called the church-house, was set apart, and a quantity of ale was brewed, which was called Whitsun Ale, or Church Ale, and was sold to the parishioners who came there to feast and drink, and gamble, and the profits were applied to the repairs of the church, and sometimes to charitable and other purposes. In the Brentford accounts for the Whitsuntide ale, 1624, the gains are thus stated:—

'Imprimis, cleared by the pigeon-holes	£4	19s.	0d.
" " by hocking . . .	7	3	7
" " by riffeling . . .	2	0	0
" " by vicualling . .	8	0	2
	22	2	9'

The hock or hoch tyde was held on Monday and Tuesday fortnight after Easter, Monday for men and Tuesday for women, when they stretched a rope across the road, intercepted all passengers, and made them pay tribute, which was to be applied to pious uses. 'Riffeling' means raffling. The 'vicualling' was the Whitsun ales.

(Brady's *Clavis Calendaria*; Strutt's *Sports and Pastimes*, by Hone; Brand's *Popular Antiquities*, by Ellis.)

WHITTINGTON, ROBERT, is the author of several grammatical treatises which were long used in the schools, and of which the fullest account is given in Dibdin's edition of Ames's 'Typographical Antiquities.' He calls himself on his title-pages a native of Lichfield (Lichfeldiensis), and he appears to have been born there about 1480. He was educated by the eminent grammarian John Stanbridge, in the school then attached to Magdalen College, Oxford;

and, after having taken priest's orders, he set up a grammar-school of his own about 1501, probably in London. All that is known of the rest of his history is that he was alive in 1530. But, besides his schoolbooks, Whittington wrote also Latin verse with very superior elegance; and he is remembered in modern times principally as the last person who was made poet laureate (*poeta laureatus*) at Oxford. This honour he obtained in 1513, on his petition to the congregation of regents of the University, setting forth that he had then spent fourteen years in studying and twelve in teaching the art of grammar (which was understood to include rhetoric and poetry or versification), and praying that he might be laureated, or graduated, in the said art. These academical graduations in grammar, on occasion of which, as Warton states, 'a wreath of laurel was presented to the new graduate, who was afterwards usually styled *poeta laureatus*,' are supposed to have given rise to the appellation as applied to the king's poet, originally styled the king's versifier (versificator), who seems to have been merely a graduated grammarian or rhetorician employed in the service of the king. Whittington, as had been customary, on obtaining his laureateship, composed a hundred Latin verses, which were published by being stuck up on the great gates of St. Mary's church. After this he used to style himself on his title-pages not only master of grammar (*grammatices magister*), but chief poet of England (protovates Angliæ). The title however conferred no academical rank, and it is known that Whittington was afterwards admitted to the degree of Master of Arts. Whittington's Latin verse has been highly praised. Of his 'Epigrammata' (printed by De Worde in 1519, and of the greatest rarity), being long addresses to Charles Brandon, duke of Suffolk, Sir Thomas More, and the poet Skelton (who, like himself, had been made *poeta laureatus* at Oxford, in 1489), Warton says, 'Some of the lines are in a very classical style, and much in the manner of the earlier Latin Italian poets.' (*Hist. of Eng. Poet.*, ii., 441, &c.)

WHITTLESEY. [Cambridgeshire.]

WHITWORTH, the name of an antient Staffordshire family, which has produced two diplomatists of some note.

Charles Whitworth, eldest son of Richard Whitworth, of Blowerpipe, in Staffordshire, was born at Aldbaston, about the time of the Revolution, and died in 1725, at London. He was an *attaché* of Mr. Stepney at several courts, and in 1702 was himself appointed resident to the Diet at Ratisbonne. In 1704 he was named envoy to the Court of Russia; and in 1710 he was again sent to that court with the title of ambassador extraordinary, to propitiate Peter the Great, irritated by the arrest of his ambassador in the public streets of London at the suit of some tradesman. Whitworth was subsequently—Plenipotentiary to the Diet of Augsburg and Ratisbonne in 1714; envoy extraordinary and plenipotentiary to the king of Prussia in 1716; envoy extraordinary to the Hague in 1717; again plenipotentiary at Berlin in 1719; and representative of Great Britain in the character of ambassador extraordinary and plenipotentiary at the congress of Cambray in 1722. He was created Baron Whitworth of Galway, in 1721, by George I. Lord Whitworth retired into private life in 1724, and died in the ensuing year, without issue. His 'Account of Russia as it was in the year 1710' came into the hands of Horace Walpole, and was printed by him at the Shrewsbury press. In the preface Walpole mentions that many volumes of Lord Whitworth's state letters and papers were in the possession of his relations.

Charles Whitworth, grandson of Francis, a younger brother of the preceding, who was M.P. for Minehead in Somersetshire, surveyor-general of the Woods and Forests, and secretary of the island of Barbados, was born at Leybourne in Kent, in 1754. His father, Sir Charles (also M.P. for Minehead), sent him to be educated at Tunbridge school, and, on his leaving that place, procured him a commission in the guards. How he came to exchange the military for the diplomatic service does not appear, but in 1786 we find him sent to the court of Poland as minister plenipotentiary.

In 1788 Whitworth was sent as envoy extraordinary and minister plenipotentiary to Russia, where he remained till 1800. Whitworth acquired and retained to the last a marked ascendency over the councils of the Czarina Catherine II. After her death (February, 1795) his troubles began. Paul I., resolute to undo everything that his mother had done, refused to ratify the treaty she had concluded with England immediately before her death. The patience and address of Whitworth were however at last successful: in 1797 Paul ratified a treaty of commerce with England. In December, 1797, Whitworth signed a provisional treaty by which the Czar agreed to take part in the coalition against France; and in June, 1799, a definitive treaty to the same effect. At this time the English minister stood so high in the good graces of the wayward emperor, that Paul requested George III. to create him a peer (he had received the ribbon of the Bath in 1793). The request was complied with, but by the time the despatch announcing that he had been created an Irish baron arrived, Paul had quarrelled with Whitworth, and ordered him to quit his dominions.

In 1800 Lord Whitworth was sent to Copenhagen to terminate amicably the differences arising out of the capture of the Danish frigate Freya and her convoy by English men-of-war. He concluded a convention with Count Bernstorff on the 29th of August. On the 7th of April, 1801, he married the duchess-dowager of Dorset, and remained unemployed till the latter end of 1802, when, having been previously sworn a privy councillor, he was appointed ambassador extraordinary and plenipotentiary to the French government. He remained at Paris till the 13th of May, 1803. Little was effected or could be effected by this mission: the struggle between Bonaparte and England had already become a struggle of life or death, and both parties felt it. The most striking incident during Lord Whitworth's embassy was the rude reception he experienced from Bonaparte in full court at the Tuileries. The character of Lord Whitworth, drawn by Napoleon in his conversations at St. Helena, appears to have been prompted by an awkward recollection of that occurrence:—'He was an able man; in my judgment somewhat of an intriguer, but dexterous. He had a fine person. The English ministers had no cause to complain of him, for he entered thoroughly into their views.'

Lord Whitworth did not after his return from Paris hold any diplomatic appointment; although a tour which he made to Paris and Naples, in 1819, with the Duchess of Dorset and a numerous and rather ostentatious suite, gave rise to some gossip about secret missions. When the country was threatened with invasion from France, he raised and clothed a battalion of infantry composed of 600 men. In March, 1813, he was made a lord of the bedchamber; on the 14th of June following he was created a British peer by the title of Viscount Whitworth of Aldbaston; and in August he succeeded the duke of Richmond as viceroy of Ireland. In January, 1815, on the enlargement of the order of the Bath, he was made one of the twelve civil knights grand-crosses; and in November he was advanced to the dignity of Baron Aldbaston and Earl Whitworth. He resigned the lieutenancy of Ireland in 1817, and was succeeded by Earl Talbot. He died (without issue) on 13th of May, 1825.

(Horace Walpole's preface to the *Account of Russia as it was in* 1710; *Annual Biography; Annual Register' Mémorial de St. Helène; Biographie Universelle.*)

WHORTLEBERRY. [Vaccinium.]

WHURDA. [Hindustan, p. 209.]

WIASMA. [Smolensk.]

WIBORG. [Finland; Jutland.]

WICHMANN, JOHANN ERNEST, physician, was born at Hanover, on the 10th of May, 1740. He early exhibited an attachment to the study of natural science, and after having received his early education at the Lyceum of Breme, he went in 1759 to Göttingen, and commenced the study of medicine under Brendel. He graduated in 1762, and presented as his thesis a paper on the use of certain poisons in the treatment of the bites of rabid animals. After graduating he visited Paris and London. This journey had a great influence on his future career. He had an opportunity of comparing the practice of the French and English physicians, and preferred the safe though somewhat empirical practice of the latter, to the uncertain though apparently scientific practice of the former. The influence of English practice on his views became remarkable in his writings, which are free from much of the speculation with which German writers abound. He returned to Hanover in 1764, and commenced practice. It was not long before his merits were recognised, and on the death of Weilhoff he was appointed court-physician.

Wichmann published several works on various departments of medicine, the most remarkable of which is his 'Ideen zur Diagnostic,' published at Hanover in 1794, in three volumes, octavo. This work has gone through several editions, and is possessed of great practical merit. In all his works he points out with great force the origin of diseases in external circumstances, and proposes correct hygienic rules for their prevention. His great fault as a writer has been considered to be his want of general views and the minuteness of his details. He wrote several other smaller works on various diseases and their treatment, which were all published at Hanover. He died on the 12th of June, 1804. (*Biographie Médicale.*)

WICK. [Caithness.]

WICKLOW, Town of. [Wicklow, County of.]

WICKLOW, COUNTY OF, one of the twelve counties into which the province of Leinster in Ireland is divided. It is bounded on the north by the county of Dublin, on the north-west and west by the county of Kildare, and on the south-west by that of Carlow, on the south by that of Wexford, and on the east by the Irish Channel. It lies between 52° 40′ and 53° 14′ N. lat., and between 6° and 6° 47′ W. long. The form of the county is irregular: its length from north to south, from the junction of the counties of Dublin, Kildare, and Wicklow to the border of the county of Wexford near the town of Carnew, is 38 miles; the greatest breadth at right angles to the length, from the border of the county of Kildare to Wicklow Head, south-east of the town of Wicklow, is nearly 33 miles. The area, as determined by the Ordnance Survey, is 500,178 acres 1 rood 7 poles, or nearly 782 square miles; of which 499,088 acres 2 roods 27 poles, or about 780 square miles, is land; and 1089 acres 2 roods 20 poles, or about 1¾ square miles, is water. The population, in 1831, was 121,557, giving rather more than 155 inhabitants to a square mile. In respect of area it is one of the smallest counties of Ireland, and in respect of population is (at least was, in 1831) the lowest except Kildare, Longford, Carlow, and Louth: it is exceeded by Louth, if the county of the town of Drogheda be included in that county. Of English counties it may be compared in area with Westmoreland (762 square miles), to which in its mountainous character it bears some resemblance; but its population is more than double that of Westmoreland. Wicklow, the assize-town, is on the coast, 27 miles in a direct line south-south-west of Dublin, or by the mail route through Bray, Delgany, and Newtown-Mount-Kennedy, 31½ English miles.

Surface, Coast-line, Geology, and Scenery.—The county of Wicklow is covered by the mountains which skirt on the south-east the great limestone plain of Central Ireland. The mountains may be regarded as part of an extensive range crossing this part of Ireland in a south-south-west direction from the coast about Dublin Bay to the junction of the Barrow and the Suir near Waterford. The central part of the range consists of a mass of granite, having its strike or direction coincident with that of the range, and cutting across the strike of the slate rocks, through which it protrudes, and the ends of which, though much shattered and confused, abut on each side against the mass of the granite. The slate rocks occupy the rest of the county on each side of the granite, and form mountains of somewhat less elevation on its flank, extending from the central part of the range on the one hand towards the sea; and on the other, towards the great central limestone plain, no part of which is in the county. Indeed Wicklow is the only county of Ireland in which neither primary nor secondary limestone is to be found. It is altogether occupied by crystalline or schistose rocks.

The eastern flank of the Wicklow mountains presents a varied aspect, being worn into deep glens and dells, which are lined with abrupt precipices or occupied by lakes, from whence begin those narrow transverse valleys whose general course to the south-east is distinguished by the most beautiful and romantic scenery. The western flank, on the other hand, presents less variety: the glens and valleys, which exhibit fewer features of attraction, being more rounded and expanded. The rivers which arise in these have a general tendency towards a north-west direction; but on both sides of the central range the transverse valleys either merge into or cut across more expanded longitudinal vales by which the central range is flanked, and beyond which arise offsets or detached groups and parallel ranges of lower hills. (Mr. Weaver, in *Geol. Transactions*, vol. v., p. 123.)

This mountain range cannot be considered as having a clearly defined crest or ridge extending longitudinally, but it is intersected by its transverse valleys, so that the mountains which compose it are separated into groups. These groups, with their principal summits, are as follows:—

Group I.—North of the Dargle and of the Liffey. 1, Prince William's Seat (on the border of the county), 1825 feet above the level of the sea at low-water; 2, Kippure (also on the border), 2473 ft.; 3, Seefingan, 2364 ft.; 4, Butter Mount, 1459 ft.; 5, Dowry, 1060 ft. These are enumerated in the order of their position from east to west. The following are near the head of the Dargle: 6, Maulin, 1869 ft.; 7, Tonduff, North, 2043 ft.; 8, Tonduff, South, 2107 ft.

Group II.—Between the Dargle and the Liffey on the north; the Avon-more on the east; the Avon-beg, which waters Glen-malur, and the King's River on the south; and the King's River and the Liffey on the west. 9, Blackmoor Hill, south-east of Blessington, 1464 ft.; 10, Sorrel Hill, 1915 ft.; 11, Black Hill, 1984 ft.; 12, Moan Bane, 2313 ft.; 13, Gravale, 2352 ft.; 14, Duff Hill, 2364 ft.; 15, Mullaghcleevaun, 2783 ft.; 16, Tonelagee, 2307 ft.; 17, Carrignagunneen, 1782 ft.; 18, Carrigeenduff, south-west of Lough Dan, 2105 ft. The mountains in these two groups are chiefly granitic. Mica-slate is found on the south-east side of Group II., and clay-slate still farther to the south-east; clay-slate is also found on the north-western side.

Group III.—Between the Fartrey or Vartry and the sea. 19, the hill above Bray Head, 668 ft.; 20, Little Sugar-loaf, 1120 ft.; 21, Great Sugar-loaf, 1651 ft.; 22, Down's Hill, 1232 ft.; 23, hill west-south-west of Newtown Mount Kennedy, 1193 ft.; 24, Ballycurry, 988 ft. The district which comprehends these hills is occupied chiefly by clay-slate; but the hill above Bray Head, the Little Sugar-loaf, and the Great Sugar-loaf, and some other summits, are formed of quartz rock. The Sugar-loaves derive their name from their conical form.

Group IV.—Between the Fartrey and the Avon-more, extending southward to the ocean. 25, Douce or Djouce, near the head of the Fartrey, 2384 ft.; 26, hill east of Lough Dan, 1581 ft.; 27, Moneystown Hill, 1272 ft.; 28, hill west of Moneystown Hill, 1408 ft.; 29, Carrick or Carrickmacreilly Mountain, 1252 ft.; 30, hill above Wicklow Head, 268 ft. Douce is granitic; the hill (No. 26) east of Lough Dan is of mica-slate; Carrickmacreilly of quartz rock; the others of clay-slate.

Group V.—Between the King's River on the north, the Avon-beg and the Ovoca on the east, the Daragh or Derry or Aughrim, a feeder of the Ovoca, on the south; and the Slaney and its affluent the Carriggower, on the west. 31, Slievh Gadoe, near the head of the Carriggower, 1791 ft.; 32, Wet Mountain, 1753 ft.; 33, hill near the junction of the Carriggower with the Slaney, 1023 ft.; 34, Table Mountain, near the head of the Slaney, 2302 ft.; 35, hill south-east of Table Mountain, 2495 ft.; 36, Lugnaquillia, the highest mountain in the county, near the source of the Little Slaney, 3039 ft.; 37, Carraway-stick Mountain, 2211 ft.; 38, Croaghan Moira Mountain, 2175 ft.; 39, Slievh Reagh, 1564 ft.: 40, Carrig Mountain, 1845 ft.; 41, Keadeen or Cadeen, 2143 ft.; 42, Brisselstown, or Brusselstown Hill, 1343 ft.; 43, hill above Coolballintaggart Lodge, 1754 ft.; 44, hill above Preban church (to the north), 1279 ft. The last two hills are between the Daragh or Derry, and its feeder the Ow. The district in which this group of hills is found is chiefly granitic, although a considerable portion on the eastern side is occupied by slate rocks; the part nearest to the granite being occupied by mica-slate and the remoter part by clay-slate. Carraway-stick and Croaghan Moira are composed of slate; the first of mica-slate, the second of clay-slate. Hill No. 44 is also slate. Slate-rocks prevail also, but not so extensively, on the western side of the group, where they compose the mass of Brisselstown Hill; and in the granitic district some of the mountains, as Lugnaquillia and Keadeen, are capped with mica-slate.

Group VI.—West of the King's River, the Carriggower, and the Slaney. 45, Hill to the north of Boystown or Hollywood church, between the King's River and the Liffey, 1079 feet; 46, summit of Tinoran, to the right of the road from Kilcullen to Baltinglass. The hills of this group are of slate: mica-slate on the south-eastern side; but clay-slate in the other parts of the group.

Group VII.—Mountains south of the Daragh and Ovoca. 47, Croaghan or Croghan Kinshela, 1399 feet; 48, summit near the head of the Goldmine River, 1356 feet. Generally speaking this district is occupied by clay-slate; but Croaghan Kinshela is formed of granitic and trap rocks alternating with clay-slate.

Group VIII.—Mountains of the barony of Shillelagh, which forms a south-westward projection from the main part of the county. 49 and 50, hills between the Daragh or Derry, which joins the Ovoca and another Derry, which joins the Slaney, 1316 feet and 1416 feet high respectively. 51, Hill west of Tinahely or Tinehely, 1312 feet; hill west of Shillelagh village, 1381 feet. This district is occupied on the western side by granitic rocks, in the centre by mica-slate, flanking the granite on the east, and on the eastern side by clay-slate.

The mass of granite which forms the surface-rock of the central district, occupying a tract of varying breadth, from 7 to 14 miles, and is the fundamental rock on which the other formations rest, protrudes in isolated portions in the districts occupied by the slates. The granite is in general remarkably pure, and free from minerals not essential to its composition. It varies much in the size of the grain: some of the largest-grained and most beautiful occurs in Glen-cree, in the northern part of the county, amid the mountains of our first group; some of the finest-grained, remarkably firm and compact, is found in the glen of Imale, at the northern side of Keadeen or Cadeen Mountain (No. 41, Group V.). The granite is not unfrequently porphyritic, as in Glen-cree and Glen-amacnass. Schorl, tourmaline, garnet, beryl, rock-crystal, epidote, heavy spar, magnetic iron-ore, galena, copper and iron pyrites, and other minerals are found in small portions. Contemporaneous veins of granite, and less frequently of quartz, are found in the granitic mass. Granite of later formation is occasionally found alternating with the rocks which rest on the fundamental granite.

The mica-slate district on the eastern flank of the granite is in general narrow, never exceeding three or four miles in breadth: it generally passes into clay-slate, by which it is bounded on the east side, throughout its course in this county. Hornblende and hornblende-slate, grenatite, emery, andalusite, hollow spar, talc-slate, which is quarried for chimney-pieces, hearth stones, gravestones, &c., and veins of quartz, occasionaly occur in the mica-slate district. In Glen-malur (watered by the Avon-beg) mica-slate is found alternating with granite. Mica-slate is found flanking the central granite on the west side between Holly Wood on the north, and Baltinglass on the south. Near Holly Wood the mica-slate gradually narrows and passes into clay-slate: but it is found, though not uninterruptedly, north of Holly Wood, interposed between the granite and the clay-slate. It forms also the cap of Brisselstown Hill, and of the mountains Keadeen and Lugnaquillia. The mica-slate on the cap of Keadeen dips 65° to the south-east, and is remarkably full of andalusite. Brisselstown Hill consists of mica-slate and trap rocks, namely, fine granular greenstone, greenstone-slate, and greenstone-porphyry. Schorl, garnet, and quartz are found in the mica-slate at Kilranela or Kilranelagh, near Baltinglass. Mica-slate and granite are found alternating near Kilranelagh.

The clay-slate on the eastern flank of the granite occupies nearly the whole of that part of the county which lies east of a line drawn from the junction of the Dargle and Glencree rivers, south-south-west to Tinehely, Shilelagh, and Clonegall in Carlow county. This clay-slate is in different parts associated with granite, mica-slate, quartz rock, flinty slate, grauwacke trap, and porphyry. The strata in the northern part of the clay-slate district, near Bray, are much inflected, but in the middle part, and southern part, so far as concerns this county, they are tolerably regular, dipping to the south-east. Insulated portions of granite break through the clay-slate amid the mountains of Group IV.: again in the south-eastern extension of the mountains of Groups II. and V. in the lower part of the valley of the Avon-beg; and again in the adjacent parts of Wicklow and Wexford counties, between the mountain Croaghan Kinshela and the town of Carnew. These portions of granite differ from the granite of the central mass in containing little or no quartz; the prevailing ingredients are felspar and mica. In some places the granite acquires a sienitic character; in others it passes into a true felspar porphyry; and in others the felspar and mica are so intimately blended as to constitute an apparently homogeneous mineral, sometimes resembling some varieties of the trap rocks, and at other times verging in aspect and texture toward clay-slate. Near Dunganstown, south-west of Wicklow, masses of greenstone and quartz rock are found, gradually passing into hornstone and compact felspar. A mass of greenstone, enclosing a bed of roofing-slate, which is quarried, is found near the Avon-more; and quartz rock in combination with clay-slate, and abounding in contemporaneous veins of pure white quartz; granite, greenstone, and greenstone-slate, alternating with clay-slate, occur in several places. Arklow rock (411 feet high) on the coast, just south of Arklow, consists of trap rocks, as greenstone, felspar, felspar-porphyry, and a variety of trap well entitled to the name of basalt, very similar to the basalt of the Giant's Causeway. Quartz rock in mass is found in the north of this clay-slate district, where it forms the masses of the Great and Little Sugar-loaf, and of the hill above Bray Head. The Great Sugar-loaf is a conical mountain having an ascent inclined 35° to the horizon. The clay-slate of the western flank of the granite occupies the most of that part of the county which lies west of the Liffey, the King's River, and the Slaney; grauwacke is found in combination with it.

The rocks on the eastern flank of the granite abound in metals, while on the western flank there is a total absence of them. In the granite and mica-slate districts the metallic substances are found in veins: the clay-slate district has metalliferous beds, and contemporaneous veins or alluvial deposits.

In the granite and mica-slate, galena, green and white lead-ore, and copper pyrites are found. The ore is smelted in small blast-furnaces, with the aid of turf, lime, and a small portion of the purest blind-coal: the lead is obtained by a single operation, and is fit for all the purposes of the plumber. The principal lead-mines are in Glen-malur.

The metals obtained from the clay-slate tract are gold, silver, copper, iron, lead, zinc, tin, tungsten, manganese, arsenic, and antimony. The metalliferous portion of the clay-slate district is small, extending in length only from the border of the county at Croaghan Kinshela, 10 or 11 miles in a north-north-east direction, and having but a small breadth. The discovery of native gold near Croaghan Kinshela Mountain (Group VII. No. 47), took place about 1796, and many hundred people assembled daily to search for it in the bed and on the banks of the Ballinvalley, or Goldmine River, a stream which rises in the mountain, and joins the Daragh just above its junction with the Ovoca. Government took up the matter, and regular stream-works were established, but they were destroyed in the insurrection of 1798. They were resumed in 1801; with the addition of works for the discovery of auriferous veins; but the search was unsuccessful, and the whole of the works were abandoned. Some gold has been found in streams near the mountain Croaghan Moira (Group V. No. 38), but in very small quantity. Copper pyrites, iron pyrites, and black copper-ore are found and wrought at Tigrony and Cronebane near the Avon-more, a little above the junction of that river with the Avon-beg. The copper-mines in Cronebane, Connary, and Tigrony, near the junction of the Avon-beg and Avon-more, yielded, in the twelve years 1788-99, 7533 tons of ore, producing about $670\frac{1}{2}$ tons, or, on the average, 8[illegible] per cent. of copper. At that time Irish ores paid a duty, when imported into Great Britain, of 16*s*. 6*d*. sterling per ton. In the twelve years 1800-1811, the produce was nearly 19,343 tons of ore, yielding 5_{11} per cent., or $1046\frac{1}{4}$ tons of metal. In one of these twelve years (1808) nearly 2577 tons of ore was raised; but since then the produce has much fallen off. Sulphur was extracted from the copper pyrites, and refined and cast into roll or cane brimstone. Native silver, minutely disseminated, sometimes in particles, sometimes in filaments, was found in the middle of the last century in a brown indurated oxide of iron at Cronebane. (Mr. Weaver *On the Geological relations of the East of Ireland*, in the *Geological Transactions*, vol. v.)

The outline of the coast is tolerably even. Just at the mouth of the Dargle, which separates the county of Wicklow from that of Dublin, is a shelving shore, on which, near Bray, are two Martello towers. About a mile south of the Dargle the coast rises into low cliffs, forming the little promontory of Bray Head. After extending about two miles uthward the cliffs subside, and a shelving shore succeeds r a mile and a half, until a small headland, the Grey tones, presents another range of low cliffs, only half a ile long, which are very soon replaced by a low shelving hore extending eleven or twelve miles south to the mouth f the Vartry, or Fartrey, at the town of Wicklow. Here e cliffs (which in one place are 66 feet high) reappear, nd continue for two miles to the neighbourhood of Wickw Head. They are succeeded by a steep though not oken shore, which extends for seventeen or eighteen iles to the southern boundary of the county to the stream hich separates it from the county of Wexford, interrupted casionally by low cliffs, and sometimes skirted by sandhills downs, especially in the shallow bay called Brittas Bay and ong the coast to the south of it. Brittas Bay is bounded the north and south by small headlands, with low cliffs. he southern headland is called Mizen Head; and a ruined wer on the hill, in the side of which the cliffs are formed, only about 40 feet above low-water mark, and the face the cliffs is still lower. The cliffs are of the clay-slate rmation, which occupies the whole coast. The mounin which rises above Bray Head is of quartz rock. he whole length of the coast may be estimated at from irty-five to thirty-seven miles. The only harbours are rmed by the mouths of the rivers Dargle, Vartry, and voca, and they are all unimportant.

The scenery of the county of Wicklow is pre-eminent r picturesque beauty. The Glen of the Dargle, a deep rk cleft or hollow, between two mountains, the sides of hich are richly wooded, is a much admired spot, and, wing to its easy distance from Dublin, is much frequented. he little river Dargle, which flows through the glen, is rmed by two streams, the Glen-cree and the Glen-islocane, which latter waters the adjacent demesne of Powersourt (the residence of Lord Powerscourt), in the deer-park f which it forms a beautiful waterfall. The stream falls ver a perpendicular rock at an elevation of 300 feet: it more striking from its elevation and the rich verdure of e surrounding scenery than from the volume of water. he appearance is most striking when a heavy fall of rain as swollen the stream.

The Glen of the Downs is a romantic opening beeen two mountains, the sides of which are covered ith rich hanging woods, interspersed with rugged cliffs. he glen is watered by a small stream flowing into the a near the village of Delgany, and is partly compreended in the beautiful demesne of Bellevue, the seat of r. Latouche. The view up the glen northward is closed the picturesque form of the Great Sugar-loaf Mountain, e conical summit of which, viewed at a distance, appears terminate in a peak, but is found, on attaining it, to be owned with a small flat plain, commanding a noble view every direction.

The Devil's Glen is a narrow pass between two mounins rising precipitously on each side of it, and has little ore width than suffices for the passage of the river Vartry, hich here flows in an eastward direction. The northern de of the glen is occupied by rich woods, with masses of ck occasionally breaking through the foliage. The uthern side is comparatively bare of wood, but the rugged ce of the rock is relieved by patches of green-sward, me of them planted with forest-trees. The two sides of e glen present in their geological structure and appearce a marked correspondence. The glen, from its depth nd narrowness, is dark and sombre in its character. At upper or western extremity is a noble waterfall: the artry throws itself over a ledge of rock a hundred feet gh in one unbroken sheet into the hollow beneath, and esents, particularly when the stream is swollen by rains, pectacle of great magnificence.

Glen-macnass, or Glen-amacnass, is a valley amid the ountains of our second group. A curved precipice rtly incloses a vast hollow into which the river Avonore (which waters the valley) falls over the brow of the ecipice. Above the waterfall at some distance rises the fty mountain Tonelagee, the sides of which present many ld granitic precipices. Under one of these precipices, om 400 to 500 feet high, is the small circular lake or tarn uler, at an elevation of 1828 or 1830 feet above the level f the sea. The military road made after the insurrection f 1798 runs through this valley.

The valley of Glen-dalough is watered by the Glen-ealo pparently a variation of the name Glen-dalough, *i.e.* Glen-da-lough, the valley of two lakes), which joins the river Glen-dasan, and falls with it into the Avon-more. The valley extends east and west, is inclosed on the north and south sides by lofty, barren, and inaccessible mountains, which unite and close the western or upper end of the valley, presenting granitic or mica-slate precipices 500 feet high. The river tumbles over the rocks at the west end so as to form a cascade, and then expands into two lakes: the upper lake is about a mile long and nearly a quarter of a mile wide, and about 440 feet above the level of the sea; the lower lake is about 435 feet above the level of the sea, only about a quarter of a mile long, and about half that distance wide. Adjacent to this lake, at its lower end, are the ruins of the seven churches of Glen-dalough and various other antiquities.

Glen-dasan, or Glen-asane, opens into the valley of Glendalough, or rather the three valleys, Glen-amacnass, Glendasan, and Glen-dalough, all open near the same point into the wider valley of the Avon-more, which may be regarded, with reference to its direction, as a prolongation of Glen-amacnass. Glen-dasan is inclosed on both sides by steep and lofty hills: near its upper end is the lake or tarn Nahanagan, half a mile long, and nearly as much wide, about 1380 feet above the level of the sea, and having on its south side precipices rising 300 feet above the margin of the lake.

Glen-malur, or Glen-malure, is to the south-west of the three glens just noticed. It extends 8 or 10 miles in a south-eastern direction, having the Table Mountain (Group V., No. 34) at its upper or north-west end. The mountains rise with considerable steepness 600 or 800 feet above the valley, and more than 2000 feet above the level of the sea. Lugnaquillia (No. 36, Group V.) rises on the south-west of the valley, but not immediately adjacent to it, 2500 feet above the bottom of the valley at the lead-works, or more than 3000 feet above the level of the sea, having at its top a large flat stone resting on low supporters, somewhat like a cromlech, called 'Pierce's Table.' Near the upper end of the glen is a waterfall formed by the Avon-beg (or, as it is called in the upper part of its course, the Ess), which waters the valley. The fall is broken by projecting crags, and loses itself in a succession of rapids in the hollow beneath. Very different from the richly wooded glens of the Dargle and the Downs, Glen-malur is characterized by the absence of trees; and this circumstance imparts to it an air of peculiar sterility and desolation. There are leadmines in Glen-malur, and its mineral treasures have given to it its name, which signifies 'the valley of much ore.'

The picturesque beauties of the Vale of Ovoca, or Avoca, have been celebrated in Moore's 'Irish Melodies.' In his song 'The Meeting of the Waters' he has commemorated the junction of the Avon-more and Avon-beg, which unite to form the Ovoca. In a note to the song, Mr. Moore speaks of the junction of 'the rivers Avon and Avoca.' This, if we may trust our other authorities, is not correct. The name Avoca, or Ovoca, is not given except to the united stream: the constituent waters are both called Avon, one the Avon-more (or Great Avon) and the other the Avon-beg (or Little Avon). The scenery near the point of junction is improved by cultivation: the grounds of Kingston House, Mount Avon, Avoca Cottage, and Castle Howard, add to its beauties. The Avon-beg is a rapid stream rolling over a rocky bed. The Avon-more has a gentle current. Castle Howard is a modern building in the Gothic style, but of somewhat incongruous architecture, combining the castellated with the monastic character. About two miles or two miles and a half below the junction of these rivers is the neat and picturesque little village of Newbridge, on the left bank of the Ovoca, with its Roman Catholic chapel and grave-yard, post-office, and savings'-bank, backed by the richly wooded slope of the demesne of Bellevue House. About two miles below Newbridge is a second 'meeting of the waters,' equal in beauty to that celebrated by Moore. Indeed there has been some dispute which of the two formed the poet's subject. This second meeting is constituted by the brawling mountainstream the Daragh, Derry, or Aughrim, and the stiller stream of the Ovoca. Near the point of junction are the grounds of Bally Arthur House, Glenart Castle, and Shelton Abbey, the last the seat of the Earl of Wicklow. Below this point the expansion of the valley and the subsidence of the hills deprive the scenery of its picturesque character, and about Arklow the country becomes flat.

Hydrography and Communications.—The central mountain-range divides the county into two slopes, the eastern and the western. The first is drained by the Dargle, the Vartry or Fartrey, the Three Mile Water, the Potter's River, and the Ovoca: the western by the Liffey and the Slaney, with their respective affluents. These two last-mentioned rivers, although draining the western slope, afterwards turn eastward, and passing through openings in the mountain-range, fall into the Irish Channel, as well as the rivers which drain the eastern slope.

The Dargle (11 or 12 miles long) rises to the north-west of Douce or Djouce Mountain (No. 25, Group IV.) and flows first east, then north, then north-east, into the Irish Channel below Bray. In its upper part, above the junction of the Glen-cree, it is called the Glen-isloreane. It receives the Glen-cree (7 miles long), the Cookstown (7 miles), and a small stream from the precipitous glen of the Scalp (5 miles), all on the left bank. This last stream, and below its junction, the Dargle itself, forms the boundary of the counties of Wicklow and Dublin.

The Fartrey, or Vartry, rises on the eastern side of Douce Mountain, and has a course of 18 miles, first east, then south, then south-east into the Irish Channel, below the town of Wicklow. It waters the Devil's Glen. It approaches very near to the sea, about two miles north of its present mouth, but being prevented from flowing into it by the ridge of sand or beach which here lines the shore, expands into a narrow lagoon above 2 miles long, called 'Broad Lough,' at the southern or lower end of which it flows into the sea. The long tongue of land intercepted between this lagoon and the sea is called the Murrough, or Murragh, and is partly occupied by the Wicklow race-course. The Fartrey receives no tributaries worth mention.

The Three-Mile Water has a course of 6 miles, and the Potter's River of 7 miles.

The Ovoca is formed by the junction of the Avon-more (22 or 23 miles long) and the Avon-beg (15 miles). The Avon-more rises on the south-east slope of Duff-hill (No. 14, Group II.) and passes through Lough Dan; it receives on the left bank the Annamoe, which rises in Crockan Pond, a little lake 1770 feet above the level of the sea, and has a course of 6 miles, passing through Lough Tay, an ov[illegible] lake the longer diameter of which is above half a mile, elevated 807 feet above the level of the sea, and surrounded by steep, abrupt, and wooded heights. The Avon-more receives also the rivers which respectively drain Glen-amacnass, Glen-dasan, and Glen-dalough: the first has a length of 8 or 9 miles; and the third, which is called the Glen-ealo River, of 5 or 6 miles; the second, which joins the third, has only a course of not more than 4 miles. Lough Dan, through which the Avon-more flows, is nearly 2 miles long from north-west to south-east, and about 3 furlongs across at the broadest part; it is about 680 feet above the level of the sea. Lough Nahanagan in Glen-dasan, and the Upper and Lower Loughs of Glendalough, have been described. The Avon-beg receives no tributaries of importance. From the junction of the Avon-more and the Avon-beg the river now called Ovoca flows 9 miles into the sea below Arklow, receiving on its right bank the Daragh, or Derry, or Aughrim (16 miles long), into which the Gold-mine River (4 miles long) and the Ow (10 miles) both fall. The Ow rises on the eastern slope of Lugnaquillia (No. 36, Group V.). The whole length of the Ovoca, measured from the head of the Annamoe, its most remote source, is about 34 or 35 miles.

The Liffey rises in a bog near Crockan Pond (from which the Annamoe flows) and has a course of 19 or 20 miles, first west-north-west, then south-west, (partly within and partly upon the border of the county), to the place where it quits the county altogether to enter that of Dublin, to which it chiefly belongs. It receives the King's River, which rises on the south-western slope of Tonelagee (No. 16, Group II.), and flows first south-west, then west, then north, 16 or 18 miles into the Liffey between Blessington and Ballymore Eustace, receiving in its course a number of small streams, none of them more than 4 or 5 miles long.

The Slaney rises on the northern slope of Lugnaquillia, and flows in a winding channel, 12 miles west to a little below the junction of the Carrigower: it then turns south, and flows 6 miles by Baltinglass into the county of Carlow, to which county, and to the county of Wexford, the lower part of its course belongs. Its whole course, in the county of Wicklow, is about 18 miles. It receives on the left bank above the bend the Little Slaney (6 miles long) fro
western slope of Lugnaquillia, and the Carriggower (7
long) from the north-west slope of Slieoh Gadoe (N
Group V.) on the right bank. The Derreen, a feeder
Slaney, which it joins in the county of Carlow, h
source and the upper part of its course in this coun
rises between Lugnaquillia and Slievh Reagh (Nos. 3
39, Group V.) and flows about 7 or 8 miles into the c
of Carlow near Hacketstown. It has afterwards tw
tions (equal together to about 5 miles) of its course
border of the barony of Shillelagh in this county
several of its smaller affluents wholly or partly bel
the county. The affluent of the Slaney, known in dif
parts of its course as the Green-island, Shillelagh,
island, or Derry river, has its source, and a consid
part (19 or 20 miles) of its course, within or upo
boundary of this county; in which it belongs chi
the barony of Shillelagh. It joins the Slaney soon
quitting this county near Clonegall on the border
counties of Wexford and Carlow.

Most of the lakes have been noticed in connection
with the scenery or the rivers. Upper Lough Bra
Lower Lough Bray are mountain lakes in whic
feeders of the Glen-cree have their respective source
first is 1453 feet above the level of the sea, and
area of more than 28½ acres; the second is 122
above the level of the sea, and has an area of
65 acres. They are near each other and are skirted
west by steep and precipitous rocks on the eastern sl
Kippure Mountain (No. 2, Group I.). There are
small loughs on the mountains.

The communications of this county were formerl
deficient. The great central range of mountain
passable only at three points, within the county,
Sally Gap, at the head of the Liffey; at Wicklow G
the head of Glen-dasan; and in Glen-malur: the fir
second of these passages were scarcely practicable e
summer. This difficulty of communication render
part of the county a comparatively secure asylum
fugitives after the suppression of the insurrection of
and a number of them held their ground amid the fast
for a considerable time. Since that period the wh
the mountain district has been rendered accessible
construction of an excellent military road, which
the county on the north, near the head of Glen-cre
runs southward by the Upper and Lower Lough
through Glen-amacnass, and across Glen-malur, to
havanagh Bridge on the Ow. The Dublin and W
mail-road enters the county on the north side at Bra
runs southward by Delgany, Newtown-Mount-Ke
Ashford Bridge, Rathdrum, and Arklow into the co
Wexford. A branch road from this in the neighbo
of Ashford Bridge leads to Wicklow. One of the
from Dublin to Carlow passes through the county
western side, by Blessington, Hollywood, Stratfo
Slaney, and Baltinglass. The other roads have been im
very much of late years, so that a horse can convey
times the quantity of produce to market which he
twenty-five or thirty years ago. There is still how
want of new roads in many places and of the improv
of existing ones. The tillage of mountain-farms ha
seriously impeded by the want of roads.

There is no water-carriage in any part of the c
except on the coast.

State of Agriculture and Condition of the People.
following statements from the evidence collected
Commissioners for inquiring into the state of the p
Ireland, relate to the barony of Upper Talbotstown,
includes a portion of the central mountain district
the western border of the county, including the to
Baltinglass. It is probable the statements are most
plicable to the county in general. The barony co
hends about 42,028 plantation acres, or 62 510
acres, of which perhaps 12,000 to 15,000 statute
are unimproved mountain or bog. 'The mountai
generally composed of "a green flag quarry-ston
large blocks underneath, and smaller pieces near th
face, covered with a small depth of moory or peat so
in most places, but springy and wet in some spots.
soil of the lowland is usually a rather light black
with a subsoil of gravel or sand, and sometimes of
clay. The quality varies much, but is generally
Most of the mountain land is dry, and much of the low

but the foot of the mountains and a large extent of bog and moorland are much in want of draining.

The farmers of the district are chiefly small dairy or breeding farmers; some of them pursue to a considerable extent the business of 'vealing,' or of fattening calves for veal. The farms are of all sizes, but most commonly of 30 or 40 acres; and about one-twentieth in mountain farms, or one-fifth in the lowlands, is held in tillage. The dairies are of from 5 to 20 cows; the system of management pursued, whether in the mountain or lowland districts, is nearly the same, but the produce varies considerably. The produe of the barony is much greater than formerly, partly from a great extent of waste land having been reclaimed, and partly from improved cultivation.

The rotation of crops is very good; it is commonly as follows:—Oats are grown in the first year after breaking up the grass-lay; in the second year, potatoes, manured; in the third year wheat, barley, or oats. Sometimes the land is laid down in grass immediately after this rotation; sometimes not until another crop of potatoes and another of corn have been raised. Clover or grass seeds are usually sown with the last crop of corn, and the land is then left under grass from four to twenty years. Clover is cultivated to a considerable extent, and some vetches and trefoil are grown by the larger farmers. One or two gentlemen grow turnips or mangel wurzel, but only to a small extent, though the soil, being generally light and dry, is well suited to them. The peasantry have little or no knowledge of the advantage of an alternation of crops; and do not cultivate the artificial grasses, except clover, which some of them are beginning to grow. The rotation of crops above described is carried on in every part of the farm in succession, except in the wet or moory bottoms, and in the sheep-walks, which form a large part, if not the whole, of a mountain farm. Little or no fallow is made, and wheat is commonly grown after potatoes.

The manures used are dung, procured chiefly from the farmer's own stock, lime, and peat, or, as it is called, 'bog-stuff.' The use of lime is increasing, though there is none dug in the county, except limestone gravel: the lime is bought ready burned: from thirty to forty barrels per acre is the usual proportion. The use of 'bog-stuff' mingled with dung, ashes, or other refuse of the house and yard, is fast increasing, especially for the potato crop.

The farmers all plough with two horses, and use Scotch ploughs or other light ploughs of similar construction. No other modern implements are used. The 'fack,' a very strong spade of long, narrow, and almost pointed shape, like an English draining spade, is the only implement employed in mountain ground: it is well adapted to strong rocky ground.

Seed wheat is usually limed and pickled, in order to avoid smut; and the crop is weeded, but very imperfectly, in June. The farmers are generally careful as to the time of reaping their crops, but some let them stand longer than others. The peasantry frequently incur loss by neglecting to cut their own crops in time, while labouring for hire.

Corn is generally threshed immediately after harvest to pay rent and other expenses.

The growth of potatoes has been much extended since the tithe composition, and from the quantity of land which the improved method of farming has afforded facility for bringing into cultivation; but they are never grown for sale by the peasantry or the poorest class of occupiers. The small farmers grow 'cups,' a kind of potato combining productiveness and goodness of quality; the labourers grow 'lumpers,' which have no merit but productiveness. The refuse, or small potatoes, are kept for pigs or fowls.

There is an immense field for profitable cultivation in the extensive mountain tracts which the county presents; and there are hundreds of families who would gladly undertake to bring them into cultivation, if allowed to do so, on condition of being rent-free for a certain number of years, or perhaps receiving a little aid in the commencement of their labours. In some parts, under some landlords, this extension of cultivation has taken place, and patches of potatoes, oats, and pasture are found on the very tops of some of the mountains.

There is very little feeding land: the grass land is used only for dairying or rearing stock, except on one or two large farms. By the introduction of green crops for feeding, the same quantity of land would rear or fatten a greater number of cattle, and give employment to a much greater number of persons. A great improvement has taken place in the cattle stock by the general introduction of the Durham or short-horned breed. Excellent half-bred stock is seen even on the smallest farms, and beautiful thorough-bred animals upon the land of several farmers in the parts of Wicklow, Kildare, and Carlow counties, which adjoin the barony of Upper Talbotstown. More than five hundred head of half or thorough-bred Durham cattle have been seen at one fair, and have fetched high prices; persons coming from various parts of England and Ireland to buy them. Indeed it is only the high prices obtained for their young and store stock that enables the farmers to pay the heavy rents they do. On the mountains the native cattle are kept, as being more hardy. The butter made is sent chiefly to Carlow market, where it is considered to be of first quality. It is packed after each churning, where they have sufficient to fill a cask at once; but as few have enough for this, they usually wait for two or more churnings before packing, in order to have the contents of the firkin of the same colour. There is little or no cheese made. On an average a good cow will produce annually a cwt. of butter, besides rearing a calf.

Few sheep are kept on the lowland farms, but a great number on the mountains. The large old Irish breed, improved by crossing with the Leinsters, are kept in the lowland farms. This breed weighs about twenty-four pounds per quarter: it is not so high on the legs, but is heavier in the carcass than formerly. The sheep are seldom fattened by the farmers, but are sold to graziers for feeding at a year and a half or two years old. The fleece of the lowland sheep is about five pounds for ewes and seven pounds for wethers. The native mountain breed, either indigenous or long since naturalized, is kept on the mountain farms: it has been of late years much improved both in shape and wool by crossing with English breeds. A cross with the south-downs was tried with good success, but the weight of wool has caused the Leicesters to be preferred. The mountain sheep are much smaller than the lowland, weighing only about fifteen pounds the quarter, and the fleece about three pounds for ewes and four pounds for wethers. They graze from May till October on the mountains, and are then sent to lowland farms till the following May, at a charge of from 4*s*. to 5*s*. a head for wintering. The stronger wethers are however kept on the mountains during the winter, except in snowy or very stormy weather. Good mountain land will feed in the summer months three sheep on every two acres. The wethers are sold to the graziers at four years old. Small farmers seldom keep sheep except on the mountains, where they have a few.

The pigs are generally of a bad breed, long-legged, large boned, and coarse. Few are bred; they are commonly purchased out of the Connaught droves, the farmers finding this plan more profitable than breeding them. They are killed for bacon, in which a considerable trade is carried on.

In the management of the dairy there is great negligence. The room appropriated for it usually adjoins the kitchen; or if there is no convenience in the house, one of the best of the outhouses is appropriated for the purpose. 'One farmer who had a dairy of nine cows, the English assistant-commissioner found had removed his dairy into a corner of his kitchen, while he was threshing in the outbuilding, which he called his dairy, but which was much more fit for his cow-house. In the dairy of another the ceiling was hung with rank bacon, and tubs full of rubbish of every description, which emitted a mixture of odours that mechanically impelled the fingers to the nose. In fact such is the general absence of the accommodation, cleanliness, and system, which are considered in all other countries indispensable to successful dairying, that it is perfectly unaccountable how the farmers here can produce butter of so good a quality; and it must arise in a great measure from the excellence of the soil and climate for the purpose.' (*Observations, &c.*, by John Power, Esq.)

The fences are generally single or double ditches, with furze or quick hedges, but more generally furze: sometimes they are mere banks with a few furze plants on the top. From their imperfect condition they frequently occasion litigation and breaches of the peace, or loss from cattle trespassing. The gardens of the poor are better fenced than the fields of the farmer. There is not much loss of land by useless fences, except in the lands of gentle men or large farmers, where broad fences are kept up for ornamental purposes.

Land is usually let by the Irish acre: and the eager competition for land from the absence of other means of maintenance for the people has kept rents up unnaturally high. The rent of tillage or grass land is about 2*l.* per acre: the rent of con-acre ground is very much higher. The tenant calculates on his butter for meeting the rent of one half-year, and on his corn for the rent of the other. Four-fifths of the land in the barony of Upper Talbotstown are held under the head landlord, the rest under middlemen; but there is no perceptible difference in the condition of the tenantry and labourers under the two classes of landlords. Farms are chiefly held under lease for one life, or twenty-one years; sometimes for three lives or thirty-one years, and occasionally for forty-one years. Exorbitant sums are frequently charged for drawing leases, and a present, frequently a large one, is made on signing a lease to the landlord's agent or the agent's wife. Many farms in the mountain districts are still held by tenants in common; but this mode of tenure is getting out of use. The size of the holdings has been a little increased by the consolidation of small farms; but not to any great extent. In the consolidated farms a considerable proportion of the land previously in tillage has been laid down in grass. The ejected tenants have generally become labourers, and are dispersed all over the country: many of them have been reduced to utter destitution, and instances have occurred of their dying through want, grief, and change of habits.

The con-acre system is very extensively in use. The land is manured and tilled by the farmer, and let for the season to the labourer, who finds seed, cultivates, digs up, and removes the crop. Where the land is manured by the farmer the rent is from 10*l.* to 13*l.* the acre, the average being 11*l.* When manure is provided by the labourer, no rent is charged in the country, but near the town from 2*l.* to 3*l.* is charged. The average quantity of con-acre ground held by a family is half an acre. The average produce is from forty to fifty barrels of eating potatoes, at twenty-four stone to the barrel, or from six tons to seven tons and a half: and about fifteen barrels, or two tons and a quarter of refuse potatoes, fit only for fowls or pigs, or for seed. The rent is paid commonly in money in the neighbourhood of towns, in the country in labour. Con-acre of oats is hardly in use; the farmers grow that crop themselves.

At the time of the assistant-commissioners' inquiry into the state of the poor (about 1835), there were in the barony of Upper Talbotstown (except three small parishes or parts of parishes, from which there was no return) 1735 labourers, of whom 791 were permanently employed, 812 occasionally employed, and 132 out of employment from age, ill health, or bad conduct. The condition of the labourer differed materially in different cases; in the neighbourhood of a rich resident proprietor or a wealthy farmer they were for the most part constantly employed; while in poor and thickly populated neighbourhoods employment was scarce, and distress consequently great. The constant labourers worked only from 220 to 280 days (250 on the average), the rest of their time being taken up by the care of their con-acre, the observance of holidays, attendance at markets, fairs, wakes, funerals, &c.; or lost through the days being wet, in which case they seldom worked. They received at the time of the inquiry 8*d.* a day in winter, 10*d.* at other times; and occasional labourers in busy seasons, as in spring and harvest, from 1*s.* to 1*s.* 2*d.*, or about 4*d.* less if (as was frequently the case) the farmer furnished the labourer with diet. Women were occasionally employed at 5*d.* or 6*d.*, and in harvest time as much as 1*s.* per day; boys under sixteen had occasional employment at from 3*d.* to 4*d.*, and in harvest at 8*d.* per day; but women and boys could only get work at busy seasons, such as harvest, or potato-setting, or potato-digging, when they might get perhaps ten days' work: it is chiefly obtained by young and unmarried women, the others having to take care of their families. Farmers whose families were not old enough, or sufficiently numerous to do the work of their farms, usually had one, two, or three boys in the house at 30*s.* or 40*s.* yearly wages, besides board and lodging. Wages had decreased about 4*d.* a day in the ten years preceding the inquiry. The labourers in this, as in other parts of Ireland, do not work so steadily or skilfully as the English or Scotch, partly, it is thought, from low diet, partly from want of early example, and from idle habits formed through the want of steady employment for boys. The yearly earnings of a constant labourer were estimated at nearly 10*l.*; those of an occasional labourer at from 3*l.* 17*s.* to 7*l.* 14*s.* 'Cottiers' are labourers in constant work, and holding anacre of ground and a cabin from their employer, with grass for a cow in summer and hay and straw in winter. Their situation is considered a desirable one: they pay 2*l.* to 3*l.*, or even 5*l.* a year for a cabin and an acre of ground, or for the ground with permission to build a cabin themselves; and from 6*l.* to 6*l.* 10*s.* for the grass, hay and straw for the cow.

A considerable number of the labourers keep pigs; their wives sometimes keep fowls, and employ themselves in knitting stockings, chiefly for use in their own families, rarely for sale. The profit on a pig was estimated, at the time of the inquiry, at from 20*s.* to 30*s.*, or perhaps more; the profit on keeping fowls was estimated at from 5*s.* to 10*s.*, or 15*s.*

The food of the labourers consists almost wholly of potatoes; they never have eggs, except when working at a distance from home, when they perhaps have one egg boiled hard to eat with their scanty dinner; small farmers occasionally eat a few eggs, but sell the greater part of what their fowls produce; they have sometimes herrings, a little offal pork, and now and then some bacon as a treat. When potatoes are plentiful, a labourer's family have three meals a day; when scarce, two, and sometimes only one. In the interval when the old potatoes are unfit for use, and the new crop is not gathered in (which interval comprehends a month or six weeks in and about the month of August), the distress of the occasionally employed labourers is very great. Their wives and children become regular beggars for the time; or, if they revolt at this alternative, they suffer, often in silence, the most pinching want, eking out their miserable subsistence by boiling charlock or wild mustard and other weeds, and sometimes they are kept from starvation only by the aid secretly conveyed to them by some kind neighbour, who can ill afford to spare anything, but who suspects them to be in the extremity of destitution. The amount of relief thus imparted by farmers, small occupiers, and even labourers, is incredible. When the general poverty is aggravated by the partial failure of the potato crop, the distress becomes dreadful indeed, and on some occasions, but for the advance of money by government, hundreds must have died through famine.

The cabins of the labourers are built of yellow clay and mud, with stone foundations; or of mud and stone mixed, or of mud alone. Those with one apartment are usually 14 feet by 10; those of two apartments 18 feet by 10. The walls are about seven feet high. They are thatched generally with straw; sometimes with heath, reeds, or potato-stalks, with sods underneath. The floor is either the natural earth, or is covered only with a thin coating of clay. The cabin, when it is not kept in repair by the landlord, or when it is, if the landlord is a poor man, is commonly in a wretched condition. Cabins are usually damp, from the floor being below the general level of the ground; and the dampness is increased by dilapidation and the practice of making the hole for the dung-heap and refuse from the house close to the cabin. The best cabins have a large open chimney, the common ones only a hole in the roof. The windows are small, usually 16 inches by 10 or 12; those in cabins near the towns and villages are glazed, or have been glazed, though the glass when broken is frequently replaced by paper, wood, hay, straw, an old hat, or a piece of a garment. In the country the windows have commonly wooden shutters, except in the poorer cabins, where the window is stopped, if at all, with hay, straw, or old clothes. The cabins never have privies, and very few of them have pigsties or any outhouses whatever. The pig, where one is kept, sleeps in the cabin. The cost of building a cabin is from 3*l.* to 4*l.* for the common ones, and from 5*l.* to 6*l.* for the good ones. If the labourer builds his own cabin, he pays about 10*s.* a year less for his land than he would do if the cabin was built for him.

The cabins generally contain a rough bedstead or frame, propped up on blocks of wood or stone, for the man and his wife and infant child; the elder children and other inmates, if any, sleep on the ground. In the poorest cabins all lie on the ground. The bedding consists in the best cabins of a tick filled with chaff; but in the common cabins the bedding is chiefly of straw or rushes, heath, fern, or moss, with a piece of sacking, a bale wrapper, an old cloak, or other clothes thrown over it. The covering in the best cabins consists of two blankets and a quilt, almost always old and thin; often, in others, of a single blanket and quilt; and, in the most wretched, of a coverlet formed of the remains of an old blanket, carpeting, old clothes, or rags, stitched together or separate. The best cabins have two or three chairs or good stools, a table, a small dresser, with a little stock of plates, cups, saucers, and mugs, a few tin vessels and pots and pans for water and cooking, a chest or box or two for clothes, &c., and a tub or two for potatoes or meal. The poorest class have one or two little stools, a make-shift table, one or two broken cups or mugs, an old tin can or cracked pitcher, and a pot to boil potatoes. Children usually sleep with their parents till 12 or 13 years old, unless the number be too great; when there is a sufficient covering for a separate bed, only two or three of the younger ones sleep with their parents, but where there is a want of covering, as many as five or six sleep with them. The crowded state of the cabins and the destitution of the inmates perpetually lead to a neglect of the decencies of life, which are less attended to than in some other counties where an equal degree of wretchedness prevails.

The clothing of the labourers is very bad; about one-third of the population who are of age to attend public worship are prevented by want of clothes from doing so. The wife and girls, from the cheapness of printed cotton, manage usually to get an outer garment, but are much in want of under-clothing. They have perhaps only one shawl among them, and take it in turn to go to chapel. The children are generally all but naked, their clothing being barely sufficient for decency, and utterly insufficient for warmth. The use of shoes and stockings is decreasing every day among the women and children; the men must have shoes to dig with, but they are commonly very old.

The common fuel of the county is turf, which is dear except near the bogs. When the labourers are unemployed, they collect heath and furze, which they cut on the mountain. Many of the proprietors do not permit this, as it deprives the game of cover. The poorer labourers burn weeds, stubble, or dried dung. Insufficient fuel to counteract the dampness and coldness of the climate is considered to be one cause of the early decline of the labourers' health and strength.

The destitution of the occasional labourers obliges them to resort to many shifts for what are commonly deemed necessaries. They wash with rain-water to save soap, and for candles use rushes dipped in fat. Yet amidst all this poverty the greater part of the labourers smoke, and many spend from 2*d.* to 6*d.* a week on tobacco. The English assistant-commissioner remarked an almost universal inattention to cleanliness, and what is in other countries considered decency of appearance, both in house and person; but in extenuation of this the want of early training and of example from those who are in a station above them must be taken into the account. Habitual drunkenness is not common; when it does occur, it is found among the tradesmen and small farmers; labourers cannot afford it, and very rarely drink spirits. The farmers drink milk, beer, and, on particular occasions, spirits.

Divisions, Towns, &c.—The county is divided into eight baronies or half-baronies, as follows. The population is from the census of 1831.

Barony and Position.		Area.			Population.
		Land.	Water.	Total.	
		a. r. p.	a. r. p.	a. r. p.	
Arklow	S.E.	67,280 2 38	76 1 0	67,356 3 38	22,796
Ballinacor, North	Central	73,501 1 9	608 2 30	74,109 3 39	23,839
Ballinacor, South	S.	78,299 2 18	16 1 37	78,316 0 15	
Newcastle	E.	52,088 1 39	207 3 0	52,296 0 39	15,770
Rathdown (Half)	N.E.	34,288 2 15	93 1 24	34,381 3 39	11,652
Shillelagh	S.W.	44,348 3 5	..	44,348 3 5	14,204
Talbotstown, Upper	W.	62,510 1 26	..	62,510 1 26	18,512
Talbotstown, Lower	N.W.	86,770 2 37	87 0 9	86,857 3 6	14,784
Totals		499,088 2 27	1,089 2 20	500,178 1 7	121,557

An examination of this table will show that the population is most condensed in the baronies of Arklow and Rathdown, where it gives rather more than one inhabitant to every three acres, and Shillelagh, where it gives rather less than that proportion. In Newcastle and Upper Talbotstown the proportion is rather more than one inhabitant to every three acres and a half; in Lower Talbotstown it is rather more than one to every six acres, in Ballinacor rather less than that proportion. The least populous districts are overspread by mountains; but it is remarkable that Rathdown and Shillelagh, though among the most populous, are mountainous also.

The county of Wicklow contains the county-town of Wicklow, the market-towns of Arklow, Baltinglass [ARKLOW; BALTINGLASS], Blessington, Bray, Carnew, Dunlavan or Dunlavin, Rathdrum, Stratford-upon-Slaney, and Tinahely or Tinehely or Tinnahealy; the post-towns of Annamoe, Ashford, Delgany, Enniskerry, Glenealy or Glanealy, Newtown-Mount-Kennedy, and Newbridge; the former city of Glendalough or Glandelough; the decayed and disfranchised borough of Carysfort or Cariesfort; and the villages of Bolinolea or Ballinalea, Donard, Kilcoole, Rathnew or Newrath, and Red-cross.

The county-town of Wicklow is partly in the parish of Kilpoole, partly in the parish of Drumkay, both in the barony of Arklow; and partly in the parish of Rathnew, in the barony of Newcastle. Wicklow is supposed to have been occupied as a naval station by the Ostmen or Danes before the Anglo-Norman invasion; and some would derive its name (which was antiently written Wykinglo, Wykenloe, or Wykinglogh, and is interpreted to mean 'the lake of ships') from that people. Maurice Fitzgerald, one of the Anglo-Norman invaders, began to build a castle here, but it was not finished at that time. In A.D. 1310 the town was burned by the Irish. In 1375 the castle was put into a state of defence by one of the Fitzwilliams, in whose family the constableship of the castle long continued. In the early part of the sixteenth century the castle and town were occupied by the native sept of the Byrnes, but were soon afterwards surrendered by them to the English government. In the civil war of 1641 the castle was besieged by O'Toole, one of the Irish insurgents, but the siege was raised by Sir Charles Coote.

The town is situated on the south-western bank of the river Vartry or Fartrey, along which it extends for above half a mile. The houses are poorly and irregularly built, and the streets narrow and ill-paved. At the eastern end of the town, on a steep rock or cliff projecting into the sea on the south side of the mouth of the river, are the remains of the castle, called Black Castle. These remains are very trifling: they consist of a rampart including a considerable area, a deep ditch cut or dug in the solid rock, within the rampart and at some distance from it, and a flight of steps cut in the face of the cliffs and leading down to the sea. In the centre of the town are the ruins of a Franciscan friary, founded in the reign of Henry III. The church of the Wicklow union (which comprehends the three parishes in which the town is situated, with those of Glenealy, Killiskey, and Kilcommon) is on the north-west side of the town, near the river. The south door has a fine Norman arch, the remains of the antient structure; but nearly all the rest of the building is of modern date: it has a tower and a copper cupola added in 1777. There is a school-house near the church. On the south side of the town are the old Roman Catholic chapel, now (we believe) used for a male and a female school, and the new Roman Catholic chapel. There are meeting-houses in the town for Methodists and for Quakers. Near the south-east end of the town are an infirmary and a county-gaol and court-house, and in the middle of the town a post-office and a police-station. On the peninsula of the Murrough or Murragh, on the opposite bank of the river, over which there is a bridge, are a race-course and stand, and some baths. The harbour is formed by the mouth of the river; it is considered capable of being much improved, and made a harbour of refuge for large vessels, at a cost of about 35,000*l.* Vessels drawing from seven to eight feet water can enter at ordinary tides. There are two lighthouses on Wicklow Head, a mile and a half south-east of the town; and on a rocky point (St. Bride's Head) midway between the town and the lighthouses, are the ruins of a Roman Catholic chapel, and near to it a cave in the cliff.

The population of the town in 1831 was 2472. The market is on Saturday, for meat, and is held in the market-house, which, with the market-place, is in the eastern part of th town. There is no regular market for corn; but the tow has the largest corn-trade of any town in the county; th average yearly sale, in the ten years from 1826 to 1835 inclusive, was 450 barrels of wheat, 15,066 barrels of barley, and 24,880 barrels of oats: part of the corn and some copper and lead ore are exported; and coal, culm, limestone, timber, and iron are imported. A few small vessels of from 35 to 100 tons and some small craft belong to the port.

Wicklow was incorporated by charter of 11 James I., and sent two members to parliament before the Union: it was in the patronage of the Tighe family, who received at the Union 15,000*l.* compensation for the disfranchisement of the borough. The portreeve, who was the principal officer of the corporation, held a court for the recovery of small debts. The corporation was dissolved by the late Irish Municipal Corporations Act, 3 and 4 Victoria, cap. 108.

The Union of Wicklow is in the diocese and ecclesiastical province of Dublin. The population was estimated at 10,799 in 1831, and 11,525 in 1834: nearly one-fourth of the population belong to the Established Church: the others are almost entirely Roman Catholics. There are churches at Killiskey and Glanealy in the Union, with congregations of between 300 and 400, taken together; and a school-house at Rathnew, licensed for service, is attended by 20 or 30. There are three Roman Catholic chapels (at Wicklow, Glanealy, and Killiskey), with joint congregations of about 3000. The gross yearly value of the benefice (a vicarage) is 512*l.* 16*s.* 8*d.*, the clear value 373*l.* 11*s.* 10*d.* It is in the diocese of Dublin. The rectorial tithes of the Union are annexed to the prebend of Wicklow in Dublin cathedral, except a small portion held by a lay impropriator. There were in 1835 twenty-seven schools (twenty-five day and two Sunday-schools) in the Union, with 882 children (406 boys and 476 girls) on the books of the day-schools: two of these (with 170 boys and 173 girls) were national schools; three others (with 41 boys, 57 girls, and 70 infants, or very young children, respectively) were supported by subscriptions; another (with 28 boys and 16 girls) was in connection with the London Hibernian Society: seven others were chiefly supported by benevolent individuals, and the rest were private schools. There was no school for superior education in the Union.

Blessington or Blesinton, is in the half-barony of Lower Talbotstown, nearly 18 miles south-south-west from Dublin. The parish has an area of 15,780 acres 3 roods 7 poles, and had in 1831 a population of 2182, about two-thirds agricultural. The town consists of one street, which had, in 1831, 51 houses, inhabited by 69 families, comprising 426 persons. In the middle of the town the street is widened and forms a market-place. The market-house and a considerable hotel are in the market-place. The church, a handsome modern building capable of accommodating two hundred persons, with a lofty square tower, stands in the churchyard, adjacent to the market-place; and near it are the parsonage-house and a school-house. There is a police-station in the town. There are a weekly market on Thursday, and three yearly fairs. Immediately adjacent to the town is Blessington demesne, formerly the residence of the marquis of Downshire. The mansion was burned by the insurgents in 1798, and still remains in ruins. Russborough House, the seat of the earl of Miltown, Russellstown House, Baltyboys House, and Burgagemoyle Cottage, are in the neighbourhood in the adjoining parishes of Burgage and Baltyboys. Blessington parish is the head of a union in the diocese of Dublin, comprehending the parishes of Blessington and Burgage, which are united in one vicarage; and the vicarages of Killbride and Boystown, or Baltyboys. There are two churches in the Union, that in Blessington, and one in Killbride parish, capable of accommodating 100 persons; and three Roman Catholic chapels, one at Killbride and two at Baltyboys. The clear yearly value of the united benefice is 265*l.* 6*s.* 9*d.* There were in the parish of Blessington in 1835, six day-schools, namely, four hedge-schools and two schools partly supported by the marquis of Downshire; and in the whole Union eighteen day-schools (nearly all of them hedge-schools) with 552 children (300 boys and 252 girls). Blessington was incorporated by charter of Charles II., and returned two members to the Irish parliament; but it was disfranchised at the Union, the marquis of Downshire, the patron, receiving 15,000*l.* compensation, and the corporation has since fallen into disuse.

Bray is in the half-barony of Rathstown, 13 miles south of Dublin on the Wexford mail road. The parish has an area of 2985 acres 3 roods 34 poles; and contained in 1831 a population of 3499. The town, or that part of it which is in the county of Wicklow, stands on the south side of the river Dargle, and consists of a long street leading up from the bridge over the Dargle, along the Wexford road, divided at its upper end into two branches, one continuing along the Wexford road, the other leading off to the right toward Bellevue and Kilmacanoge: it contained, in 1831, 447 houses—427 inhabited, 19 uninhabited, and 1 building, with a population of 501 families, or 2590 persons. That part of the town which is north of the Dargle is in the parish of Old Connaught, in the half-barony of Rathdown, in the county of Dublin; and had at the same time 227 houses, namely, 193 inhabited, 24 uninhabited, and 10 building, with 209 families, or 1168 persons; making a total in the town of 674 houses, namely, 620 inhabited, 43 uninhabited, and 11 building, with a population of 710 families, or 3758 persons. Bray is resorted to as a watering-place, chiefly from Dublin, being recommended by its easy distance and the romantic scenery adjacent to it. The streets are neither paved nor lighted, but the road is well made and kept, and the houses, though not regular, are neat. Many of them are built and fitted up to be let in the season. The church is near the bridge; and there are in the town a Roman Catholic chapel (besides one in Old Connaught parish, on the Dublin side of the river), a Presbyterian meeting-house, an infant school-house, another building for a school and a savings'-bank, a police-station, and a fever hospital, formerly a barrack. The trade of the place is not great; a small manufacture of flax and wool is maintained for charitable purposes; some coal, timber, slates, and limestone are imported, the mouth of the river forming a small haven with a bar at its entrance. There are a brewery and a water-mill in the town. There are two markets in the week, on Tuesday and Saturday, and several fairs in the year, some for cattle, others, which are attended by traders from Dublin, for friezes. The average yearly sale of corn in the ten years from 1826 to 1835 was 4160 barrels of oats; not any wheat or barley. A number of fine trout are caught in the river and sent to the Dublin market. There is an old castle, now used as a barrack, on the Dublin side of the river, and a coast-guard station on the shore between the town and Bray Head. Near the town are several mansions, especially Wingfield, Hollybrook, Kilruddery, the seat of the earl of Meath, and Powerscourt, the seat of Lord Powerscourt. The rectory and vicarage of Bray and the vicarage of Old Connaught form a union in the diocese of Dublin, of the clear yearly value of 480*l.* 10*s.* There were in 1835 nine day-schools and one Sunday-school in the Union, with 658 children under daily instruction, namely, 255 boys, 345 girls, and 58 children in the infant-school, of sex not distinguished in the return. Two of the schools, with 89 boys and 140 girls, were national schools; the infant-school was supported by Lady Powerscourt, and one school, with 22 boys and 80 girls, was wholly supported by another lady. The Sunday-school was a Roman Catholic school with 300 children.

Carnew is in the barony of Shillelagh, 29 miles south-west of Wicklow, and 60 south by west of Dublin. The parish extends into the baronies of Scarewalsh and Gorey, in the county of Wexford. The area of the whole parish is 23,466 acres 16 poles; that of the Wicklow portion, 15,350 acres 1 rood 26 poles: the whole parish had in 1831 a population of 6865; the Wicklow portion, of 4973—from two-thirds to three-fourths agricultural. The town is on a cross-road, and consists of one principal street called in different parts Carnew Street and Wool Green, running east and west, and of two lanes, Coolattin Row, leading to the north, and Mill Lane to the south: the number of houses in 1831 was 131, namely, 122 inhabited, 5 uninhabited, and 4 building, with a population of 152 families, or 826 persons. There is a castle which tradition states to have been battered by Cromwell in his march from Dublin to Wexford, but which has since been roofed and repaired. The church is a handsome building with an embattled tower and spire: and there are a dispensary, a post-office, a police-station, and a school-house for boys and girls. There are a snuff and tobacco manufactory, and a brewery; and, near the town, a corn-mill and a stone-quarry. There is a market on Thursday, for pigs, potatoes, and poultry; and there are eight fairs, four of them considerable horse and cattle fairs. The rectory of Carnew is in the diocese of Ferns: it is of the clear yearly value of 701*l.* 4*s.* 7¼*d.* There is a chapel-of-ease in the village of Shillelagh. There is a Roman Catholic chapel in the parish. There were in the parish, in 1835, six day-schools, with 519 children, namely, 326 boys and 193 girls: the four largest schools were almost entirely supported by Lord Fitzwilliam.

Dunlavin or Dunlavan is 27 miles south-west of Dublin, in the half-barony of Lower Talbotstown. The parish extends into the half-barony of Upper Talbotstown, and into the barony of Upper Cross in the county of Dublin; and has an area of 5852 acres 2 roods 21 poles, with a population in 1831 of 2529. The town is on one of the roads from Dublin to Timolen and Castle Dermot, and consists of two principal streets, like the letter T, and consisting in 1831 of 161 houses—155 inhabited, 3 uninhabited, and 3 building; with a population of 165 families, or 1068 persons. Several of the houses are well built, and there are a neat church of modern erection, a market-house of some architectural pretension, standing out in the middle of one of the streets, a Roman Catholic chapel on the Fair Green, a school-house, a police-station, a dispensary, and a post-office. The market is on Wednesday, for corn and potatoes: the yearly sale of corn on the average of the ten years 1826-35 was 380 barrels of barley and 12,396 barrels of oats: not any wheat was sold. The parish is the head of a union in the diocese of Dublin, comprising several parishes: the clear yearly value of the united benefice is 543*l*. 6*s*. 1¼*d*., with a glebe-house. There are two Roman Catholic chapels in the Union, one very small. There were in the Union in 1835, nine day-schools and one Sunday-school. The day-schools had 334 children, namely, 163 boys and 171 girls; one was the parochial school in connection with the London Hibernian Society, supported partly by a donation from that society, but principally by private subscriptions; it had 56 boys and 61 girls: another small day-school was supported by the bounty of an individual. The Sunday-school was held in the church, and was for scriptural instruction; it was attended by from 25 to 30 boys and 45 to 60 girls.

Rathdrum is in the half-barony of Ballinacor North, 33 miles from Dublin on the mail road from Dublin to Wexford. The area of the parish is 53,155 acres, 2 roods, 29 poles. The population in 1831 was 8624, about two-thirds agricultural. The town is near the right or west bank of the Avonmore, and consists of three or four streets or lanes irregularly laid out: it contained, in 1831, 145 houses, all inhabited, with a population of 176 families, or 1054 persons. The church is a modern building in the town, and there are a Methodist meeting-house, a building erected by the late Earl Fitzwilliam as a flannel-hall, a market-house, and a police-station. The flannel and woollen cloth manufactures were formerly carried on in the town, but since the abolition of the bounty on Irish woollens these branches of industry have been nearly, if not quite, abandoned. There are two breweries in or near the town. The market is on Thursday; and there are several yearly fairs, beside a monthly flannel-fair. The yearly sale of corn, on the average of the ten years from 1826 to 1835, was only about 60 barrels of wheat, 46 barrels of barley, and 175 barrels of oats. The parish is in the diocese of Dublin, comprehending the districts of Ballykine, Ballinacor, and Knockrath; the benefice is of the clear value of 506*l*. 7*s*. 7¾*d*., with a glebe-house. Some of our authorities give these divisions as separate parishes, but they have not formed separate ecclesiastical charges in modern times. There are two episcopal chapels, one at Carysfort and one at Ballinatone. An apartment in the Flannel Hall is used as a Roman Catholic chapel; and there are three other chapels in the parish. There were in 1835 in the parish nine day-schools, with 476 children, namely 218 boys, 181 girls, and 77 children of sex not distinguished in the return; and five Sunday-schools, with about 570 children. Of the day-schools, one, with 104 children, namely, 53 boys and 51 girls, was a royal chartered school founded by King Charles I., with a good endowment; two others, one with 50 boys and one with 71 girls, were on Erasmus Smith's foundation; two others, with 97 children, were in connection with the Kildare-place Society; and these, with the remaining four day-schools, were assisted by private contributions.

Stratford, distinguished as Stratford-upon-Slaney, is in the ecclesiastical district of Rathbran or Stratford, in the half-barony of Upper Talbotstown, about 33 miles south-south-west of Dublin. This town is of modern origin, having been founded by the late earl of Aldborough, after whose family name it was called. It is described in Seward's 'Topographia Hibernica' as having 'four squares and twelve streets;' but this description must refer to the plan of the founder, which was never realized. The town is near the right or north-west bank of the Slaney, over which there is a bridge, and consists of one principal street, having in the course of it two large open spaces, one an oval, the other a square, which latter the main street crosses diagonally; there are two or three smaller streets branching from the main street at right angles at the open spaces. The town comprehended, in 1831, 105 houses, namely, 101 inhabited and 4 uninhabited, with a population of 151 families, or 952 individuals. It contains the district church of Rathbran, a neat structure built by the earl of Aldborough, A.D. 1790, a Roman Catholic chapel, and a Presbyterian meeting-house. Near the town, on the bank of the Slaney, are a cotton print-work and a bleach-mill; and near the Little Slaney, which falls into the Slaney near the town, is a fever hospital. Stratford is the seat of a considerable manufacture of printed cottons, which, with the woollen manufacture, employed, in 1831, 177 men, namely, 150 in the town and 27 in the other part of the parish, beside women and children. The market is on Tuesday and Saturday. The ecclesiastical district of Rathbran is in the parish (rectory) of Baltinglass: the perpetual curacy is of the clear yearly value of 98*l*. 14*s*. 11½*d*., arising partly from glebe, but chiefly from an endowment by the late earl of Aldborough, augmented from Primate Boulter's fund. There were in the district, in 1835, six day-schools, with 285 children, namely, 160 boys and 125 girls; and one Sunday-school, with 43 children, namely, 20 boys and 23 girls. Of the day-schools, one with twelve boys was a classical school, the rest were hedge-schools.

Tinahely, or Tinehely, or Tinnahealy, is in the parish of Kilcommon, in the half-barony of Ballinacor South, about 52 miles south of Dublin. The area of the parish is about 16,017 acres; the population in 1831 was 4327. The town was destroyed in the insurrection of 1798, and has since been neatly rebuilt. It is near a stream flowing into the Green-island or Shillelagh, or Derry river, and consists of three streets meeting in the market-place. It contained, in 1831, 96 houses, namely, 94 inhabited and 2 uninhabited; with a population of 111 families, or 575 individuals. There are a considerable water-mill for corn, a market and court-house, a police-station, a post-office, and a dispensary. There is a market on Wednesday, and there are several yearly fairs, chiefly for cattle and pigs. The church is half a mile south of the town, and a Roman Catholic chapel is a mile to the east-south-east. At Coolruss in the neighbourhood are 'Black Tom's Cellars,' the remains of a mansion commenced by the celebrated earl of Strafford. The parish of Kilcommon is a rectory, forming part of the union of Crosspatrick, in the diocese of Ferns: the union is of the clear yearly value of 578*l*. 6*s*. 5*d*. There were in the parish, in 1835, only two day-schools, with 175 children, namely, 100 boys and 75 girls: one was a parish school, partly supported by Earl Fitzwilliam.

The post-town or village of Annamoe, in Derrylossary or Derralossary parish, in the half-barony of Ballinacor North, 8 miles south-west of Newtown-Mount-Kennedy, and 30 from Dublin, consisted, in 1831, of no more than 11 houses, all inhabited, with a population of 11 families, and 67 persons. It is on the right bank of the Avonmore, over which there is a bridge, and has a neat Roman Catholic chapel, a post-office, and a mill. Close to the village is the extensive demesne of Glendalough; also the glebe-house and grounds of Derrylossary parish. Ashford, in Rathnew parish, in the barony of Newcastle, 28 miles from Dublin, on the mail-road to Wexford, has a bridge over the Vartry and a post-office. Adjacent to it, though in another parish (that of Killiskey), are the parish church of Killiskey and a Roman Catholic chapel. The village of Ballinalea or Bolinolea, in Rathnew parish, immediately adjoins Ashford: it had, in 1831, 80 houses,—78 inhabited, 1 uninhabited, and 1 building, with a population of 99 families, or 476 persons. Immediately adjacent to it are the demesnes of Rossna and Cronroe houses. Delgany is in Delgany parish, in the half-barony of Rathdown, 19 miles from Dublin. It was antiently called Dergne, or Delgne, and was the scene of a great battle, A.D. 1022, between the Ostmen or Danes of Dublin and the king of Leinster. The village had, in 1831, 30 houses, all inhabited, with a population of 30 families, or 188 persons; a church, in which is a handsome monument of the late Mr. David Latouche; a glebe-house, and a school-house. The post-office is a little distant from the village, adjacent to the magnificent demesne of Bellevue, in the Glen of the Downs, the seat of the Latouche family. Enniskerry is in the parish of Powerscourt, in the half-barony of Rathdown, 13 miles from Dublin, on the south side of the Cookstown river, which joins the Dargle. It had, in 1831, 70 houses (69 inhabited and 1 uninhabited), with a population of 98 families, or 497 persons. There are an infant school-house, a police-station, and a post-office. Several respectable families are resident, and the romantic scenery of the neighbourhood draws many persons from Dublin, for whose accommodation there are good hotels and lodging-houses. The adjacent demesne of Powerscourt, with its spacious and splendid mansion of hewn granite, is the residence of Viscount Powerscourt. The apartments are very fine, and contain a number of excellent paintings, and the grounds are of almost unequalled beauty. Near Enniskerry are the demesne and house of Tinnehinch, which were purchased by the Irish parliament and presented to the late Henry Grattan: it is now the residence of his son. Glenealy is in the barony of Newcastle, between 5 and 6 miles from Wicklow. The village had, in 1831, 29 houses (28 inhabited and 1 uninhabited), with a population of 30 families, or 193 persons. In it are the parish church, a Roman Catholic chapel, a national school-house, and another school-house. Newtown-Mount-Kennedy is in Newcastle Upper parish, in the barony of Newcastle, 22 miles from Dublin, on the mail-road to Wexford. It had, in 1831, 123 houses (121 inhabited and 2 building), with a population of 158 families, or 825 persons. This town had formerly a market, but it is now discontinued, and the market-house is used for a school-house. There are still several yearly fairs. A chapel-of-ease to the parish church, a police station, and a post-office are in the village; and around it are a number of gentlemen's mansions and parks. Newbridge is in the parish of Castlemacadam, in the barony of Arklow. It has been noticed in our description of the scenery in the vale of Ovoca.

Glendalough, or Glandelough, is in the parish of Derrylossary, in the half-barony of Ballinacor North, 31 miles from Dublin by the military road. The name is properly applicable to the secluded valley already described, in which the ruins of this antient city stand, and appears to be identical with Glenealo, the name of the river which drains the valley. In this valley St. Coemgene, or Keivin, or Kevin, a young man of noble birth, born A.D. 498, took up his abode, and afterwards founded an abbey, under the invocation of St. Peter and St. Paul, over which he presided as abbot and bishop. St. Keivin died A.D. 618, aged a hundred and twenty, and his festival is kept on the 3rd June. The abbey suffered much in subsequent years. It was burned once or twice by accident, and repeatedly sacked or burned by the Danes or others. Notwithstanding these disasters, the religious establishments in the glen went on increasing, and the jurisdiction of its bishops extended even to the walls of Dublin. About the middle of the twelfth century the religious began to desert the place, and the see was united, A.D. 1214, to that of Dublin, in the reign of King John, in pursuance, as it was affirmed, of the purpose of Cardinal Papiron, papal legate in the reign of Henry II. It is stated in a contemporary record of the union of the two dioceses by the archbishop of Tuam, preserved in Ware's 'History of Ireland,' that the place had been deserted for near forty years past, so that 'from a church (says the record) it has become a cave of robbers and a den of thieves; and more murders are committed there, through the lonely and wide solitude, than in any other place in Ireland.' It is observable that in the same record the bishop of Glendalough before the annexation is termed, rather slightingly, 'a certain rural bishop' ('quendam corepiscopum'). The see however continued to exist, either by usurpation or papal appointment, and the bishops were supported by the natives. Denis White, last titular bishop, resigned his claims A.D. 1491, and the see has been ever since indisputably united to that of Dublin.

The ruins of many of the ecclesiastical buildings remain. The easternmost are the ruins of the priory of St. Peter and St. Paul, otherwise the priory of St. Saviour, on the south side of the united stream of the Glenealo and Glendasan: the priory has been a building of more elegant design and richer embellishment than any other building
in the valley; but the remains are very imperfect
the opposite or north side of the stream, a little m
the west, are the ruins of Trinity Church, sometimes
Ivy Church, from its being overgrown with ivy: th
and chancel remain: between them is a semicircular
and there are the remains of a round tower or belfry
to the church. A short distance west of Trinity Chu
a small paved area, said to have been the market-pl
the city, with a base of masonry on which the market
is said to have stood. The market-place is on the nor
or rather north-eastern side of the river Glendasan
above its junction with the Glenealo. From this
paved causeway, the remains of which may be trac
several places, formerly led up the valley of Glen-
traces of a road leading up the valley of Glen-da
may also be seen in one or two places. To both
roads the name of 'St. Kevin's Road' is given. Cl
the market-place the river Glendasan is crossed by
and by stepping-stones: there was antiently a bridge
opposite to the market-place, on the south side
Glendasan, on the tongue of land between that an
Glenealo, are the ruins of the cathedral and of s
other churches. The ruins of the cathedral, of w
called the Priest's Church, of a 'Cloigtheach' or
tower, and of several crosses, are in an enclosed b
ground, entered, immediately on crossing the Glen
by a gateway with a semicircular arch. The rema
the cathedral consist of parts of the nave and choir
nave was 48 feet long by 30 wide, and was united
choir by a semicircular arch, now fallen down. The
circular east window of the choir adorned with a ch
moulding, and having on its imposts sculptures of so
the traditionary adventures of St. Kevin, and three
dows on the south side of the nave, remain: none of
appear to have been glazed; and the east wind
narrowed in penetrating through the thickness of th
so that on the outside it is a mere spike-hole. The w
doorway is also standing. What is called the P
Church, or the Priest's House, is described by Ledw
the sacristy: the closet for the holy vestments and u
remains. The crosses in the grave-yard are muti
one of them, formed of a single block of granit
neatly sculptured, is supposed to be the market-cro
moved from its base in the market-place. The round
is in the north-west corner of the grave-yard: it
feet high, the walls being entire, with a circular b
coping on the top, but the conical roof or cap is
the base is 52 feet in circumference; the walls a
feet thick. There was formerly the stump of a
round tower not far off. In the inclosures which
diately adjoin the grave-yard of the cathedral is a
with a stone roof, commonly called St. Kevin's Ho
St. Kevin's Kitchen, by far the most perfect of a
antient buildings in the valley. It is nearly 23 fee
and 15 feet wide inside, and has a semicircular v
roof, with an opening into a small round tower or
covered in with a conical cap rising 45 feet from the g
similar to those of the antient round towers. The
the church is a high ridged roof externally, rising
from the ground: at the west end of the church is a
chapel of somewhat later date, with a roof of lower
the chapel was used for worship not many years since.
sites of two other churches may be traced in this a
adjoining inclosure. A short distance westward fro
cathedral, but not in the adjacent inclosure, are the r
Our Lady's Church, a small building of more orna
character than most of the others, covered with ivy,
which circumstance it is sometimes called 'Ivy Ch
Westward of Our Lady's Church, scattered in the
are the remains of stone crosses and two or three
earthen forts; and on the south-east side of the
lake, on the bank of the Lugduff Brook, which flow
it, in the midst of a plantation, are the ruins of R
Church, or Rhefeart Church, the burial-place of the
of the sept of O'Toole. On the south side of the
is a stone with an inscription now illegible, but s
record the interment of one of the O'Tooles, wh
A.D. 1010. There are some fragments of crosses
this church. On the south side of the same lake a
ruins of another church called 'Templenaskelli
'Teampall-na-Skellig,' otherwise Dysart-Kevin. Cl
the church, in a rocky projection from the mo
which here skirts the south bank of the lake, is a

on called St. Kevin's Bed. It is a hollow, sufficient
tain one person only, 30 feet above the lake, in the
of a rocky precipice rising almost perpendicularly
he water, and accessible by a very difficult and dan-
s path. A small chapel or crypt near the abbey
h, discovered in the latter part of the last century, is
sed to have been the tomb of St. Kevin. 'St. Ke-
Keepe' and 'St. Kevin's Well,' in the neighbourhood,
nnected by some tradition with the saint, whose name
so been lately given to a national school-house in the
. Glendalough is sometimes called 'the Seven
hes:' Ledwich endeavours to ascertain which were
ven; but his list is inaccurate, for it includes 'Ivy
h,' the modern popular designation of Our Lady's
rinity churches, both of which are given in his list
their proper names.

ysfort is about 6 or 7 miles south-west of Rathdrum:
ommonly called Macreddin, or Moycreddin. It had
le erected between A.D. 1625 and 1629, while Henry
Lord Falkland, was lord-deputy of Ireland, from
the name (Cary's-fort) appears to have been derived.
astle was taken by the natives in the great insurrec-
f 1641. The village was incorporated by Charles I.,
turned two members to the Irish parliament. It was
chised at the Union; and the earl of Carysfort, the
, received for it 15,000*l.* compensation money. It
v a decayed village, with an episcopal chapel,
ly endowed, a Roman Catholic chapel, and a well-
ed school.

village of Ballinalea has been noticed in connection
he post-town of Ashford. Donard (population in
717), in the half-barony of Lower Talbotstown, about
s south-east of Dunlavin, has two churches, one of
in ruins, a Roman Catholic chapel, and a police-
; Kilcoole (population in 1831, 469), in the barony
wcastle, near the post-town of Newtown-Mount-
dy, has a church in ruins; Rathnew, or Newrath
ation in 1831, 544), in Newcastle barony, near
ow, has a ruined church and a police-station; and
ss (population in 1831, 280), in the barony of Ark-
or 7 miles north of Arklow town, has a ruined church,
e-station, a dispensary, and a school-house.

isions for Ecclesiastical and Legal Purposes.—The
is chiefly in the diocese of Dublin and Glendalough,
in that of Leighlin, and partly in that of Ferns.
mber of parishes and other ecclesiastical charges
or wholly in the county we give below. It is to be
ed that many of the parishes and other charges are
into unions, so that the number of benefices is
below that of the ecclesiastical cures.

ocese.	Rect. and Vic.	Rect.	Vicar.	Perp. Curac.	Impr. Curac.	Cha-pel.	Total Cures.	Sin. Rect.	Bene-fices.
nd Glen- h. . .	6	11	12	5	0	4	38	1	22
. . .	2	4	4	2	0	1	13	0	8
. . .	0	4	0	1	1	0	6	0	5
tal . .	8	19	16	8	1	5	57	1	35

number of places of worship in the unions and
s which are wholly or partly in the county was re-
to parliament in 1835 as follows. (*First Report of*
issioners of Public Instruction.) This statement
es all the places of worship in those parishes or unions
h only a part (and in some instances a small part)
in the county: it will not therefore be strictly cor-
applied to the county, but will be near enough to
general idea of its state as to the means of religious
tion.

	Established Church.		
iocese.	Churches.	Chapels-of-Ease.	School or other rooms used for worship.
ublin . .	25	1	2
ighlin . .	9	0	0
rns . .	6	1	0
	40	2	2

	Roman Catholics.		Protestant Dissenters. Meeting-houses for		
ese.	Chapels.	Rooms used for worship.	Presby-terians.	Metho-dists.	Quakers.
in . .	31	2	1	2	2
hlin .	10	0	1	1	1
s . .	7	0	0	1	0
	48	2	2	4	3

The educational statistics of the same unions and parishes, according to the return made to parliament in 1835, were as follows:—

Diocese.	Day-Schools.	Scholars.		Sex not stated.	Total Scholars.	Sunday-Schools.	Scholars.
		Boys.	Girls.				
Dublin	162	3995	3565	210	7770	21	about 3500
Leighlin	46	1695	1275	..	2970	1	40
Ferns	22	975	686	..	1661	..	..
	230	6665	5526	210	12,401	22	about 3540

Wicklow is in the Leinster circuit: the assizes are held at Wicklow, and general sessions of the peace are held there and at Baltinglass. The county-gaol at Wicklow was till lately utterly inadequate in respect of accommodation. For an average of from 60 to 70 prisoners (including females and debtors) there were only 32 small cells, 5 day-rooms, 4 yards, a chapel not sufficiently divided, and 3 rooms used for an hospital. Large grants have however been made by the grand jury, with the consent of the cess-payers, in order to make the required additions. The prisoners wear a prison dress, and are employed at stone-breaking and net-making, and occasionally at various trades, and a good school is carried on by the turnkeys. There is a tread-wheel for hard labour sentences. The female prisoners are clothed and divided into two classes, under a matron and deputy, who give them instruction and occasional employment. The whole prison is remarkably clean. 'The Board of Superintendence meet monthly, and take a benevolent interest in the welfare of this establishment; the local inspector is a good public officer; the governor attends to his duty; and the duties of chaplain and medical officer are performed with zeal and attention.' (*Inspectors of Prisons' Nineteenth Report.*)

There is a district bridewell at Baltinglass, which was also inadequate until within the last two or three years, when an addition has been made to it: there are now 13 cells, 4 day-rooms, 4 yards, with a small hospital, which is room enough for the average number of prisoners, except at session times. It has a keeper, matron, and turnkey; but at the time of the Twentieth Report of the Inspectors of Prisons (*Parl. Papers*, 1842) very little in the way of discipline or instruction had been attempted. Some school instruction had been given, but it was doubtful if it had been regular; and there was no chaplain, nor was there any provision for religious instruction.

The criminal returns for 1841 give the number of committals for trial at the assizes or sessions at 254; the number of summary convictions at petty sessions, 112; and the number of persons committed for drunkenness at 106. These returns were lower in all respects than for any other county. Of 254 persons committed, 131 were convicted, 2 of capital offences; and 123 were acquitted or discharged.

The county is in the district of the Richmond lunatic asylum in Dublin. There are county infirmaries at Wicklow and Baltinglass; fever hospitals at Arklow, Blessington, Bray, Enniskerry, Newtown-Mount-Kennedy, Stratford-on-Slaney, and Wicklow; and dispensaries at Arklow, Aughrim, Blessington, Bray, Calary, Carnew, Dunlavin, Enniskerry, Kiltegan, Rathdrum, Redcross, Shillelagh, and Tinehely; and one (locality not given) for Delgany and Newcastle.

The grand-jury presentments for 1840 amounted to 27,059*l.* 15*s.* 2¾*d.*, thus distributed:—

	£.	*s.*	*d.*
New roads, bridges, &c. . . .	4232	2	5½
Repairing roads, bridges, &c. . .	8999	0	7¾
Erection or repair of court and sessions houses	292	17	6
Building or repairing prisons . .	..		
All other prison expenses, including salaries	1795	5	10½
Police and police-establishments, and payments to witnesses . . .	3979	9	11½
Salaries of county officers, not included above	1478	0	0
Public charities	3285	6	9
Repayment of advance to government	867	15	10
Miscellaneous, not included above .	2129	16	2½
	27,059	15	2¾

The county constabulary force, on the 1st of January, 1841, consisted of 1 county-inspector (second-rate); 5 sub-inspectors (1 extra-rate, 2 first-rate, 2 third-rate); 6 head constables (1 first-rate, 5 second-rate); 29 constables, and

169 sub-constables (125 first-rate, 44 second-rate); with 5 horses.

Before the Union the county returned ten members to the Irish parliament: two for the county itself; and two each for the boroughs of Wicklow, Baltinglass, Blessington, and Carysfort; at present it returns only two, namely, the county members. The number of voters on the register at the end of the year 1835 was 1755; the number on the register in February, 1841, was 1503, exclusive of those who had registered in 1832, and had not since re-registered.

History.—Sir James Ware considers this county, and with good reason, to have been included in the dominions of the Cauci (Καῦκοι) of Ptolemy, to whom he assigns also the county of Kildare. He supposes them to have been a branch of the German Cauci. The Slaney was perhaps the Modonus (Μόδονος) of Ptolemy; and the Ovoca may be safely identified with the Oboca (Ὀβόκα) of the same writer. In the period antecedent to the Anglo-Norman invasion, the barony of Arklow and the southern part of the barony of Newcastle formed the territory of a branch of the sept of the O'Kellys: their country was called Crioch-Cualan, or Hy-Briun-Cualan. Another part of the county, called Imayle, including a part of the mountain-range, belonged to the sept of the O'Tooles; and the western part, called Raniloughs (a name which seems to be embodied in that of the parish of Kil-ranelagh), or Colconnell, or Feagh M'Hugh's country, belonged to a branch of the sept of the O'Byrnes. Another part of the sept occupied the east coast adjacent to the O'Kellys.

The church and monastery of Glendalough formed a constant object of hostile attack by the Danes or Ostmen of Dublin, and was repeatedly sacked or destroyed by them. In the Anglo-Norman invasion (A.D. 1169) the combined forces of the invaders and their ally Dermod, king of Leinster, marched towards Glendalough to chastise the O'Tooles, in whose country the city stood, and who had refused obedience to him. The city was taken without resistance, and plundered and burned. In the division of lands among the invaders, Wicklow was assigned to Maurice Fitzgerald. In the division of Leinster and Munster into shires by King John, what is now the county of Wicklow was included in that of Dublin, and was not formed into a separate county until the government of the lord-deputy Sir Arthur Chichester, in the reign of James I., A.D. 1605. The native septs appear to have preserved a precarious independence in the mountains; of which the separate continuance of the bishopric of Glendalough for nearly three hundred years after the attempt of the Anglo-Norman government, with the aid of the pope's legate, to suppress it, is an indication. Castles were built to restrain them, but with little effect. During the visit of Richard II. to Ireland (1394-5) arrangements were made for the removal of the native septs and for the establishment of English settlers in the mountains, but the project was never carried into effect. In the time of Elizabeth, Pheagh or Feagh M'Hugh, chief of the O'Byrnes, was in rebellion against the government. In 1580, in conjunction with his allies, he cut off a considerable detachment of English forces at Glendalough. In 1596 he was defeated, and in 1597 slain. The natives joined in the great insurrection of 1641, and were in the sequel subdued by Cromwell in his march toward the south.

In the insurrection of 1798, the insurgents of the county attacked Stratford-on-Slaney and Newtown-Mount-Kennedy, but were repulsed. The Wexford insurgents entered the county from the south, but were beaten at Arklow by General Needham and Colonel Skerrett: this was one of the most important actions of the war, as it prevented the insurgents from advancing upon Dublin.

(Ordnance *Map of Wicklow; Map of Ireland*, by the Society for the Diffusion of Useful Knowledge; Mr. Weaver, *On the Geological relations of the East of Ireland*, in the 'Geological Transactions;' Seward's *Topographia Hibernica; Travellers' New Guide through Ireland;* Sir James Ware's *History of Ireland;* Harris's *Hibernica;* Moore's and Leland's *Histories of Ireland;* Lewis's *Topographical Dict. of Ireland; Parliamentary Papers.*)

WICKLIFFE. [WYCLIFFE.]

WICQUEFORT, ABRAHAM DE, was a native of Holland, and was born, it is commonly stated, at Amsterdam, in 1598; but he early left his country and took up his
residence in France. In 1626 he was appointed
elector of Brandenburg his resident at the French
and he held that post till 1658, when, at the instan
Cardinal Mazarin, he was arrested by a lettre-de-c
and thrown into the Bastile, on a charge of s
secret intelligence to the government of the United
vinces, and also of being a spy in the pay of other f
governments. He remained in confinement for a
and was then released and ordered to leave France.
this he passed over to England, and thence returned
native country, where the Pensionary De Witt, with
he had in fact carried on a clandestine correspond
procured him the appointment of historiographer
States, or, according to other accounts, of secretary-
preter for foreign dispatches. Possibly he held both
offices, or they may have formed only one office.
same time the duke of Brunswick-Lünenburg app
him his resident at the Hague. It was De Wicqu
luck however to fall a second time under the suspic
betraying his trust; in March, 1676, he was arreste
placed in confinement at the Hague, on the charge of
ing secret correspondence with the enemies of the
and in November following was condemned to per
imprisonment and to the forfeiture of all his effects
remained in custody till 1679, when he effected his
by exchanging clothes with one of his daughters, an
refuge at the court of the Duke of Zell. Quar
however with that prince because he would not exer
self with more zeal to procure the reversion of the se
passed upon him by the Dutch government, he left
1681, and is supposed to have died the year after.

In that age of profligate policy De Wicquefort
much request for his dexterity and accomplishment
the more perhaps from the belief of his unscrupulo
and want of principle); but he seems to have enjoy
reputation on any other account. He is respectably
however in a literary capacity. His first publicati
pears to have been a translation into French from th
man of the travels into Muscovy, Tartary, and Pe
Adam Olearius, 'Relation du Voyage de Moscovie,
which appeared in 4to. at Paris, in 1656, again in
4to., at Paris, in 1659, and in a third edition, which
far the best, in folio, at Amsterdam, in 1726. Th
followed by a translation into French from the Spa
the embassy of Garcias de Silva into Persia, 'L'A
sade de D. Garcias de Silva Figueroa en Perse,' &c
Paris, 1667. After his imprisonment at the Hag
published in 12mo. at Cologne a defence of himself
the title of 'Mémoires touchant les Ambassadeurs, S
L. M. P.' (meaning, it seems, 'Le Ministre Prison
But his two principal works are his treatise
'L'Ambassadeur et ses Fonctions,' first published in
4to., at the Hague, in 1681, and subsequently at A
dam, in 1724, in 1733, and in 1736; and his 'Histo
Provinces Unies,' or 'History of the United Pr
from the peace of Münster,' which he began to w
his return to Holland, in 1659, under the inspection
Witt. He had both written and printed a consi
portion of this latter work when he was thrown into
in 1676; but it was first published in a folio volume
Hague, in 1719. Another posthumous work of De W
fort, entitled 'Mémoires sur le Rang et la Presćanc
les Souverains de l'Europe,' was published, in 4to.,
sterdam, in 1746.

WIEBEKING, CARL FRIEDRICH, an eminen
tical engineer and writer on hydraulic and civil a
ture, was born at Wollin in Pomerania, in 1762.
applied himself so early and so earnestly to the p
study of topography, that when only seventeen he
trusted with the task of making a statistical survey
of the duchy of Mecklenburg-Strelitz, which was en
on nine sheets. His success in this, his first unde
of the kind, caused him to be employed almost imme
afterwards by the Prussian government to make a
survey of Pomerania between Belgard and Zamow.
about 1784 to 1788 he was engaged in making simi
veys of their territories for the dukes of Gotha and
and the rulers of some other German states; durin
period he also devoted a considerable portion of h
each winter to the study of architecture, as well ci
military as hydraulic and engineering. In 1788
appointed engineer in the service of the duchy of B
in 1792 he first appeared before the public as a w

professional and scientific subjects, in a work entitled 'Ueber Topographische Charten,' and his 'Beiträge, &c.,' or 'Contributions to Practical Hydraulic Architecture and Machinery.' From this time he was chiefly occupied for many years upon his large work, 'Wasserbaukunst,' to collect materials and information for which he visited Holland, and afterwards France, the latter country together with his father-in-law, Oberbaurath Rousseau, the results of which scientific journey are given in the third and fourth volumes of the first edition, which was brought out in five volumes, from 1798 to 1805. This work, which is esteemed the most complete of its kind, obtained for him a high reputation not unattended with other advantages, for in 1802 his services were engaged by the Austrian government, with an accession to his income of 2000 florins as a salary, and he was employed to inspect the ports and harbours of Trieste, Venice, Fiume, and other places within the Austrian-Italian territory. He was thus occupied till about 1805, when he was invited to Bavaria, and there became chief engineer and inspector of roads and canals, which appointment he continued to hold till 1818, when he retired upon a pension. While actively engaged in his extensive professional duties, he had not neglected his literary occupations, one of which was a new edition of his 'Wasserbaukunst;' and now that he was released from the former, he applied himself diligently to his pen, and undertook another very extensive work of a far more generally interesting and popular character than the former, namely, his 'Theoretisch-practische Bürgerliche Baukunde,' a general course of civil architecture and its history, in 4 vols. 4to., with a very large folio atlas of plates, 1821-6.

This work is certainly a very valuable contribution to architectural study, if only on account of the fund of fresh information it supplies relative to the architecture of Germany, Holland, Poland, Russia, and some other parts of Europe, in regard to which scarcely anything can be gathered from any other general collection of the kind. As may be expected, many of the subjects contained in the plates have been often given in various publications, but there are also a vast many unedited ones, and among them several original designs by Wiebeking himself. In a work of so encyclopedical a nature in regard to its subject, repetition is of course unavoidable, but Wiebeking's would, without other alteration, have been greatly better, and more useful for reference, had not the atlas, a huge oblong folio, opening to an extent of nearly seven feet, been so inconveniently large, and quite unnecessarily so, on account of so many different subjects being introduced into a single plate. It is also to be regretted that the plates themselves are inferior specimens of architectural drawing, being, unlike those in Durand's 'Parallèle,' executed for the greater part in such a coarse and loose style, that they are evidently not to be implicitly relied upon in all respects. Very great allowance however is to be made for the defects and deficiencies of a work so comprehensive in its plan as to exceed the means of a single individual, however well qualified or however industrious. With the materials he has collected, and for which he was obliged to depend in many instances on information received from correspondents, it would now be comparatively easy to improve and extend what he commenced, and that at a time of life when most writers begin to abate if they do not close their literary labours. One excellent feature in his work is the historical tables of buildings and architects, drawn up according to the respective countries, and although far from complete, and requiring many additions to be made and dates inserted, they very well deserve to be so extended and republished in a separate form.

As to Wiebeking's own talents in architecture, it does not appear that he ever executed or designed any building actually erected, a circumstance not particularly to be regretted if we may judge of what he would have done from the specimens which he has given us, as already mentioned, in the work we have just been speaking of; where one of the designs by himself is for a cathedral, which is externally a Corinthian temple, decastyle and peripteral, disfigured however by a range of very lofty and plain windows within the colonnades; while internally it is in the Gothic or pointed style. Another design of the same kind is Gothic within, Grecian Doric in front, and Italian in character in its side elevations. In others we meet with large orders applied to façades consisting of several stories, whereby the windows look as much too diminutive as the columns do too large; yet, taken independently of the columns, some of the elevations are of a bold and vigorous character.

Besides the works already mentioned, he published several others, his 'Theoretisch-practische Strassenbaukunde,' 1808, and, so late as 1840, one entitled 'Analyse Historique et Raisonnée des Monumens de l'Antiquité; des Edifices les plus remarquables du Moyen Age, &c.' and dedicated to Queen Victoria of England.

The Chevalier von Wiebeking, as he was usually called, being knight of several German and foreign orders, as well as member of nearly all the principal academies and learned societies in Europe, died at Munich, May 29th, 1842, in his eighty-first year, without having experienced much previous indisposition or the infirmities usually attending such advanced age. As an instance of longevity merely, his age is not very extraordinary, but it becomes a remarkable case, if what has since been stated is correct, namely, that of the family he left at his decease the eldest son was turned of fifty, and the youngest an infant only two years old. The former of these, Carl Wiebeking, is a distinguished engineer, whose first work after his return from France, England, and Holland, in 1814, was a bridge near Munich, across the Isar, designed by his father, and consisting of three arches, each ninety-six feet in span.

(*Zeitgenossen*; *Conversations-Lexicon*; Wiebeking, *Baukunde*.)

WIELAND, CHRISTOPH MARTIN, was born on the 5th of September, 1733, at Oberholzheim, a village in the neighbourhood of Biberach in Suabia, where his father was pastor. Old Wieland, who belonged to the Pietistic party of German Protestants, was well acquainted with the antient languages, and a good philosopher of the school of Christian Wolf. From Oberholzheim he was transferred soon after the birth of his son to Biberach, where he died at an advanced age as senior of the Protestant ministry of the place. The mother of Wieland was, according to his own description, a model of a pious, domestic, and affectionate woman. The influence of such parents is visible more or less throughout the life of Wieland, and under their direction his talents were awakened at an unusually early age. In his seventh year he read Cornelius Nepos with great facility, and began to learn Greek; in his eleventh year he attempted to write Latin poetry, and in his twelfth he wrote a German epic on the destruction of Jerusalem. The early years of his life were passed happily in his father's house. In his fourteenth year his father sent him to the excellent school of Klosterbergen, near Magdeburg, where he paid great attention to the antient languages. Xenophon, especially the 'Cyropædia,' with its beautiful episode of Araspes and Panthea, and the 'Memorabilia' of Socrates, which he used to call the Gospel of the Greeks, made the deepest impression upon him. During this period he also read with great zeal the German translations of Steele, Addison, and Shaftesbury, and the original works of Voltaire, D'Argens, La Metrie, and others, for he had learned French in a very short time without a master. His French reading tended to destroy his religious belief, and with it his peace of mind. One of his teachers discovered the change which had taken place, and succeeded in calming the struggle which was going on in his mind; but his health was already much impaired by it. When he had attained his sixteenth year, his father sent him to reside with a relation, a physician at Erfurt, for the recovery of his health, and to prepare himself for the university. After having spent eighteen months at Erfurt, a residence which, as he himself says, was more useful than agreeable, he returned, in the summer of 1750, to his parents at Biberach, where he passed six months, the happiest of his whole life—for it was the period of his first love for a cousin, Sophia von Gutermann, who afterwards became known as a writer under the name of Sophia de Laroche. The attachment to her and her conversation had an extraordinary influence upon Wieland: he describes it as having made him an enthusiast for religion and everything that was good and virtuous. It was during a conversation with her that he conceived the idea of a didactic poem 'On the Nature of Things, or the most perfect World' ('Ueber die Natur der Dinge, oder die vollkommenste Welt'). This poem, although Wieland afterwards wished to suppress it, as a juvenile production, excited among the leading men in matters of taste a very favourable opinion of the young author's talents. It has recently been reprinted in the supplementary volumes to his works. In the autumn of 1750 Wieland went to the university of Tübingen, professedly to study the law, but he occupied himself chiefly with classical literature, philosophy, and modern poetry, and devoted to his professional study only as much attention as was necessary to enable him to pass his examination. Socrates appeared to him the beau idéal of a man, and he resolved to follow his example. De Bar's ‘Epîtres Diverses,’ which then caused a great sensation in Germany, induced Wieland to write his ten moral epistles (‘Zehn Moralische Briefe,’ Tübingen, 1751), which were addressed to Sophia. These letters, which are distinguished for humour and delicacy of feeling, are the best picture of the state of his mind at that time. Another didactic poem, the ‘Anti-Ovid,’ the production of a few days, is greatly inferior to his moral letters. While at the university Wieland showed little inclination to form friendships with the young men of his own age: his great desire was to become acquainted with the chief literary men, and to join them in their labours for improving the national taste. With this view he sent a specimen of an epic poem, ‘Arminius,’ to Bodmer, at Zürich, which laid the foundation of an intimate friendship between this great critic and Wieland. In 1752 Wieland returned to Biberach, and as he had no prospects of obtaining an appointment, he formed the plan of going to Göttingen, taking his degree and entering upon the career of an academical teacher there. But this plan was given up, and he accepted the invitation of Bodmer, who asked him to come to Zürich and remain in his house, until a suitable appointment should be found. Wieland, on his arrival at Zurich, was received in the kindest manner by Bodmer, and soon found in him a second father. Bodmer and Breitinger were then at the head of the new school of German poetry, which vigorously and successfully combated the pedantic formalism of Gottsched of Leipzig and his followers. Wieland gained the esteem and admiration of Bodmer, and was not only made acquainted with the best productions of German literature, but also with the most eminent men, who assembled around Bodmer as the greatest critic of the day. In the first year of his stay at Zürich, Wieland, at the request of his patron, prepared a new edition of a collection of polemical essays against Gottsched on the improvement of taste in Germany (‘Sammlung der Züricherschen Streitschriften zur Verbesserung des Deutschen Geschmackes wider die Gottsched'sche Schule, von 1741-44’), and accompanied it with a preface. All that Wieland wrote at Zürich bears the strongest marks of Bodmer's influence, both in form and sentiment, and although Bodmer himself was a poet of very inferior merit, Wieland expatiated at great length on the beauties of his poetry, especially the epic ‘Noah’ (‘Von den Schönheiten des Bodmer'schen Gedichtes Noah’). Wieland showed himself still more as the disciple of Bodmer in his epic ‘Der Geprüfte Abraham,’ in three cantos, in which Bodmer greatly assisted the young poet; in ‘Briefe von Verstorbenen an hinterlassene Freunde’ (Zürich, 1753), and various other compositions: for during this period Wieland wrote with the same haste and want of reflection as his patron. Wieland also adopted his religious fanaticism, and his talents would perhaps have been ruined, or at least have been led in a false direction, had not the more healthy study of the Greeks preserved him from new and greater aberrations. In 1754 Wieland, fortunately for him, left the house of Bodmer, to undertake the education of the sons of two distinguished families at Zürich. The circle in which he now began to move obliged him to make himself acquainted with Italian, French, and English poetry, and his continued study of Shaftesbury, Xenophon, and Euripides gradually led him to the path which was most suited to his genius. His reason now began to gain the ascendency over his imagination and feelings. The acquaintance of a distinguished actor induced Wieland about this time to try his strength in the dramatic line, and he wrote the tragedies ‘Lady Johanna Grey,’ ‘Clementina von Porretta,’ and the comedy ‘Pandora;’ but these attempts met with no success, and he found out in time that the drama was not his proper sphere. After having been engaged as a teacher at Zürich for four years, he accepted the situation of tutor in a distinguished family at Bern, but he soon gave it up, and occupied himself with lecturing on philosophical subjects, and with new literary undertakings. His residence at Bern, and especially his intercourse with women of acquirements and education, gave to his mind a more decided turn, and his real talents now began to be developed. Among those women who exercised a great influence over him, we may mention the celebrated Julia Bondeli, the friend of Rousseau. It was at Bern that Wieland wrote the beautiful story of ‘Araspes and Panthea,’ and conceived the plan of his ‘Agathon,’ his most celebrated novel; he also wrote here the first five cantos of an epic called ‘Cyrus,’ which appeared in 1757, and of which a new edition was published in 1759. The idea of this poem was suggested to him by the exploits of Frederick the Great, during the Seven Years' War, in which Wieland, though at a distance from the scene of action, took a most lively interest. The ‘Cyrus’ however was never completed.

In 1760 Wieland returned to Biberach, where he obtained an appointment in the administration of the town. Although this post secured him an honourable existence, it was in all other respects very ill suited for him. This occupation had no attractions for him, and the small town of Biberach had no intellectual resources like those which he had enjoyed at Zürich and Bern. He also heard that Sophia was married to a gentleman of the name of De Laroche. All these circumstances threw him more than ever upon his own resources. He sought and found recreation in the study of Shakspere, twenty-eight of whose dramas he translated into German (Zürich, 1762-66, 8 vols. 8vo.). This was the first German translation of Shakspere; but Wieland, whose mind had been nurtured chiefly by the study of Plato, Xenophon, Euripides, and the French writers, was not the man to give a faithful picture of the great dramatist; his translation has a certain prettiness, elegance, and polish, but he never comes up to the strength and pathos of Shakspere. Germany however must be grateful to him for having taken the first step towards nationalizing Shakspere, and for having paved the way for his successors, Eschenburg, Voss, Schlegel, and others. Another circumstance which relieved the dullness of his life at Biberach, and gave to his mind a peculiar turn, was that Sophia de Laroche, accompanied by her husband and Count Stadion, came to stay in the neighbourhood of Biberach, whither the count retired from public service. Wieland formed the acquaintance of the party, and became the sincere friend of all. The extensive library of the count, and his knowledge of the world, suggested new thoughts and ideas to Wieland. Wieland, who was at all times very susceptible to influences from without, became in the company of his new friends a man of the world. His religious enthusiasm left him, and a sort of practical wisdom became his guide, which to some extent destroyed the intensity of his feeling, but at the same time laid the foundation of his literary greatness. Wieland's compositions of this period combine the refined sensuality of the Athenians with a sort of practical philosophy and the elegance of the French. That a voluptuous sensuality runs through all his productions of this period, cannot be denied; but this sensuality, however seductive it may be to a youthful and inexperienced reader, was in reality only the playful musings of his imagination, and perhaps the consequence of his over-anxiety to obtain a numerous class of readers: his personal character at this, as well as all other periods of his life, was of the highest moral purity. His first production of this kind was his poetical story of ‘Undine’ (1762), which was followed by ‘Komische Erzählungen’ (1763-64), ‘Abenteuer des Don Silvio von Rosalva, oder der Sieg der Natur über die Schwärmerei’ (1764), which is a sort of imitation of Cervantes' ‘Don Quixote.’ During this period, which may be termed the frivolous period of his life, the things for which he had before entertained the highest enthusiasm, such as love, religion, virtue, and philosophy, were occasionally ridiculed as unnatural, and as the mere offspring of our fancy. But during this same period he produced his best novel, ‘Agathon’ (1766), the scene of which is antient Greece, and in which he endeavours to show how far a man may advance in wisdom and virtue by the mere use of his natural faculties, and what influence outward circumstances may have upon him. The works which he wrote about or shortly after this time are all of an erotic character, such as his ‘Idris und Zenide’ (1767), a romantic poem in five cantos; ‘Musarion,’ a work unique in its kind for the racefulness, and harmonious beauty of its style, the author himself called a philosophy of the ; and a poem entitled 'Die Grazien' ('The Graces')

In his novel, 'Der neue Amadis' (1771), Wieland oured to show the superiority of intellectual over hysical beauty; a theme which he took up again in r years in his 'Krates und Hipparchia.'

65 Wieland married the daughter of an Augsburg nt, who was devotedly attached to him, and with e lived for 35 years in almost unparalleled happi- She bore him fourteen children in twenty years. In e was invited to the professorship of philosophy in versity of Erfurt. He accepted the offer, and dis- the duties of his office with the most honest zeal, envy and the intrigues of the academic body, who it a disgrace that a poet, and an erotic poet too, be among them, placed the most vexatious obstacles ay. The secret and open attacks that were made m, drew forth the humorous poem 'Der Verklagte and 'Nachlass des Diogenes von Sinope' (1770). ner of these works is the last of his erotic poems, written to defend that kind of poetry. The latter posed to defend his own views of human life and sophy. The works which now followed had a more nd philosophical character, partly in consequence osition at Erfurt, and partly the result of the events imes, among which we must mention the effects d by the works of Rousseau, and the reforms in- d by the emperor Joseph II. Wieland attacked the s of Rousseau in a small humorous novel entitled x und Kikequetzel' (1769 and 1770), and in his e zur geheimen Geschichte des menschlichen Ver- und Herzens, aus den Archiven der Natur' (1770). work, which appeared two years later under the ldener Spiegel oder die Könige von Scheschian,' is tion of the most important lessons which the rulers nd should derive from history.

nd was not at Erfurt long without attracting the n of the Duchess Amalie of Saxe-Weimar. She a person to complete the education of her two sons, chose Wieland on the recommendation of Dalberg. Wieland accordingly went to Weimar, where he the title of Hofrath, and a salary of 1000 thalers, as continued after the cessation of his duties under e of a pension. The kind and honourable manner in e was received at the court, the attachment of his nd the intercourse with the distinguished men re already assembled around the duchess, had rms for Wieland, that he felt at once that he was oper sphere. His first literary productions at Wei- e a melodrame, 'Die Wahl des Hercules,' and a ma 'Alceste' (1773), which were received with inary favour, and are still among the better produc- the kind in Germany. It was an important event erary history of Germany that Wieland established ed the 'Deutscher Mercur,' a monthly periodical to criticism and matters of taste. Wieland alone from 1775 to 1789, and from 1789 to 1805 in con- with the well-known archaeologist Böttiger. Wie- wn criticisms were on the whole neither true nor l, and when he expounded his principles in his let- his 'Alceste,' Goethe and Herder rose in arms im. Goethe wrote his well known farce 'Götter, und Wieland,' to which Wieland replied in a hu- way and with his usual mildness. This affair drew tion of Wieland's pupils to Goethe, who was subse- also invited to Weimar, and became the friend of .

The first important work which appeared after 's arrival at Weimar, was his humorous history of bitants of the antient town of Abdera ('Die Abde- 73), which the author intended to be an analysis rrors, contradictions, and singularities in human It was followed by 'Erzählungen und Mährchen'), which are distinguished from his earlier works n by a greater earnestness, depth of feeling, and nce of voluptuous descriptions. The greatest of land's poetical productions is his epic romance ,' in 12 cantos, which appeared in 1780.

the publication of 'Oberon,' Wieland abandoned of romantic poetry, to devote the remainder of his e study of the Greeks and Romans, and he formed gn of making all Germany acquainted with the ieces of the antients by a series of translations. He began with a translation of Horace's 'Epistles' (1782, reprinted at Leipzig in 1816, 2 vols. 8vo., and at Leipzig, 1837, 4th edition), which was followed by Horace's 'Satires' (1786, reprinted 1819, 2 vols. 8vo.). Both works are accompanied with commentaries and introductions, which are useful, especially for the history of the period of Horace. The translation itself is free, as it was intended more for the general reader than for scholars, and is more like a modernization than a real translation. The next production was a translation of Lucian (Leipzig, 1788-91, 6 vols. 8vo.), likewise with a commentary. Tooke's translation of Lucian is made from the German of Wieland. [TOOKE.] Wieland himself declared his translation of Horace's 'Epistles' and his commentaries upon them to be his best work, and that from which his own individuality could be best recognised. The fruits of Wieland's long study of Lucian are also visible in the following works, which are very successful imitations of that writer:—'Dialogen in Elysium' (1791), 'Göttergespräche' 'Gespräche unter vier Augen,' and 'Peregrinus Proteus' (1791). Simultaneously with these labours Wieland wrote a great number of essays for the 'Deutscher Mercur,' which, when collected, filled sixteen volumes of his works. A collection of all Wieland's works was published at Leipzig from 1794 to 1802, in 36 volumes, and six supplementary volumes, in 4to., and great and small octavo. In this collection all the works underwent a careful revision, and some were almost entirely rewritten. The handsome remuneration which he received for his edition enabled him to realize one of his favourite schemes: he purchased the small country-house of Osmannstedt, near Weimar, in the picturesque valley of the Ilm, where he intended to spend the remainder of his life. He took up his residence there in 1798, with his wife and children, and it was here, in the enjoyment of a quiet and patriarchal life, that Wieland unfolded all the excellence of his character. He continued however to devote the greater part of his time to literary labours. From 1796 till 1804 he alone edited the 'Attisches Museum,' and from 1805 to 1809, conjointly with J. Hottinger and Fr. Jacobs, under the title of 'Neues Attisches Museum.' This journal was chiefly devoted to the illustration of Greek literature, and here he resumed his old and favourite plan of giving to his countrymen a series of translations of the best Greek writers, of which a great many are contained in this journal. Some original works which appeared about this time contained the fruits of his renewed study of antiquity, such as 'Aristippus und einige seiner Zeitgenossen' (1800-1802), and the small novels 'Krates und Hipparchia' and 'Menander und Glycerion.'

Fortune, which had hitherto always been smiling upon Wieland, had reserved some of its hardest blows for his old age. After the death of Sophia Brentano, a granddaughter of Sophia de Laroche, who had been living in his house and had been attached to him as to a father, he lost, in 1801, his wife. After this event the retreat of Osmannstedt had no more charms for him: owing also to some misfortunes, he would have been obliged to encumber it with debt, if he had kept it longer; accordingly he disposed of it, and returned in 1803 to Weimar, where he soon formed an intimate friendship with Schiller. In the same year he was elected a foreign member of the National Institute of France; during the congress at Erfurt in 1808, Napoleon honoured him with the order of the Légion d'Honneur, and the emperor Alexander of Russia with that of St. Anna. But the year before, death had deprived him of his friend and patron the Duchess Amalie, in whose company, during the last part of her life, he had spent some hours almost every day. In 1809 he was seized with a long and dangerous illness, and he had scarcely got over it when he broke one of his ribs by being upset in his carriage. But he got over this injury, and reappeared in the circle of his friends as cheerful as before. In the year 1806 he had commenced his last great literary undertaking, a translation of all the letters of Cicero, which he continued until his death, on the 20th of January, 1813, without being able to complete it. It appeared at Zürich, 1808-1821, in 7 vols. 8vo.; the last two vols. were completed and edited by F. D. Gräter. In accordance with Wieland's own wish his body was conveyed to Osmannstedt, and buried in the same tomb with his wife and Sophia Brentano. The monument on the tomb bears the following inscription, by Wieland:—

'Lieb' und Freundschaft umschlang die verwandten Seelen im Leben,
Und ihr Sterbliches deckt dieser gemeinsame Stein.'

'Love and friendship embraced their kindred souls in life, and this common
stone covers their mortal remains.'

On the general character of Wieland we may add the following remarks. Wieland was not a poet of the first order: his peculiar talent consisted in appropriating to himself and further developing that which he acquired from others, though he always impressed upon it the peculiar stamp of his own mind. He never penetrated deep into the nature of man, but rather remained in the happy medium; but he is unrivalled in the light and insinuating gracefulness of his productions and the elegance of his style. His philosophy breathes the spirit of Socrates, though not without a mixture of the principles of Aristippus. He did not acquire a thorough and lasting influence upon German literature, but his great merit consists in the amount of knowledge, taste, and refinement which he diffused among his contemporaries, and which has been transmitted to their descendants. Moreover it must not be forgotten that it was Wieland who reconciled the higher classes of Germany to the literature of their own country, and who formed a beneficial counterpoise to the transcendental character which Klopstock and his school introduced into German poetry.

Besides the collection of Wieland's works mentioned above, another appeared in 1818-1828, at Leipzig, in 53 vols. 12mo. The most recent is that of 1839 and 1840, in 36 vols. There are a great number of biographies of Wieland, but the best is that of J. G. Gruber, Leipzig, 1815, 4 vols., which is also reprinted, with improvements, in the collection of Wieland's works of 1828, where it forms vols. 50-53.

(Compare Heinsius, *Geschichte der Deutschen Literatur*, p. 492-507; Gervinus, *Neuere Geschichte der poet. National-Literatur der Deutschen*, ii., p. 3-20; Jördens, *Lexicon Deutscher Dichter und Prosaisten*, v., p. 345-487.)

WIELICZKA is a town of Austrian Galicia, in the circle of Bochnia. It is situated partly in a fertile plain, partly on several terraces on the declivity of a mountain which forms almost a semicircle round the town. It is irregularly built, and contains 470 houses, partly of wood, with 4520 inhabitants. It is remarkable for its celebrated salt-mine, which extends under the whole town and to a considerable distance beyond it on each side: the mine is from east to west 9500 feet, from north to south 3600 feet, and its greatest depth is 1220. This bed of salt is said to have been discovered by a shepherd named Wieliczka, in 1220, and to have been worked soon afterwards. It is divided into five levels, one below the other: according to Beudant, the bottom of the first is 34, of the second 72, and of the fifth 170 toises, or 1020 feet, below the surface. There are thirteen shafts by which they descend into the mine, two of which are within the town, viz., 1, the Lesno, with a winding oak staircase of 470 steps, built by Augustus III. in 1744, for visitors of distinction—this descent is 200 feet; and, 2, the Danielowic shaft, which is 198 feet deep. These, with the Wodda Gora and the Janina, are the four principal shafts. The others are ordinary, very convenient shafts, from 9 to 15 feet square. Sandy clay or marl and sandstone alternate with the strata of salt. Four different qualities of salt are extracted from the mine: 1, green salt, *zielony sol*, with which a good deal of earth is mixed—about three-fourths of the whole produce of the mine; 2, shaft salt, *szybikowa sol*, which is very pure, and is used without any preparation besides pounding; 3, crystal salt, *oczkowalu sol*—this is perfectly transparent and pure, and is used for the table and in the dyehouses; at Wieliczka, crucifixes and snuff-boxes are made of it; 4, *blottnith*, which is only fit for the cattle. The quantity of salt extracted is from 450,000 to 500,000 cwt. in a year. The number of workmen is 800 or 900, none of whom live in the mine: but there are 100 horses that always remain under ground. A labyrinth of passages, often connected at a considerable height by bridges, extends through the several stories. In the new chambers pillars of salt are left standing; in the old chambers the roof is supported by timber, which remains in a remarkable state of preservation, the mine being extremely dry, though it contains sixteen ponds, in several of which boats are used. The great chambers made by excavating the salt are used as salt-magazines, coopers' shops, stables for the horses, &c. Sixty or seventy of the chambers are very large, and are chiefly visited by strangers. Those most worth seeing are —1, the great hall, which is very like a vast Gothic apartment, adorned with slender pillars and wreaths of foliage, and a chandelier 20 feet in diameter; 2, the ball-room, which is still larger; it is adorned with a colossal Austrian eagle, transparencies painted on slabs of salt, several chandeliers of the same material, and is used on all extraordinary festivities as a drawing-room or ball-room, and when properly lighted has a most striking effect, like a fairy palace; 3, St. Anthony's chapel, in the Gothic style, hewn in the salt, with an altar and several statues as large as life; 4, the Corpus Christi chapel; and, 5, a smaller, very elegantly vaulted hall, in which there is an obelisk of salt with a Latin inscription in gold letters. The magnitude and beauty of the vaulted passages, the vast halls, the chapels with their altars, crucifixes, images, and lamps constantly burning before them, strike a stranger with wonder.

In the town of Wieliczka there is a mine-office which has the superintendence of the works both here and at the neighbouring town of Bochnia. [BOCHNIA.]

(Jenny, *Handbuch für Reisende*; Blumenbach, *Gemälde der Oesterreichischen Monarchie*; *Die Oesterreichische National-Encyclopädie*; *Conversations Lexikon*.)

WIFE; HUSBAND and WIFE. Many of the legal incidents attached to the relation of husband and wife, or, as they are called in our law books, *Baron* and *Feme*, have been already noticed under their several heads: the mode of contracting the connection may be found under MARRIAGE, and of dissolving it, under DIVORCE; the provision for the wife out of her husband's real estates, made by the common law and modified by statutes, is treated of under DOWER; and the right derived from the same source by the husband to a life interest in his wife's real estate if he survives her and has had a child capable of inheriting, under COURTESY OF ENGLAND; the voluntary provision which may be made for the husband, the wife, and the offspring of the marriage, is discussed under SETTLEMENT and JOINTURE; and the nature of the property which the wife has, if not independently of her husband, concurrently with him, is described under PARAPHERNALIA and SEPARATE PROPERTY. The article PARENT AND CHILD shows what little right the law has conceded, and that only recently, to the wife with regard to the children of the marriage. In the present article it will therefore only be necessary to give a general sketch of the subject, so as to bring the separate parts under one view, and to supply such information as may not yet have been given.

The common law treats the wife (whom it calls a feme covert, and her condition coverture) as subject to the husband, and gives him leave to exercise over her reasonable restraint, if not to inflict on her moderate chastisement; now however the wife may obtain security that the husband shall keep the peace towards her. It looks on the husband and wife in most respects as one person, having only one mind or will, which is exercised by the husband. Hence a wife cannot sue separately from her husband for injuries done to her or her property, or be sued alone for debts, unless her husband shall have abjured or been banished the realm; or unless where she is separated from him and has represented herself as a single woman, or where, by particular customs, she is permitted to trade alone, as in London; but even here the husband should be joined as defendant by way of conformity, though execution will issue against the wife alone. For injuries to the wife's person or property the remedy is by a joint action, or sometimes by the separate action of the husband. Thus adultery is a ground for an action of damages by the husband against the adulterer. Hence again not only can they not in any case, by the common law, contract with or sue one another; but compacts made between them and all debts contracted towards each other when single (unless those made in consideration or at least in contemplation of marriage) are made void at the common law by their union. This rule does not however apply to debts due from the husband to the wife in a representative character, as administratrix or executrix, for instance. They cannot make grants one to another to take effect during the joint lives; nor can the wife, excepting in the exercise of a power, devise lands to her husband or to any other person unless (as it is said) by the custom of London and York; but the husband may devise to his wife property to be enjoyed by her after his death. They cannot give evidence touching one another in civil matters, with this exception, that the statute 6 Geo. IV., c. 16, s. 37, enables commissioners in bankruptcy to examine the bankrupt's wife touching the estate of her husband, and subjects her to the usual penal ties if she suppresses or falsifies the facts. In criminal prosecutions founded on injuries committed by either party on the person of the other, the injured party may be a witness. Neither can rob the other in the contemplation of law. The property of both is, with some modifications, liable to the debts of either, and with the person of his wife the husband takes the liability to her debts contracted before marriage; but those debts are only recoverable during the wife's life. If she dies before him, he is relieved from that responsibility, whatsoever fortune he may have had with her, excepting that he must apply to the discharge of such debts any assets which are received by him as his wife's administrator. As the law considers the wife to be under the perpetual control of her husband, it relieves her from responsibility for offences short of murder and high treason committed at his instigation—the evidence of that instigation being his presence during the commission of the offence. For the same reason all deeds executed by her are void; unless in fulfilment of powers vested in her or under the guarantee of certain solemnities to ensure her free agency. A disposition by a woman of her property after the commencement of a treaty for marriage, without the privity and concurrence of her intended husband, is deemed by courts of equity to be fraudulent, and will be set aside after the marriage as an injury to her husband; and by the act 1 Vic., c. 26, passed in 1837, a will made before marriage is revoked by the subsequent marriage of the party making it. [Will and Testament.]

This legal identity cannot be dissolved, whether in the eyes of the civil or ecclesiastical courts, by any voluntary act of the parties. Thus no deed of separation, unless it contains an immediate and certain provision for the wife, and no advertisement or other public notification will relieve a husband from the liability to provide his wife with necessaries fitting to her rank in life (the question of fitness being decided by a jury), or consequently from the duty of paying the debts contracted for such necessaries, if she has been driven from his house by his misconduct. On the other hand, a wife cannot recover at law from her husband from whom she lives apart any allowance which he has contracted with herself to pay her in consideration of the separation, if he desires that their union should be renewed. Nor again is a deed of separation a sufficient answer to a suit promoted by either party for restitution of conjugal rights; far less is it an answer to the charge of adultery committed either before or after separation, for though 'the ecclesiastical court does not look upon articles of separation with a favourable eye, yet they are not held so odious as to be considered a bar to adultery.' (Haggard's *Consistory Reports*, i., 143.)

But this union may be dissolved, when sought for, *bonâ fide*, by either party without collusion with the other, as a remedy for that other's conjugal offences [Divorce]; and the dissolution relieves the husband of his responsibility for his wife's debts contracted after the divorce is pronounced, or, in case of his wife's adultery, contracted after the discovery of the adultery and the consequent separation; for if no separation takes place, or if the husband abandons his usual residence to his wife and her paramour, he will be liable to debts contracted by her with tradesmen who are ignorant of the facts. So too, by the common law, a husband is not liable for the debts of his wife contracted after she has quitted his house without sufficient cause, and he has given particular notice to the tradesmen that he will not pay her debts. Still less is he liable for debts contracted while she is living in open adultery. On the other hand, where the divorce is obtained by the wife on account of the cruelty or adultery of her husband, the spiritual court continues on him the duty of maintaining her (if her separate property will not enable her to live according to her rank in life) by requiring him to make her an allowance proportionate to his means. [Alimony.] The common law recognises this right of the wife in such circumstances to an allowance under the name of her estovers; and grants her a writ for the recovery of them; but this remedy is now never resorted to. (For the usual meaning of the word Estovers see that article, vol. x., p. 42.)

Such is the general and leading principle of the common law; but this supposed identity of person, of interest, and of property by no means involves equal rights.

The theory of the law is, that the husband has over his wife's personal property absolute control, and over real property a control modified partly by the general rules of descent, partly by statute, partly by the decisions of courts of equity, which always lean to the protection of the wife's property and the maintenance of any contract or provision made, whether by her husband or others, for her benefit, even so far as to admit a suit of the wife in the name of her next friend against the husband for injuries done by the latter to her property or for the recovery of rights withheld by him. To this end they interpret the Statute of Uses, as giving the wife, by the interposition of trustees, independent rights to property and control over it. Thus although she cannot take by direct grant from her husband, she may avail herself of such a grant by him to trustees for her benefit, and generally she may take by devise and by descent directly; and by settlement, or by grant through the intervention of trustees; she may herself be a trustee, and (although that position has been controverted) she may devise her trusts. Again, the common law vests in her husband not only her personal property (excepting her paraphernalia), but her chattels, real or leasehold interests; yet if a settlement has not been made on her expressly in consideration of her fortune, those portions of her personal property which consist of securities for money or beneficial contracts, and her chattels real, survive to herself; if the securities have not been realised, and the chattels real have not been aliened, during his life by her husband: excepting arrears of rent due on the wife's separate estate; to these the husband is entitled by statute 32 Henry VIII., c. 37. [Choses in Action.] Nor does the settlement deprive her of this right with regard to things in action acquired subsequently to the execution of the settlement, unless it expressly reserves to the husband future as well as present personalty. If a husband requires the intervention of a court of equity for the purpose of reducing into possession his wife's property, the court will require him to make on her a settlement proportionate to the benefit which he derives. Usually one half of the fund is settled upon the wife and children, but the court takes all the circumstances into consideration; especially whether any settlement already exists: and it will not grant its aid to the wife who demands a settlement, if she is the born subject of a state which gives the whole property of the wife to the husband. So too the adultery of the wife deprives her of her equity (unless she has been a ward of court married without the consent of the court); but her delinquency will not induce the court to vest the whole of her property in her husband, because he does not maintain her. The court will secure the property for the benefit of the survivor and the children. On the other hand, in case of the cruelty of the husband or his desertion of his wife, the court will award to her and her children not only the whole principal, but the interest of the property in question. On the same principle, if the husband is insolvent, the court will grant to the wife out of her trust property an allowance usually equal to half the proceeds of that property. The interest which the husband takes in his wife's real estate of which she is seised in fee vests the profits in him during her life, but it gives him no power over the inheritance. By the common law a husband might aliene his wife's real estate, or lease it for her life or that of the tenant, and she was left to her remedy if she survived him, or her heir at law had his remedy if the husband survived: if they neglected that remedy, the alienation by the husband was good; but by the 32 Henry VIII., c. 28, the wife or her heir may enter and defeat the husband's act. By that statute the lease of lands held by a man in right of his wife, or jointly with her, is good against husband and wife if executed by both; the lease may be for years or for life, but it must relate to land usually leased, it must not be by anticipation or in consideration of a fine; it must reserve a fair yearly rent to the husband and wife; and the husband is restricted from aliening or discharging the rent for a longer term than his own life. If however the wife receives rent after her husband's death upon any lease of her estate improperly granted by him, she confirms that lease. A wife's copyhold estates are forfeited to the lord by any such acts of her husband as are ruinous to the estate (*e.g.* waste), as destroy the tenure (*e.g.* an attempt to convert it into a freehold), or otherwise deprive the lord of his rights, as a positive refusal to pay rent or perform service. But courts of equity will relieve the tenant when the forfeiture is not wilful or can be compensated. The enfranchisement of the wife's copyhold estate by the husband does not alter the mode of descent, but the estate go to the wife's and not to the husband's heirs. Husband and wife to whom freehold or copyhold estates are given or devised take in entireties, and not as joint tenants; so that neither can aliene without the consent of the other, and the estate will be the wife's if she survives her husband.

The husband may mortgage his wife's real property during their joint lives and during his life in addition, if he survives her and become tenant by the courtesy; if the wife joins in that mortgage, and recognises it after her husband's death, she will be bound by it; but she may, if she thinks fit, repudiate it. Before fines were abolished, her levying a fine rendered a mortgage a good security against her and her heirs; and since the act abolishing that form of assurance, a deed acknowledged by her as the act prescribes effects the same object. [Fine of Lands.] A mortgage made by a wife of her estate for the sole benefit of her husband, and not to discharge a debt of her own, gives her a right at equity to compensation out of his assets.

Such are the principal rights which a husband acquires in his wife's property, and the limitations of those rights. On the other hand, the law gives to her if she survives him an estate for life in a third part of all such estates of inheritance as he was solely seised of during the marriage, and as any children of the marriage might possibly have inherited. [Dower.] That right of dower may be forfeited in various ways, and it may be defeated by a provision for her, made before marriage, in the shape of jointure. [Jointure.] Since the stat. 3 and 4 Wm. IV., c. 105, in marriages subsequent to 1st January, 1834, dower does not accrue on estates disposed of by the husband during his life or by will, and it may be also defeated by a declaration of the husband by deed or will, that his estates are not to be subject to dower.

The Statute of Distributions (22 & 23 Car. II., c. 10) gives to the widow of an intestate husband (if her claim has not been barred by settlement) one-third of his personal property where there is issue of the marriage living, and one-half where there is none. But the widow of a freeman of the city of London, or of an inhabitant of the ecclesiastical province of York (excepting the diocese of Chester), if the husband died intestate, leaving personal property more than sufficient to pay his debts and funeral expenses, is entitled to the furniture of her bedchamber and her apparel (*widow's chamber*), or to 50*l.* in lieu of it if her husband's personalty is worth 2000*l.*; then the personal estate is divided into three parts, whereof one-third goes to the widow, one to the children, and one (the *dead man's share*) to his administrator. Of this last share the widow is entitled under the Statute of Distributions, which regulates the division of it, to one-third if there is a child, and one-half if there is not. The benefit of this custom cannot be taken from the widow by any fraudulent device, such as a gift by the husband to a third party whilst he was at the point of death; or a gift with a reservation that it should only take effect after his death.

Marriage revokes powers of attorney previously granted by the wife, and disables her from granting them; but it does not disable her from accepting such a power, or from acting on one granted to her before coverture. She may too be attorney for her husband. She cannot bequeath her personal estate by will unless under a power, or with the consent of her husband.

The separate property of the wife has been already treated under that head. [Separate Property; Pin-money.]

There remains one of the most difficult parts of this subject, viz. the separation of husband and wife, and the effect of deeds made by them either in consequence or in contemplation of such an event. The ecclesiastical courts consider all deeds of separation and all covenants in the nature of such deeds to be void. The courts of law however not only have supported such deeds against the husband, but have enforced a covenant made by him with his wife's trustees to pay her an annuity as a separate maintenance in the event of their future separation, with the approbation of the trustees. Whether such a covenant would now be supported by the courts of law is very doubtful. In order to render a deed of separation valid it ought to be made by the husband and wife, with trustees for the latter, and any provision made in it by the husband ought to be for a valid consideration, such as a covenant on the part of the trustees to relieve the husband from the wife's debts or maintenance; so the cruelty, or adultery, or desertion of the husband is a consideration, because the wife might have sued him in the ecclesiastical courts, and obtained alimony. But courts of equity will not interfere to enforce such deeds, though by a strange inconsistency they will enforce the husband's covenant for a separate maintenance if made through the intervention of trustees, and indeed in certain rare cases if made between the husband and wife alone. Nor is the adultery of the wife a sufficient answer to her claim to the separate maintenance. It is doubtful whether the wife can anticipate or dispose of this kind of allowance; the more so, because it ceases if the cohabitation is renewed, or is only prevented by the perverseness of the wife. The civil law considers the husband and wife as separate persons; and the ecclesiastical courts, following that law, permit them to be sued separately.

(Roper's *Law of Husband and Wife*, edited by Jacob.)

WIFE. (*Scotland.*) The moveable or personal estate of a husband and wife is under the administration of the husband; according to the phraseology of the law it is called 'the goods in communion,' because on the dissolution of the marriage by the death of either party it falls to be so divided that if there be issue of the marriage a third, and if there be no issue a half, goes to the nearest of kin or to the legatees of the deceased, whether husband or wife, the remainder being the property of the survivor. During the continuance of the marriage the husband's right as administrator is in all respects equivalent to the right of a proprietor, and whether the common property has been acquired by himself or by the wife, it is entirely at his disposal, in so far as that disposal is intended to have effect during his lifetime. His right of bequeathing it is limited by the Scottish law of succession. [Will.] As the husband has the administration of the wife's property, he is responsible not only to the extent of the goods in communion, but personally, for the wife's obligations, whether contracted before or after marriage. Action against a wife for debts contracted before marriage is laid against herself, but her husband is cited as administrator of the goods in communion, and while all 'diligence' or execution for attaching property falls on the goods in communion, he is liable to whatever execution may proceed against the person. In case of the dissolution of the marriage before execution, the execution will proceed only against the portion of the goods in communion which falls to the share of the wife or to her representatives, and will not lie against the person of the husband. No suit can be raised against a married woman unless the husband has been made a party. The wife cannot of herself enter into a contract exigible by execution against the goods in communion and the person of her husband, unless in certain cases in which by general law or by practice she holds an agency. To this effect she is *præposita negotiis domesticis*, and whatever debts she incurs for household purposes are debts against the husband. The husband may discharge himself from responsibility for debts so incurred by suing out an 'inhibition' against her in the Court of Session. The sphere of her authority may be enlarged by her husband trusting to her the management of any department of business, and she will then, as ostensibly authorized to represent him in the transactions relating to the business, render him responsible for the performance of her acts as a principal is responsible for those of his agent. A wife's agency will not extend, without special authority, to the borrowing of money.

Heritable property (a term nearly equivalent to that of real property in England) belonging to either party is in the administration of the husband. He can however grant no lease of his wife's heritable property, to last beyond his own life, without her concurrence. On the other hand, from the date of the proclamation of the banns all deeds granted by the wife are null if they do not bear the husband's concurrence. His right of administration, including the necessity for his concurrence in the wife's deeds, may be excluded, either generally or in relation to some particular estate. The former can only take place by his resigning his *jus mariti* in an antenuptial contract of marriage; the latter may be accomplished by the special exclusion of the *jus mariti* in the title of any estate conveyed to the wife. Every deed executed by a wife is presumed to have been executed under the coercion of her husband, and is reducible as a deed executed under the effect of

orce and fear, unless the wife ratify it by oath before a
nagistrate. On occasion of the ratification, not only must
ne husband be absent, but the act of ratification must
ear that he was so.

A separation of married parties may take place either
judicial interference or voluntary contract. Actions
judicial separation proceed before the court of session,
hich in such cases exercises its consistorial jurisdiction
succeeding to the commissary court. Personal violence,
acts physically or morally injurious on the part of the
sband, will justify a judicial separation at the suit of the
fe. That the husband insisted on retaining a servant
th whom he had held an illicit intercourse before the
rriage was held a ground of judicial separation.
etham *v.* Letham, 8th March, 1823, 2 S. D, 284.) In
licial separations at the instance of the wife, an aliment-
allowance is awarded to her against the husband, pro-
rtioned to his means. When a husband abandons his
fe, an alimentary allowance will be awarded to her
hout a judicial separation. A voluntary separation
y take place by mutual agreement, but in such a case
alimentary allowance will not be awarded unless it
been stipulated for. It is in a wife's power, however,
withstanding a voluntary separation, to sue for judicial
aration if the previous conduct of the husband towards
would justify it, and thus obtain an award of alimony.
e husband whose wife is either judicially or voluntarily
arated from him ceases to be responsible for the debts
urred by her after the date of the separation. Her own
perty is liable to execution for her obligations, but not
person, unless her husband be living out of Scotland,
which case it has been decided that a wife transacting
siness on her own account is liable to diligence against
person, or arrest and imprisonment. (Orme *v.* Diffors,
th November, 1833, 12 *S. D.*, 149.) The husband has the
controlled custody of the children of the marriage during
pillarity. The court of session will interfere for their
otection in the case of their personal ill-usage, or of
nger of contamination, but not on the ground of a
ecial estate being settled on a child by a third party.

On the dissolution of a marriage by the death of either
rty, an anterior question to that of the distribution of the
operty is, whether the marriage was permanent. A per-
anent marriage is one which has lasted for a year and part
a day, or of which a living child has been born. In the
ase of dissolution by death of a marriage not permanent,
here is a question of accounting, and the property of the
rties is, as nearly as circumstances will permit, so dis-
ibuted as it would have been had no marriage between
hem been solemnised. In the case of a permanent mar-
iage, the moveable property is divided as above stated,
he survivor getting a half, if there is no issue, and a third
f there is issue. Of any real property in which a wife
ies infeft, if there have been a living child born of the
arriage, and if there is no surviving issue of the wife by
former marriage, the widower enjoys the life-rent use;
his is called 'the courtesy of Scotland.' A widow enjoys
he life-rent of one-third part of the lands over which her
usband has died infeft, by way of 'Terce.' The distribu-
ion of the property, personal or heritable, may be other-
ise arranged by antenuptial contract, or equivalents to
he property to which a party would succeed may be made
y the settlements of the deceased.

On the dissolution of marriage by divorce [DIVORCE],
he offending party forfeits whatever provisions, legal or
onventional, he or she might be entitled to from the mar-
iage; and the innocent party, at whose instance the suit
f divorce is brought, retains whatever benefits, legal or
onventional, he or she may have become entitled to by
e marriage. It follows that when the divorce proceeds
t the suit of the wife, she obtains, at the date of the de-
ee of divorce, the provisions which, as above, she would
e entitled to on the death of her husband; and that, on
e other hand, if the suit be at the instance of the hus-
and, the wife not only loses her right to such provisions,
t forfeits to the husband whatever property she may
ave brought into the goods in communion.]

WIFE, ROMAN. [MARRIAGE, ROMAN.]

WIGAN, a market-town and parliamentary and muni-
pal borough, in the hundred of West Derby, in the county
Lancaster, 18 miles west-north-west of Manchester, and
9 miles from London. Whitaker says that there was a
stle at Wigan in the Saxon period, which became the nucleus of the town. Leland's description in the early part of the sixteenth century is as follows:—'Wigan, pavid, as bigge as Warrington, and better buildid. There is one paroch chirche amidde the towne; summe marchauntes, summe artificers, summe fermers.' Camden describes Wigan as a 'neat and populous' place. The inhabitants showed great devotion to the cause of Charles I.; the town was several times taken and retaken by the contending parties during that period; and the principal actions in which the earl of Derby was engaged were fought either in the town or its vicinity.

Wigan is neither a handsome nor a very clean town. The old streets are irregularly built, but some of the new ones near the river Douglas contain many good houses. The town is well supplied with excellent water under an act obtained in 1761, and is lighted with gas by a company formed in 1823. From its situation on the Lancashire coal-field, the population of the borough has increased with the development of manufacturing industry: it was 10,989 in 1801; 14,060 in 1811; 17,716 in 1821; 20,774 in 1831; and 25,517 in 1841. The manufactures of the place comprise linens, calicoes, checks, fustians, the spinning of cotton-yarn, and other branches of the cotton manufacture, in most of which a large number of Irish are employed. In 1720 an act was obtained for making the river Douglas navigable from Wigan to the Ribble, which it enters a few miles above the wide outlet of the Ribble. The shares in this navigation were purchased by the undertakers of the Leeds and Liverpool Canal, who substituted artificial cuts for the natural bed of the river. The Leeds and Liverpool Canal, which passes through the town, gives it the advantage of water communication with Yorkshire and many parts of Lancashire; and, by the Lancaster branch of this canal, with Westmoreland. The Preston and Lancaster Railway, by which the chain of railway communication is extended from the southern coast of England and London to Lancaster, passes through Wigan.

Wigan has received nine royal charters, the first of which was granted by Henry III. in 1246. The governing charter prior to 1835 was granted by Charles II., and under it the municipal body consisted of a mayor, recorder, twelve aldermen, and two bailiffs. Under the Municipal Reform Act the limits of the borough remain the same; but it is divided into five wards, which collectively return ten aldermen and thirty councillors. The number of burgesses, or municipal electors, in 1837 was 1200. The number of borough magistrates, including the mayor and ex-mayor, is fifteen. The expenditure for municipal purposes in 1840-41 was 3185*l.* The principal items of receipt were 141*l.* for rents and fines; 225*l.* tolls and dues; 1439*l.* borough and gaol rates; 509*l.* from the Treasury on account of prosecutions; and the sum of 833*l.* was advanced by the treasurer. Wigan returned two members to parliament the 23rd Edward I. (1295), and again twelve years afterwards, but from that time to the sixteenth century the privilege was not exercised. Before the passing of the Reform Act the corporation had the power of admitting non-resident honorary burgesses, who had a right to vote in the election of borough members. The number of this class of burgesses in 1831 was thirty-four. The other electors were residents within the borough, paying scot and lot, and previously elected by the jury of burgesses at the annual meeting for the election of mayor: this jury had the power of admitting every male inhabitant resident in the borough of full age to a participation in the electoral privilege; but the total number of parliamentary electors in 1831 was only 89. The borough had long been notorious for its expensive parliamentary contests. The Reform Act did not alter the limits of the parliamentary borough, which, as well as the municipal borough, is identical with the township. The number of electors on the register in 1839-40 was 532.

The parish church of Wigan is a handsome structure. The living is a rectory; gross revenue 2823*l.*, net revenue 2230*l.* St. George's church was erected in 1781 as a chapel-of-ease, and was partly endowed by a parliamentary grant: it is a perpetual curacy; gross annual value 142*l.*, net 118*l.* The Roman Catholics are numerous, and have two chapels, one built in 1818, at a cost of 6000*l.*, and another in 1819, which cost 8000*l.* Several of the principal denominations of dissenters have each two chapels. There is a free grammar-school, founded in the reign of James I.; but by whom it was first endowed is not known: the value of the various endowments is now worth 20*l.* a year. Under an act obtained in 1812 fifteen governors are appointed, who elect a head master and usher: the number of boys is limited to eighty. The Blue-coat School, established by voluntary subscription in 1773, for educating and clothing forty poor children, is now united with the national school, in which above three hundred children are instructed. In 1833 the number of children returned as attending the daily schools was 782 boys and 658 girls; and at the Sunday-schools, 2019 boys and 2430 girls.

The town-hall was built in 1720, at the cost of the borough members. In the market-place there is a large brick edifice, 102 feet by 66, erected, in 1816, for the use of the manufacturers on market-days: it is called the Commercial Hall, but is in fact a cloth-hall. A dispensary was established in 1798, and a building was erected for the institution early in the present century. A savings'-bank was established in 1821, and in 1842 the number of depositors was 1628. A mechanics' institute was opened in 1825. The market-days are Wednesday and Friday, and there are three annual fairs.

The parish of Wigan is very extensive, comprising an area of 27,610 acres, or above 43 square miles. The borough boundary contains 2170 acres. There are besides three chapelries and eight townships, whose population, in 1841, was as follows:—Chapelries—Billinge (Chapel end), population 1550, a perpetual curacy, value 235*l.*; Hindley, population 5459, a perpetual curacy, value 148*l.*; Upholland, population 3113, a perpetual curacy, value 165*l.* The rector of Wigan is the patron of each of the above livings. The townships are—Abram, population 901; Billinge (Higher end), 712; Dalton, 483; Haigh, 1363; Ince, 2565; Orrell, 2478; Pemberton, 4394; Winstanley, 681. The population of the parish (including the borough) was 25,552 in 1801; 31,481 in 1811; 38,318 in 1821; 44,486 in 1831; and 51,988 in 1841. There are several springs in the parish impregnated with sulphur, which have been useful in scorbutic complaints. At Hindley there is a well which takes fire if a lighted candle be applied to the surface. Haigh, Aspull, and Ince are famous for cannel coal. At Dalton, Haigh, Orrell, Hindley, Pemberton, and Upholland, 857 labourers were employed in coal-pits in 1831. At Upholland there was once a Benedictine priory, and the priory church is now used as the chapel-of-ease.

(Baines's *Lancashire; Municipal and Boundary Reports*, &c.)

WIGEON, or WIDGEON, *Mareca Penelope*, *Anas Penelope*, Linn.

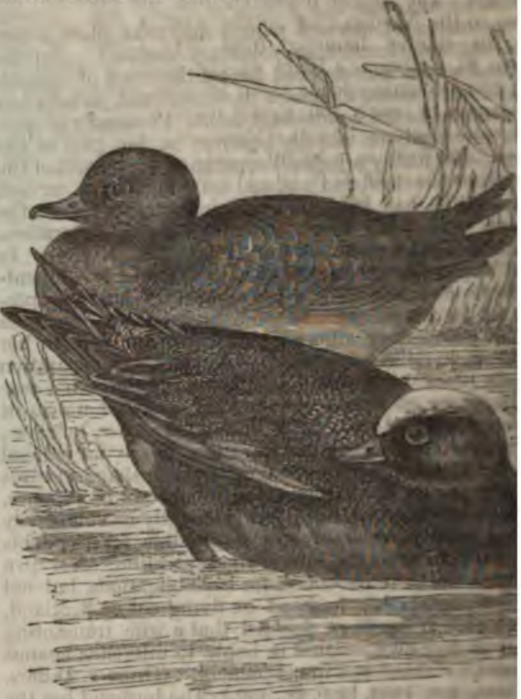
Description.—Male.—Forehead yellowish-white; head and neck rusty-chestnut; face dotted with black; throat black; breast colour of wine-lees; back and sides striped with black and white zigzags; wing-coverts and lower parts white; beauty-spots composed of three bands, the middle of which is green, and the lateral ones deep black; scapulars black, edged with white; under tail-coverts black; bill blue, but black at the point; iris brown; feet ash-coloured. Length 18 inches.

Female smaller than the male, head and neck rusty, sprinkled with black spots; feathers of the back blackish-brown, bordered with rusty; wing-coverts brown, edged with whitish; beauty-spots whitish ash-colour; breast and sides rusty; bill and feet blackish ash-colour.

Young Males resembling the females. In *very old males* the yellowish-white of the forehead does not extend upon the top of the head, which takes place in the *males of a year old*: it is only in the *old males* that the wing-coverts are pure white. (Temm.)

This is the *Canard Siffleur* of the French; *Anistra fischiarola*, *Anatra Marigiana*, and *Fischione* of the Italians; *Pfeifente* of the Germans; *Smient*, *Fluit-eend*, and *Halve-eend-vogel* of the Netherlanders; *Wriand* of the Swedes; *Bles-and* of the Danes; *Wheiver*, *Whim*, *Pundle*, *Pundle-whim*, *Whew*, *Pandled whew*, *Easterling*, and *Yellowhall*, of the modern British; and *Chwiw* of the antient British.

Geographical Distribution.—Lapland, where they are called *Grass Ducks*, Norway, and Sweden, in all which places they breed. Iceland, where a few breed. Holland, where they sometimes breed. Germany, France, Spain, Italy, Egypt?, Smyrna, Asia: neighbourhood of the Caucasus, India, Japan. Very numerous in the British Islands in the winter, arriving at first towards the end of September or beginning of October, the flocks increasing in
portion to the severity of the weather. They have
known to breed in Sutherlandshire.



Wigeon; Male and Female.

Habits, Food, &c.—According to Colonel Hawke
wigeons either choose their mates or detach them
into small trips preparatory to that choice about St.
tine's day. The nest is placed among low bushes,
or rushes near fresh water, and is formed of the t
vegetable materials in a state of decay, with a warm
lining from the parents' body. Eggs from five to
smaller than those of a *Wild Duck*, and rich cream-
A vegetable diet forms the principal support of the
which not only feeds on aquatic plants, but also
same kind of short grass as that on which the goose
as Mr. Waterton has satisfactorily proved, in addi
other evidence of its grazing habits. [DUCKS, vol.
178.] The last-named zoologist states that the
procures its food in the day; but it is also a nocturnal

This species has always been in request for the
the price in the Northumberland Book which
against the bird is one penny. Perhaps no wild fowl
to market in greater plenty. Vast numbers are fu
by the decoys; but the 'gunner' contributes no
share; not so large a quantity however as he forme
Colonel Hawker truly says that the wigeon for coast
shooting is like the fox for hunting—it shows the
sport of anything in Great Britain. No writer has
so fully or so well on the subject of wild-fowl shoo
the Colonel; and to his good sound practical book
refer our readers.*

HYBRIDS.

The male wigeon has been known to breed in
ment with a pin-tailed duck and common duck (t
coloured variety).

WIGHT, ISLE OF, on the south coast of Engl
separated from the mainland of Hampshire by a
called the Solent Sea (*Pelagus Solvens* is the Lati
which Bede gives to it). The average breadth of th
nel is less than four miles. It is narrowest to the
Yarmouth, where it is contracted to about a mi
narrow tongue of gravelly beach which runs out
two miles from the Hampshire coast, and on the
mity of which is situated Hurst Castle. This
part of the channel is extremely deep. From Ya
to near West Cowes the width is from two to three
it is here contracted to a mile and a half, but op
opposite to Southampton Water to about five m
then grows narrower as it approaches Spithead, wh
entrance to the channel from the east is from two

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* 'Instructions to Young Sportsmen in all that relates to Game a
ing,' 8vo., 1838, London.

miles. The current through the channel, both with the rising and ebbing tide, is extremely strong.

The form of the island is that of an irregular rhomboid or lozenge. The longer diameter, from the Foreland on the east to the Needles Cliff on the west, is not quite 23 miles; the shorter diameter, from West Cowes on the north to St. Catharine's Point on the south is about 13 miles; the circumference is about 56 miles, and the area is 86,810 acres, or nearly 136 square miles, which is thirteen square miles less than the area of the county of Rutland. The Needles Cliff, west, is in 50° 40′ N. lat., 1° 34′ W. long.; the Foreland, east, is in 50° 41′ N. lat., 1° 5′ W. long. West Cowes Castle, north, is in 50° 46′ N. lat., 1° 17′ W. long.; St. Catharine's Point, south, is in 50° 35′ N. lat., 1° 18′ W. long.

Coast and Surface.—The coast of the Isle of Wight consists for the most part of precipitous cliffs or steep slopes. The north coast is lower than the south. From West Cowes to Newtown inlet it presents rather steep slopes; about Newtown it is low, but rises again towards Yarmouth. West of the æstuary of the Yar the coast is steep and high. Colwell Bay has slopes; Totland Bay is mostly enclosed by perpendicular cliffs of horizontal strata, but in the greater part of Alum Bay the strata are vertical, or nearly so, rising in grotesque pointed cliffs to the height of 300 feet. The unbroken face of a chalk ridge forms the south side of the bold promontory of which the three or four insulated masses of chalk called the Needles have formerly been a continuation. From this point, which forms Scratchell's Bay, a line of chalk precipices extends to Freshwater Gate, in many parts nearly perpendicular, the western part, called the Main Bench, being 600 feet high. The chalk cliff is continued eastward, the height gradually diminishing till it terminates at Compton. Thence a succession of narrow terraces, in some places quite perpendicular, gradually increase in height to the south front of St. Catharine's Hill, which rises to a height of upwards of 400 feet from an elevation of 400 feet above the sea. From St. Catharine's to St. Boniface land-slips have formed a series of terraces, which have long been firmly settled, and thence to Dunnose there are similar land-slips, but more recent, ruinous, and unsettled. From Dunnose northward an almost unbroken line of perpendicular cliffs, at Luccombe 200 feet high, gradually decrease in height till they totally disappear at Sandown Bay; but in about half a mile the red cliffs of Yaverland begin to appear, and soon rise to the height of 200 feet. These are succeeded by the vertical face of the chalk range, which, as seen at Culver Cliff, is similar to the Needles promontory, but not so high. A series of precipices, presenting perpendicular faces of stone and loam, gradually decrease in height to Bembridge. Having passed the entrance to Brading Haven, the coast rises, and at St. Helen's is again high, steep, and woody, as far as Nettlestone, where rocky points forty or fifty feet high project into the sea. At Puckpool the coast is steep and lofty, and is covered with wood to Ryde, Binstead, Quarr, and Wootton, where it is again low. From King's Key to East Cowes the coast is more undermined by land-springs and the sea.

The surface of the Isle of Wight is for the most part at a great elevation above the sea. A range of high chalk downs extends, with some interruptions and irregularities, from the Culver Cliff east to the Needles west. In this chalk range there are three principal depressions: between Yaverland and Brading, three-quarters of a mile wide, through which the eastern Yar flows; between St. George's Down and Carisbrooke, half a mile wide, through which the Medina flows; and at Freshwater Gate, hardly a hundred yards wide, through which the western Yar flows. Besides these principal depressions, several others, from 100 to 200 feet deep, divide the range into a series of long eminences. A considerable part of the range, especially at the east end and west end, is single, and very narrow at the top, with steep slopes to the north and south; about the centre the chain is double, and sometimes triple, extending into irregular offsets. The highest point of the chalk range is Mottiston Down, 698 feet above the sea. The south side of the island consists of a high range of downs, the upper part of which, on the west, is part of the chalk ridge; on the south, is chalk in horizontal strata; on the east, is green sandstone and ironsand. A broad valley separates the lofty range of south downs from the central chalk ridge. The north side of the island, which is in general less elevated than the south side, consists of a great variety of wooded hills and valleys.

The most extensive of the valleys is that of the eastern Yar, alluded to above, which comprises a large portion of the most fertile land in the island. It is bounded south by the southern range of downs, north by the central chalk ridge, west by the eastern boundary of the Medina valley, and east by the sea. The basin of the Medina, which is in general very narrow, forms a central valley. The south-western valley is bounded on the east by St. Catharine's Hill, on the west by the sea, on the north by the chalk ridge. Numerous small streams drain this tract, but as the coast is high, they enter the sea by narrow chasms called chines. These chines all owe their formation to a common cause, the action of small streams which descend from the high land to the sea, and falling over the edges of the cliffs have worn for themselves deep gullies, some of which run inwards a considerable distance from the shore. On the north-east are a number of small valleys, which open separately into the sea; that of the Wootton river is the most extensive. Inconsiderable streams run through these valleys. Another series of separate valleys, but more flat and marshy than the north-eastern, forms a north-western valley which is bounded on the west by the high land of Colwell Bay and Totwell Bay. Last and least is the singular valley of Freshwater, in which the western Yar rises within a few yards of the south coast, and running into the sea at Yarmouth, almost makes a distinct peninsula of the western end of the island.

The highest part of the island is St. Catharine's Hill, the summit of which is 830 feet above the sea; the height of Dunnose is 792 feet.

Rivers.—The Medina rises near the north-eastern foot of St. Catharine's Hill, and runs in a narrow valley till near Gatcombe, where the valley becomes wider; it then passes through the chalk ridge near the centre of the island, and flowing on the east side of Newport, forms immediately below the town a wide æstuary, and enters the sea five miles to the north, between East and West Cowes. The eastern Yar, or Brading river, has its source in the same range of hills as the Medina, not far to the east; it runs in a direction generally north, north-east, and east, and passing through a narrow chasm is the chalk range between Brading and Yaverland, then forms Brading Haven, which at high water is a beautiful lake of 800 acres, but at low water is a surface of muddy sand crossed by the Yar. It receives several small affluents in its course. The western Yar rises near Freshwater Gate, and falls into the sea at Yarmouth; it is an æstuary in nearly its whole length, which is less than three miles. The Wootton River and the Newtown River are small streams which form similar æstuaries.

Geology.—The whole series of the strata which compose the Isle of Wight are exhibited in its precipitous cliffs in the most distinct and complete manner. Some of the phenomena which those strata present are extremely curious. The north side of the island consists of the strata above the chalk; the centre and the upper part of the south side consists of the chalk; and the lower part of the south and the south-east sides consist of the strata below the chalk. The whole of these strata, taken in a descending series, are the following:—alluvium, upper freshwater formation, marine formation, lower freshwater formation, sand without shells, London clay, plastic clay, chalk with flints, chalk without flints, chalk-marl, green sandstone, blue marl, and ferruginous sand and sandstone, the lowest of the series. The series above the chalk belongs to what has been called the chalk basin of the Isle of Wight, the boundaries of which are, near Winchester to the north, near Carisbrooke to the south, Brighton to the east, and Dorchester to the west. This basin is circumscribed by chalk-hills, except where it is broken into by the Solent Sea.

The most extraordinary circumstance in the geological structure of the Isle of Wight is the vertical or highly inclined position of the central chalk ridge and of the plastic clay and London clay to the north of it. The strata farther to the north and to the south are horizontal, or nearly so, those to the south being the chalk and underlying strata, which remain undisturbed, while those to the north are more recent formations deposited horizontally and unconformably on the broken edges of the vertical strata. Two great sections of these vertical strata are exhibited by the Culver Cliff and the cliffs of Whitecliff Bay on the east, and by the Needles Cliff and the cliffs of Alum Bay on the west.

In Whitecliff Bay, the plastic clay and sands form two row cliffs perfectly vertical; rounding the cape to the south, the chalk of the Culver Cliff rises to a great height at an angle of about 70°, dipping N.N.E., and gradually diminishing to about 50°. In Alum Bay, a section, quite conformable, but more extensive and distinct, is exhibited. On the south are the lower strata of chalk and chalk-marl at an angle of about 50° N.N.E., the upper strata of chalk at an angle of about 70°; farther to the north, the plastic clay and its sands perfectly vertical; still farther to the north, the London clay, also vertical; and, farthest, a bed of yellow sand inclined at an angle of 60° or 70° N.N.E. The thicknesses of these strata above the chalk (or rather, as they are now, on one side of it) are—1, plastic clay formation, 1131 feet; London clay, 250 feet; and yellow sand, 100 feet: altogether 1481 feet. The face of the chalk ridge is about one-fourth of a mile wide. The upper strata of chalk have alternating strata of flints in a very extraordinary state, the pieces of flint, though closely invested with the chalk and perfectly retaining their forms, being found, when taken hold of, to be shivered into fragments of every size from three inches to an impalpable powder, and the fractured edges of every particle being quite sharp, as if the effect had been occasioned by a blow of inconceivable force. The plastic clay in Alum Bay consists of clays, marls, and sands in a countless number of layers, some extremely thin, of every variety of colour, and most of them, especially when recently cut, inconceivably bright, like the stripes of a ribbon or the streaks of a tulip. It contains also eight beds of wood-coal, or rather bituminized wood, each about one foot thick, and vertical, like the other layers. The cross fracture of the coal is earthy; it burns with difficulty, with little flame, and a sulphureous smell. The line along which the disturbing force acted that occasioned the vertical position of the strata may be traced as far as Abbotsbury in Dorsetshire.

Another very curious circumstance in the stratification of the Isle of Wight is that of a marine deposit between two freshwater deposits. This is distinctly shown in a natural section of Headon Hill, on the north side of Alum Bay. Hence it has been concluded that this hill must have been twice the bottom of a freshwater lake, and at an intermediate period have been covered by the sea. This marine deposit does not seem to be a part of any extensive formation; it only forms a bed, of which the actual boundaries are unknown; but the freshwater formations have been found to correspond very closely with the *calcaire grossier* of the Paris basin. Beneath these formations in Headon Hill, and extending into Alum Bay, Totland's Bay, and Colwell Bay, is a stratum of pure siliceous sand without shells, from 30 to 50 feet thick, which is extensively used for making the best kinds of glass. This sand, a bed of black clay, 35 feet thick, immediately above it, the lower freshwater formation, the marine formation, the upper freshwater formation, and the alluvium which forms the top of the hill, are all nearly horizontal, the dip being slightly to the north.

The fossil shells contained in the *lower freshwater formation* are limneus, planorbis, cyclostoma, and one or two others: there are no marine remains. The beds of this formation in Headon Hill are irregular; it forms the upper part of the cliff in Totland Bay, and appears at Warden Ledge in a more uniform and indurated state, and has been traced as far to the east as Nettlestone. It is only 14 feet thick in the Binstead quarries, formerly in much estimation, but now wrought out. The *marine formation* consists of a shelly-marl. The fossil shells consist of cerithia, many species, cyclas, cytherea, ancilla, &c., generally very perfect, and may be gathered by handfulls. This formation appears about half-way up the cliff in Headon Hill, where it is 36 feet thick. It is seen occasionally all round the north side of the island, in Totland Bay, Colwell Bay, Cowes, Ryde, and as far to the south as Bembridge. The *upper freshwater formation* is 55 feet thick in Headon Hill, but it is not so thick in other parts of the island. It consists of a yellowish-white marl. The fossil shells are abundant, and consist of limnei, helices, planorbes, and others, extremely thin and friable, many of them quite perfect, and without any admixture of marine shells. It appears in many places on the north side of the island, as far south as Whitecliff Bay, sometimes in consolidated strata and sometimes in blocks lying loose in the soil. The top of Headon Hill, as before mentioned, consists of an alluvium, chiefly of rolled flints.

The whole of the north side of the island is consi
to belong to these formations.

The south side of the Isle of Wight, from Dunnose t
Catharine's, consists, in the upper part, of chalk and c
marl, in nearly horizontal strata; the centre is green
stone, beneath which is dark marl, and then ferrugi
sand. Whenever the land-springs act on this marl,
formed into mud, runs out, and leaves the green sands
and chalk without support, which then tumble down.
this manner have been formed those picturesque ter
called the Undercliff. The green sandstone, so called
its being mixed with a considerable quantity of g
earth, is here about 70 feet thick, divided in layers by c
substances. The green sandstone and dark-red ferrug
sand extend from Dunnose to Yaverland. The iron
is very thick, and some of it consolidated into ro
may be seen in the lofty perpendicular Redclif
Yaverland. Cliffs of the iron-sand may be trace
Sandown Bay on the east to Freshwater on th
except where it is concealed by the ruins of the
cliff. It forms the substratum of all the south sid
island.

Between the central chalk ridge and the south
downs, the chalk and green-sand are entirely wa
in this space, which constitutes the valleys of N
and Kingston, the iron-sand only is found.

Soil and Agriculture.—North of the chalk
predominating soil is a stiff clay, which is extre
suited for the growth of wood, especially oak, wh
neighbourhood of East Cowes and St. Helen's, gr
to the water's edge. Elm does not bear the sea
as oak, but in sheltered situations it grows to a
Ash is not common, and the beech is rare. T
the island was formerly covered with forest, and t
demand for ship-building has thinned it greatly.
well wooded. All the northern half of the island
inferior to the southern half as arable land. T
whether clay or loam, is generally very full of flints
chalk is used for manure, and sea-weed is mixed w
dung in the farm-yard. The soil of the whole of th
part of the island is generally a rich red loam, in some
inclining to sand, in others more stiff and clayey, but
where extremely fertile. Timber does not grow so we
the south side of the island as on the north side. A
fleecy grey moss invests many of the trees. Almo
the lower tracts are employed in tillage, and the pro
of wheat especially is greater than in almost any other
of the kingdom. Wheat, barley, and oats are exported
considerable amount annually, and all kinds of pul
green crops are cultivated. The pastures and meadow
rich, but few oxen are reared. Dairies are attached to
of the larger farms. The Alderney and Devonshire
are preferred. Large flocks of sheep are fed on the d
and are in repute for the fineness of their wool.
50,000 are shorn annually, and about 6000 lambs are
to the London markets every year.

Game is abundant, especially pheasants. Fish
taken in great abundance, except shell-fish. L
and crabs are very large and fine on the south side
island. Sea-fowl, choughs, puffins, razor-bills, &c.,
to the cliffs in summer in vast numbers: the Main
is their chief place of resort.

The climate is very mild, especially in the valley
sheltered parts of the south side of the island. La
myrtles, geraniums, and various kinds of delicate
greens, flourish through the winter. The Undercli
been particularly recommended as suitable for invali

The Isle of Wight is much visited, as well for the
deur and extraordinary geological structure of its cli
for the beautiful scenery of the interior, in which, con
ing the smallness of the space, it is not surpassed b
other part of the kingdom.

Divisions, Towns, &c.—The Isle of Wight is includ
the county of Southampton (Hampshire). The two
equal divisions of the island formed by the Medina
tute the Liberties of East Medina, which contai
parishes, and West Medina, which contains 16 pari
By the Reform Act of 1832, the Isle of Wight was
rated from Hampshire for parliamentary purposes,
returns one member to the House of Commons.

The following is the population of the Isle of Wigh
cording to the enumeration of parishes, &c. for the
1841:—

Division.	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
h, Township, or Extraparochial Place.	English Statute Acres.	Inhabited.	Uninhabited.	Building.	Males.	Females	Total of Persons.	Under 20 Years.		20 Years and upwards.		In this Country.	Elsewhere.
								Males.	Females.	Males.	Females.		
ast MEDINA Liberty.													
on[1] . . . . Parish	8,270	361	16	1	1,010	954	1,964	520	464	490	490	1,882	82
ad . . . . Parish	1,140	50	5	..	124	154	278	59	67	65	87	230	48
urch[2] . . . Parish	150	51	3	6	132	170	302	56	73	76	97	216	86
g[3] . . . . Parish	7,350	520	37	3	1,324	1,377	2,701	676	664	648	713	2,448	253
ll[4] . . . . Parish	6,400	260	5	2	725	710	1,435	346	373	379	337	1,414	21
, St. . . . Parish	1,880	273	29	4	641	732	1,373	333	349	308	383	1,182	191
ce, St. . . Parish	350	23	2	1	64	50	114	30	18	34	32	81	33
rch[5] . . . Parish	8,870	445	12	5	1,285	1,245	2,530	597	572	688	673	2,240	290
. . . . Town		1,009	63	11	2,457	3,383	5,840	1,155	1,384	1,302	1,999	4,421	1,419
. . . . Parish	1,170	121	3	..	287	326	613	121	161	166	165	530	83
[6] . . . . Parish	910	85	..	..	206	256	462	83	107	123	149	356	106
gham[7] . . Parish	4,390	466	41	2	1,202	1,316	2,518	608	628	594	688	2,211	307
. . . . . Parish	1,920	117	2	3	327	333	660	167	182	160	151	633	27
or Wotton[8] Parish	530	2	1	..	7	18	25	3	6	4	12	22	3
ton (part of)[8] Hamlet		6	..	..	15	11	26	6	4	9	7	26	..
d . . . Parish	670	15	1	..	37	43	80	18	24	19	19	73	7
Medina, Total . .	44,000	3,804	220	38	9,843	11,078	20,921	4,778	5,076	5,065	6,002	17,965	2,956
r MEDINA Liberty.													
. . . . Parish	2,700	135	4	..	358	352	710	187	171	171	181	675	35
. . . . Parish	750	30	..	..	73	77	150	33	33	40	44	136	14
ne[10] . . . Parish	5,090	125	6	..	328	327	655	165	160	206	219	688	62
own . . Chapelry		23	..	1	43	52	95						
oke[11] . . . Parish	8,880	895	66	9	2,656	2,646	5,302	1,561	1,208	1,271	1,573	4,791	822
ombe . . . Hamlet		16	..	..	51	42	93						
erton (part of)[11] Hamlet		38	..	..	125	93	218						
. . . . . Parish	1,880	114	1	9	331	279	610	158	141	173	138	592	18
ater[12] . . . Parish	4,760	250	11	1	641	658	1,299	321	314	320	344	1,179	120
mbe . . . Parish	1,310	45	..	..	149	157	306	78	91	71	66	294	12
ton . . . Parish	650	10	..	..	42	31	73	20	19	22	12	73	..
ston[13] . . . Parish	1,070	33	1	..	90	86	176	47	43	43	43	158	18
PORT[14] . Boro' & Parish	80	733	64	1	1,809	2,049	3,858	839	851	970	1,198	3,490	368
las,St.,CastleHold,Parish[15]													
thin Newport Borough	410	38	3	..	72	122	194	20	43	52	79	175	19
thout Newport Borough		11	..	..	46	35	81	23	17	23	18	78	3
wood[16] . . . Parish	4,270	191	6	..	513	527	1,040	1,146	1,196	1,231	1,574	4,317	830
es, West . . Town		723	50		1,864	2,243	4,107						
et[17] . . . Parish	5,480	237	7	..	625	593	1,218	328	311	297	282	1,183	35
ell[18] . . . Parish	4,060	131	..	..	365	349	714	191	183	174	166	660	54
y . . . . Parish	1,370	26	..	..	84	79	163	46	36	38	43	155	8
uth . Town and Parish	50	114	8	..	256	311	567	122	131	134	180	471	96
est Medina, Total . .	42,810	3,918	227	21	10,521	11,108	21,629	5,285	4,948	5,236	6,160	19,115	2,514
Total	86,810	7,722	447	59	20,364	22,186	42,550	10,063	10,024	10,301	12,162	37,080	5,470

chief towns are—Newport, Cowes, East and West, nd Yarmouth.

ort, the capital town of the Isle of Wight, is situ- a valley near the centre of the island, on the west the Medina river, which is navigable to Newport. e flows nearly to Newport bridge, and carries large to the quay, which is built in front of the town, the Carisbrooke stream falls into the Medina. of considerable burthen can ascend with high The town is built on an easy ascent, and the which are sufficiently wide, cross each other at right It is a very pretty town, well paved, lighted with l clean. The town-hall and market-house form a neat structure, which is said to be very commodious in its arrangements. It was begun in 1814 and finished in 1816, at a cost of 10,000*l*. The magistrates of the island meet in the town-hall every Saturday, to determine parochial matters, and to commit offenders for trial to the county assizes. The Isle of Wight Institution, which is a public library and reading-room, is a building which is said to surpass the town-hall in elegance: it was built by subscription in 1811. There is also a Mechanics' Institute. The free grammar-school is a large stone building, erected in 1619. The conferences between Charles I. and the parliament were held in the school-room, and lasted forty days. There are two assembly-rooms, and a small but neat theatre. The church

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les the hamlet of Biddlesford.

of Whitwell return includes part of the tything of Nettlecombe, ether with Bonchurch parish, forms the whole of that tything.

des Alverstone, formerly a chapelry, and 10 persons in barges and

les the manor of Appuldurcombe, with 36 inhabitants; the tythings y, with 187; Rond, with 313; Sandford, with 114; Rookley and h 265.

des the villages of Wroxall, Ventnor, Winston, and Princelett; the ah contains 8370 inhabitants. The great increase of population (3442) is ascribed to building and the continual influx of visitors ering-places of Ryde and Ventnor. Ventnor contains 970 inhabit-

les 86 visitors.

les the hamlets of Burton, Coombly, Fairlee, and East Cowes. East tains 880 inhabitants.

ntire parish of Wootton contains 51 inhabitants. The entire hamlet on, which is partly in Carisbrooke parish, contains 244 inhabitants.

[9] Includes the hamlet of Limmerston, and part of the hamlet of Chilton, the remainder of which is in the parish of Mottiston.

[10] The entire parish of Calbourne contains 750 inhabitants.

[11] Includes two houses, extraparochial, in Parkhurst Forest, 13 persons; Parkhurst Prison, 319; House of Industry, 441; Albany Barracks, 54; Lunatic Asylum, 34 persons. The entire parish, including the above, contains 5613 inhabitants.

[12] Includes the tythings of Easton, Middleton, Norton, and Weston.

[13] Includes part of the hamlet of Chilton, the remainder of which is in the parish of Brixton.

[14] Includes 14 persons in the gaol.

[15] The entire parish of St. Nicholas Castle-Hold contains 275 inhabitants.

[16] The entire parish of Northwood contains 5147 inhabitants. This return includes 23 persons in houses extraparochial.

[17] Includes the hamlet of Ningwood.

[18] Includes the tythings of Atherfield, Gatcombe, Kingston, North Shorwell, and South Shorwell.

was built in 1172, but has been frequently repaired since: it is a large plain structure. There are six chapels belonging to different classes of dissenters. The House of Industry, in the vicinity of Newport, is a spacious building, with 80 acres of land attached to it, divided into fields and gardens, and cultivated by the inmates: in 1840 there were 441 persons in it. The Albany Barracks, not far from the House of Industry, were built in 1798, and were much employed during the war: they have a good military hospital, and grounds attached to them: in 1840 they contained only 54 persons. Parkhurst prison, for juvenile convicts, also in the neighbourhood of Newport, in Carisbrooke parish, contained, in 1840, 319 individuals, and the gaol at Newport 14. The Lunatic Asylum, which is in Carisbrooke parish, contained 34 persons in 1840.

The market is on Saturday, and is much frequented by persons from all parts of the island, Newport being a central depôt, from which corn and other agricultural produce are shipped, and which imports articles of manufacture, coals, provisions, and whatever else may be wanted for the interior and south side of the island. An annual fair is held on Whit Monday, Tuesday, and Wednesday; and at Michaelmas there are three Bargain-Fair Saturdays, when the country men-servants and maid-servants meet at separate parts of the town to be hired, and this is the great season for rustic sports.

Previous to the Municipal Reform Act in 1835, Newport was a municipal and parliamentary borough. As a municipal borough, it consisted of a mayor, a recorder, eleven aldermen, self-elected, twelve chief burgesses, and an indefinite number of freemen. It was incorporated by a charter of James I. The governing charter of the borough was 13 Chas. II. By the Municipal Reform Act it has been divided into two wards, with six aldermen, and eighteen councillors. The number of burgesses, or municipal electors, in 1837 was 526. The expenditure of the borough in 1840-41 was 662*l*. 9*s*. 7*d*.: among the items were—for the administration of justice, prosecutions, &c., 30*l*. 16*s*. 8*d*.; police and constables, 282*l*. 7*s*. 2*d*.; rents, rates, taxes, and insurance, 43*l*. 6*s*. 10*d*.; salaries, pensions, and allowance to municipal officers, 103*l*. 3*s*. 10*d*.; public works, repairs, &c., 80*l*. 6*s*. 4*d*.; printing, &c., 2*l*. 12*s*. 3*d*.; miscellaneous, 15*l*. 9*s*. 10*d*. As a parliamentary borough, the right of election was in the mayor, aldermen, and burgesses; the greatest number of electors who had polled at any election during thirty years preceding 1831 was 22. The population within the limits adopted by the Reform Act for parliamentary purposes was, in 1841, 6330. It returns two members to the House of Commons, as it did before the Reform Act. The number of parliamentary electors on the register in 1839-40 was 663, of whom 657 were householders of 10*l*. or upwards. The number on the register in 1835-6 was 603. The parliamentary return gives the population of the town and borough as 3858; but as a considerable part of the actual town is in the parish of Carisbrooke, this is not the true population of the town proper. It is probably about 5000. Newport is properly a chapelry, the minister being nominated by the vicar of Carisbrooke, but it is called a parish, has separate churchwardens and overseers, and is in no respect subject to interference from the parish officers of Carisbrooke.

Cowes, West and *East*, are situated respectively on the west and east sides of the mouth of the Medina. East Cowes is a small place, but it contains the custom-house for the whole island. The communication with West Cowes is by a ferry.

West Cowes is built at the bottom and on the side of a steep hill. The lower streets are narrow and irregular, but the upper part of the town is picturesquely situated, and there are many elegant cottages and gentlemen's seats near it. There is a town-hall and market-house, a very plain building, for the erection of which an act was obtained in 1816. The church was built in 1653, and enlarged in 1811 at an expense of 3000*l*. by a private gentleman. It is a chapel dependent on the parish church of Northwood. Another chapel, which was consecrated in 1832, was erected and partly endowed at the sole expense of a lady. There is also a Roman Catholic chapel, a Methodist chapel, and an Independent chapel. A national school was erected in 1821. West Cowes castle is a small fortress on the seashore. The population of the parish of Northwood, in which West Cowes is situated, by the returns of 1841, is—males, 2377; females, 2770: total, 5147. There ar
contiguous to the Parade at the west end of th
Owing to the steepness of the beach, the bathing-m
are managed by windlasses.

Ryde is situated in the parish of Newchurch,
liberty of East Medina, on the north-east shore
island. The town is modern; the streets are w
tolerably regular, well paved, and cleansed under c
sioners appointed by an act passed in 1829. The
being generally stuccoed, and of various forms an
and intermingled with the foliage of trees in the m
gardens, the appearance of the town is very pict
The market-house and town-hall form a handsom
ing 198 feet by 56. St. Thomas's chapel and St.
chapel are both dependent on the parish church
church, which is seven miles distant. There is
pendent chapel and a Methodist chapel. There i
school, and there are Sunday-schools attached to St.
chapel and the two dissenting chapels. There a
near the pier. The town has considerable trade
ports corn, flour, sheep, calves, lambs, &c., and
West India ships frequently call here to supply th
with provisions for their voyages. Tuesday and Fr
the market-days. Boat and yacht building are ca
and occasionally larger vessels are built. The
erected at an expense of 12,000*l*. The foundation
June 29, 1813, and the structure, which is mostly
was completed in 1814; it extends 1740 feet into
A landing may be made in calm weather at all tim
tide. It is furnished with an iron railing and cover
and forms a very fine parade. The populatio
parish in 1841 was 8370, consisting of 3742 males
females. The population of the town, accordin
census of 1831, was 3396: it is now probably
4000 and 5000.

Yarmouth is a small town. The population of
and parish, according to the returns for 1841, is
It is situated at the mouth of the æstuary of the
Yar. It has an excellent roadstead, and there
munication by steam-boat twice a day with Lyn
It has a town-hall and market-house, a church, a M
chapel, and a Baptist chapel. The castle is a sm
The market is on Wednesday. Yarmouth is a c
town, which was not affected by the Corporations
1835. It consists of a mayor and eleven other ch
gesses, who are self-elected. The governing char
James I. Previous to the Reform Act it was a
mentary borough, and returned two members. The
franchise was in the mayor and corporation. The
number who had voted at any election for the thir
preceding 1831 was nine. It had sent representa
early as 1304, but did not send them regularly till
1584. It was disfranchised by the Reform Act.

Brading is a small town picturesquely situated
slopes of two opposite hills on the south-east sid
island. Several of the houses are antient, cons
bricks supported by timber framework. The mark
and town-hall is a small structure. The church
and of considerable antiquity. It is a corporatio
was not affected by the Corporations Act of 183
corporate body consists of two bailiffs, two ju
deputy steward, an indefinite number of burgesses
habitants at large. The number of electors in
338. The title to admission to the elective body i
hold inhabitancy. The population of the borough
2000. The governing charter is 1 Edw. VI. The
tion of the town and parish in 1841 was 2701.
Haven admits small vessels when the tide is in. S
Middleton attempted to reclaim the haven from th
making a dyke, for which purpose he brought ov
men from Holland, but the sea broke in, and the
was never afterwards resumed. [MIDDLETON, SIR

Newtown, a municipal borough, and formerl
parliamentary borough which returned two me
the House of Commons, is now a very small place
chapelry in Calbourne parish, which contained, in
houses and 95 inhabitants. It is situated on th
west side of the island, at the top of the æstuar
Newtown river, between Yarmouth and Cowes.
water vessels of 500 tons can come up this æstuar
creeks of which are several salterns, now little use
place was once called Francheville, and was a
some extent and importance. It was burnt by the

reign of Richard II., but the great cause of its decline
e growing importance of Newport. The municipal
onsists of a mayor and an indefinite number of chief
ses, who are self-elected, and of whom the number
was 23. The governing charter is one granted in
gn of Elizabeth. As a parliamentary borough, New-
as disfranchised by the Reform Act.

ory and Antiquities.—The Isle of Wight was con-
by Claudius, A.D. 43. In 495 it was conquered by
the Saxon, who destroyed the original inhabitants,
placed them by his own countrymen. In 661 Wal-
g of Mercia, subdued it. Not long afterwards it
jected and compelled to embrace Christianity by
lla. In 787, 897, 998, and 1001, it was plundered
Danes; and in 1052, Earl Godwin, who had been
d by Edward the Confessor, made a descent on it,
ndered it. William the Conqueror bestowed it on
sman William Fitz Osborne, and created him Lord
sle of Wight. A succession of Norman Lords held
445, when Henry VI. created Beauchamp, earl of
k, King of Wight, and crowned him with his own
The kingly title however was not continued, and
of the Lords was the Earl Rivers, who was beheaded
ard III. in 1483. During the period that it was held
Lords it was frequently threatened by the French,
etimes plundered by them. One of the last of their
lescents was in the reign of Richard II., when they
ed all the island except Carisbrooke Castle, but re-
receiving 1000 marks from the inhabitants. On the
n of Henry VII., Sir Edward Widville, or Woodville,
to the late Earl Rivers, was made Captain of the Isle of
and the title was held by his successors for a consider-
iod. The last Captain was the earl of Portland, who
placed by the parliament, and the earl of Pembroke
ointed Governor in his place. He was succeeded
nel Hammond, and during his governorship Charles
to the Isle of Wight after his escape from Hampton
He arrived there Nov. 1, 1647. He was not strictly
d at first, but was so afterwards, when he made
unsuccessful attempts to escape. On one occasion
lly, he got his head out of the window, but was
to draw it back when he found that he could not
body through. A conference between Charles and
liament was held in the school-room of the free-
of Newport, which lasted some weeks. On the 29th
1649, he was seized, and conveyed to Hurst Castle.
tle and office of Governor of the Isle of Wight is still
ued.

Roman name of the Isle of Wight was *Vectis*, which
obably pronounced Weectis, or Ouectis, the contracted
which, Wect, is the most likely origin of the pre-
ame. In the Domesday-Book it is spelled Wect,
nd Wiht.

Isle of Wight does not abound in antiquities. Bar-
e found on the downs, but there are no traces of
forts or camps, or of Saxon warfare. Carisbrooke
s the only antient fortress. Its keep is perhaps an-
Norman times, but no other part of it. During
of the Lords of Wight, whose power and privileges
most regal, the present village of Carisbrooke was
tal of the island, and Carisbrooke Castle was the re-
of the Lords. The castle stands on a lofty eminence,
keep still higher on an artificial mound. Fitz
the Norman built the castle, and included the
hin the ditch with which he surrounded the whole.
le was successively enlarged by subsequent lords.
idville, or Woodville, built the main gateway,
very handsome, in the reign of Edward IV.: the
Woodville appear on its front. There were several
al establishments in the island, but none of large
pt Quarr Abbey, which was founded in 1132. It
lved by Henry VIII. It was bought by a merchant
ampton, who swept away everything except some
f the long walls, which enclosed an area of thirty
building which has been called the Refectory, but
good authority, and a few fragments of gables,
and doorways. Carisbrooke Priory is entirely de-
, except the church, which is now parochial. There
ll but very curious turret on the summit of St.
e's Hill. The lower part was probably used as a
the chapel of a hermitage which stood there, and
er part as a lighthouse. It was repaired by Sir
Worsley. Some of the parochial churches are perhaps as old as the Norman conquest; some possibly older. Yaverland church is one of the most antient. The entrance-door is arched, and has what appear to be Saxon mouldings of very uncommon forms.

(Worsley's *History of the Isle of Wight*; Sir H. Englefield's *Description of the Isle of Wight, with Observations on the Geology*, by T. Webster; Phillips and Conybeare's *Geology of England and Wales*, 8vo.; *Geological Map*; *Guide Books*, &c.)

WIGTON. [CUMBERLAND.]

WIGTON. [WIGTONSHIRE.]

WIGTONSHIRE, the most southern county of Scotland, on the western coast, is bounded on the east by Wigton Bay and the river Cree, which separate it from the Stewartry of Kircudbright; on the north by Ayrshire; on the west by the Irish Channel; and on the south by the Irish Sea. It lies between 54° 38′ and 55° 4′ N. lat., and between 4° 16′ and 5° 6′ W. long. The area of the county is 459 square miles. It is indented by spacious bays and harbours. Wigton Bay, on the east, diminishes from a width of eight miles until it terminates in the river Cree, a distance of ten miles. Luce Bay forms an indentation in the southern part of the county, and stretches inwards about fifteen miles: the distance between the two headlands of Barrow Head and the Mull of Galloway is about fifteen miles, the Mull being about a mile and a half farther south, and the most southern point of Scotland. The point of the Mull, on which there is a lighthouse, is a peninsula of about a mile and a quarter in length by a quarter of a mile in breadth. The small island of Whithorn, which lies about three miles north-east of Burrow Head, contains 495 inhabitants. It affords safe and commodious shelter for shipping. Lochryan Bay, on the north-west, extends into the country about eight miles, to Stranraer, its breadth varying from two to four miles. No part of the county is above 13 miles from the sea.

Wigtonshire formed a part of the antient province of GALLOWAY, and is sometimes called West Galloway. The aboriginal Keltic inhabitants were not driven out of the country by the Romans, who, although they invaded the province of Galloway, do not appear to have established a colony there. Gaelic was the vernacular dialect of the district until after the middle of the fifteenth century, and was not entirely disused in remote places until some time after the commencement of the following century. [GALLOWAY.] There are Druidical remains at Ardwell, Cairnfield, Glenterra, and Torhouse, in the parish of Wigton. At Kirkenner are the traces of two antient circular camps; half a mile west of Whithorn, those of a Roman camp; and in the parish of Mochrum an Anglo-Saxon camp. Some British remains exist, and relics of the Keltic inhabitants are occasionally discovered. The remains of an antient wall or rampart, called the Deil's Dike, which commences at Lochryan, and is believed to have terminated near Bowness in Cumberland, where the great Wall of Hadrian commenced, is supposed by Chalmers to have been the work of the Romanized Britons after the departure of the Roman armies: an account of this antient work is given at the end of the 'Statistical Account of Wigtonshire,' published in 1841. The oldest church in Scotland was built by St. Ninian, near the site of the present Whithorn. There were monasteries at Whithorn, Wigton, Glenluce, and Soulseat; and several antient castles scattered over the county.

The surface of Wigtonshire, though consisting of eminences and hills of considerable height, is said to be less elevated above the level of the sea than any other county in Scotland. The principal eminences are Mull-hill, Montlokowre, Bunman, Cairnhill, Cairn of Dolt, and Grennan Hill, and they vary from 400 to 900 feet in height. From the general mildness of the winter the county has been termed the Devonshire of Scotland. It may be divided into three districts:—the Rhynns (peninsula), which lies west of a line drawn between Luce Bay and Lochryan; the Machers (flat country), lying between Wigton and Luce bays; and the Moors, which include the remainder, being more than one-third of the whole county. The fresh-water lochs are numerous, but small, and occupy an area of about seven and a half square miles. Dowalton, in the Machers, the largest, is about two miles long by a mile and a half broad. The only navigable rivers are the Cree, navigable for about four miles, and the Bladenoch, for a still shorter distance; both empty themselves into Wigton Bay. The river Luce, which falls into Luce Bay after a course of 21 miles from the borders of Ayrshire, is easily crossed on foot, except when floods occur. The other streams of the county are comparatively insignificant. The soil of the Machers and the Rhynns is described as consisting for the most part of a hazelly loam, dry, and adapted for the turnip husbandry. There is a tract of rich alluvial land in the eastern part of the county, which extends from the parish of Kirkenner to Newtonstewart. The Moors are bleak and barren, and in many places consist of peat land partially covered with water. Out of 288,960 English acres which the area of the county comprises, it is stated in the recent 'Statistical Account' that 101,136 acres, or about 35 per cent., are under cultivation, and 187,824,or about 65 per cent., in pasture. The land is not much subdivided, is mostly under entail, and let in farms of moderate size, generally for leases of nineteen years. In 1831 there were 820 occupiers of land employing labourers, and 487 occupiers who did not employ labourers. A great impulse has been given to agriculture since the introduction of steam-navigation, which has given the farmers access to the best and largest markets in England and Scotland, both for corn and cattle. There are steam-boats to Glasgow, Belfast, Liverpool, and Whitehaven. There is some fear lest the Galloway breed of cattle should lose their purity in consequence of the dairy system having been lately considered as more profitable than breeding. The handsome and active little breed of horses known as Galloways is fast becoming extinct.

The population of the county in 1755 was 16,466; 22,918 in 1801; 26,891 in 1811; 33,240 in 1821; 36,258 in 1831; and 39,195 in 1841. The greatest decennial increase which took place during the present century was 23 per cent. between 1811 and 1821, and the smallest was 8·1 per cent. in the ten years preceding 1841. In 1841, out of 18,290 males, 9490 were under 20 years of age, and 8800 were above that age; and out of 20,905 females, 9575 were under 20, and 11,330 were above 20. The number of persons returned as not born in the county was 9409, of whom 5772, or 14·7 per cent., were natives of Ireland. The number of parishes in the county is 17, and the number of places which made returns under the census of 1841 was 44. Four parishes comprise an area exceeding 30,000 acres, and one, Old Luce, contains 40,350 acres, or above 63 square miles. The number of schools in 1839 was 84. There are no poor-rates or legal assessments, except in one parish. When the last 'Statistical Account' was prepared, about 700 persons, or 1 in 52, were receiving parochial aid, at the rate of rather less than 2*l.* per annum each. There are savings'-banks at Stranraer and Whithorn.

Wigton, the county-town, which was made a royal burgh about 1341, is situated on an eminence about 200 feet above the level of the sea. The harbour is within a quarter of a mile of the town. In the middle of the principal street a long oblong space has been enclosed and planted with shrubs, evergreens, and forest-trees, and spacious gravel-walks have been laid out, with a bowling-green in the centre. The revenue of the corporation is about 350*l.* per annum. There is a good grammar-school, attended by from 80 to 100 scholars. There is a private bank, and branches of two of the Edinburgh banks. The parish church is an old and mean-looking edifice. In the churchyard there is a monument to the memory of two female martyrs, one aged eighteen and the other sixty-three, who, in 1685, were tied to a stake within the flood-mark and drowned for not conforming to prelacy. At the village of Bladenoch there is a whiskey distillery which consumes about 16,000 bushels of malt annually. In 1842 there belonged to Wigton 20 vessels averaging rather more than 100 tons each, besides several under 50 tons.

The most important harbours are Carty, Wigton, Garlieston, and the Isle of Whithorn in Wigton Bay; Port William and Sandhead, on the west side of Luce Bay; and Portnessock and Portpatrick, on the Irish Channel. At Carty, which is about a mile and a half below Newtonstewart, vessels of from 35 to 45 tons arrive, and at spring-tides those of from 70 to 80 tons can come up. Garlieston harbour was greatly improved a few years since, and will now shelter thirty vessels. The number of vessels belonging to this port in 1839 was 15, of which 4 were each of 100 tons burthen, and the remainder averaged 48 tons. Vessels of 100 tons burthen are built here. Portpatrick is the station for the post-office steam-packets to Do hadee, on the opposite coast of Ireland: the dist between the two ports is from 10 to 11 miles. The popula has decreased 196 since 1831, and since the introductio steam-boats the port has been less resorted to. Portpat was once the Gretna Green for Ireland. At Stranra pier was built about twenty-five years ago, at which rably large vessels may lie, but they can only come high-water. Nearly 40 vessels belong to this port, w average about 48 tons each.

The population of each parish in the county in 184 as follows:—

Glasserton . .	1253	Mochrom . .	253
Inch . . .	2950	Penninghame .	367
Kirkcolm . .	1973	Portpatrick. .	204
Kirkcowan . .	1423	Sorbie . . .	170
Kirkenner . .	1769	Stoneykirk . .	306
Kirkmaiden .	2202	Stranraer . .	345
Leswalt . .	2712	Whithorn . .	279
New Luce . .	652	Wigton . . .	256
Old Luce . .	2448		

The town of Newtonstewart (pop. 1218), in the of Penninghame, and the town of Portpatrick (588 each burghs of Barony. Wigton (1860), Whithorn (and Stranraer (4878), with the small burgh of New way (430), in the stewartry of Kircudbright, form a di of burghs for the return of one member to parlia The population of the four burghs was 8681 in 1841; the number of electors on the register in 1839-40 wa The county returns one member, and in 1839-40 the ber of county voters was 1039.

In 1831 there were about 400 men employed in we woollen, cotton, and linen in the county. In the vi of Sorbie a manufactory of damask has been carried above half a century, which is much famed for its qu and patterns. The fisheries on the coast are now pletely neglected.

(*New Statistical Account of Scotland*—'Wigtonsh *Population Returns*, 1841.)

WILBERFORCE, WILLIAM, was born at Hull on 24th August, 1759. His father, Robert Wilberforce, a merchant in that town, descended from the antient Y shire family of Wilberfoss; his mother was the daug of Thomas Bird, Esq., of Barton in Oxfordshire. His c stitution was so weak from his infancy, that in after-life expressed his gratitude 'that he was not born in less c lized times, when it would have been thought imposs to rear so delicate a child.' He was however an ac and spirited boy, of good ability, and showing, even at early age of seven, a remarkable talent for elocution. commenced his education at the grammar-school of which he attended for two years; but on the death of father in 1768, he was transferred to the care of his u William Wilberforce, who placed him as a parlour-boa in a mean school near Wimbledon. While at this s his aunt, who was an ardent admirer of White preaching, first led his youthful mind to contempla truths of religion, but at the same time imbued him her peculiar views. His mother, on hearing that he in danger of becoming a Methodist, withdrew him his uncle's care, and placed him at the Pocklington g mar-school in Yorkshire, under the Rev. K. Basket. removal from Wimbledon exercised an important influe upon his future life. His own reflection, twenty-six y afterwards, was that it had 'probably been the mean his being connected with political men, and becom useful in life; and that if he had stayed with his uncl should probably have been a bigoted despised Metho At Pocklington his serious dispositions were soon pated by a life of ease and pleasure. His talents fo ciety, and his rare skill in singing, made him an accep guest with all the neighbouring gentry, and much was thus wasted in gaiety. Yet we are told that greatly excelled all the other boys in his composi though he seldom began them till the eleventh hour is very remarkable, in connection with his subsequent tory, that when fourteen years of age he addressed a to the editor of the York paper 'in condemnation o odious traffic in human flesh.'

In October, 1776, he entered St. John's College, bridge, at the age of seventeen. Here he was at fir troduced to dissolute companions, whose habits were day, 1790, 'At thirty and a half I am in constitution sixty.' From his infancy he had suffered much from weak eyes, and his exertions were constantly interrupted or rendered painful by this infirmity. Still rising with new hopes and vigour from every disappointment, he confidently relied upon ultimate success. At length the hour of triumph was at hand. In January, 1807, he published a book against the slave-trade, at the very moment that question was about to be discussed in the House of Lords. The abolition bill passed the Lords, and its passage through the Commons was one continued triumph to its author. Sir Samuel Romilly concluded an affecting speech in favour of the bill 'by contrasting the feelings of Napoleon in all his greatness with those of that honoured individual who would this day lay his head upon his pillow and remember that the slave-trade was no more;' when the whole house, we are told, burst forth in acclamations of applause, and greeted Mr. Wilberforce with three cheers. He was himself so overcome by the touching allusions of Sir Samuel Romilly, as to be insensible to all that was passing around him. At home he was met by the congratulations of his family and friends; while the judgment of the public had already been pronounced by the first journal of the age: 'Let our gratitude be testified to that man,' says the 'Edinburgh Review,' 'who has begun and led through this glorious struggle—who has devoted to its success all his days and all his talents—who has retired from all recompense for his labours save the satisfaction of doing good to his fellow-creatures—who, giving up to mankind what others have sacrificed to party, has preferred the glory of living in the recollection of a grateful world to the shining rewards of a limited ambition' (No. XVI., July, 1806).

During the whole of this period he had been actively interested in all the momentous questions of that time. He had opposed the war with France at the cost of a temporary estrangement from Pitt; he braved the court and the minister in resisting an addition to the income of the Prince of Wales—and clashed with his early friends in supporting the impeachment of Lord Melville. Nor could any one have felt more keenly than Mr. Wilberforce such sacrifices of friendship to duty. On being taunted with inconsistency for not accompanying the procession to St. James's with the Address for the removal of Lord Melville, for which he had voted in the House, his vindication was truly sublime—'I know not,' said he, 'what Spartan virtue or Stoical pride might require; but I know that I am taught a different, ay, and a better lesson by a greater than either Lycurgus or Zeno. Christianity enforces no such sacrifice. She requires us indeed to do justice, but to love mercy. I learn not in her school to triumph even over a conquered enemy, and must I join the triumph over a fallen friend?'

In the midst of his various engagements he had also done public service to religion. In 1797 he published his 'Practical View of the prevailing Religious System of professed Christians in the Higher and Middle Classes of this Country, contrasted with real Christianity.' This work met with extraordinary success. In a few days it was out of print, and within half a year five editions (7500 copies) issued from the press. Since that time upwards of 50 editions have been published in England and America. It has also been translated into the French, Italian, Spanish, Dutch, and German languages. Its merits were applauded by the highest dignitaries of the church, and by the most eminent of his contemporaries. Edmund Burke spent the last two days of his life in reading it, and sent a particular message of thanks to Mr. Wilberforce for having written it. He had also during this period exerted himself to establish a national church in India, and led the way to the appointment of Indian bishoprics. The Church Missionary Society and other religious and benevolent associations were likewise indebted to him for his zealous aid.

He had represented Yorkshire during the whole of that portion of his parliamentary career which ended in the abolition of the slave-trade. Five times he was elected without a contest, and his sixth election tested the affection of his constituents even more than their previous unanimity. Immense subscriptions were immediately raised to defend him against his wealthy opponents, and such was the zeal of the freeholders in his favour, that while the joint expenses of Lord Milton and Mr. Lascelles amounted to 200,000*l*., the whole charge of bringing to the poll his
large majority did not exceed 28,600*l*. At length wh
a dissolution was expected in 1812, he determined to
sign his seat for the county, although no contest was
be apprehended. Among the chief causes which led
this determination were the great pressure upon his ti
and strength, in attending to the business of so large a co
stituency, and the desire of watching over the education
his children.

In 1797 he had married Barbara Ann, eldest daugh
of J. Spooner, Esq., by whom he had a family of
children, the eldest at this time 14 years old. Tho
unable to discharge to his own satisfaction the duties o
member for Yorkshire, he was unwilling to retire from par
ment, and accepted a seat for the borough of Bramb
His activity in his new position appears to have b
as unremitting as before. His chief care was to ind
foreign powers to follow the example of England
abolishing the slave-trade. He overlooked no opportu
for furthering this object. The restoration of the Bo
bons in France, the visit of the allied sovereigns
this country, and the congress of Vienna, especia
were seized upon by him, as favourable occasions
enforcing upon European governments the abolition
the slave-trade. In personal interviews and correspo
ence he laboured to implant his principles in the m
influential minds of Europe. The emperor Alexander,
king of Prussia, Talleyrand, the Duke of Wellington,
Lord Castlereagh, were all in turn solicited, exhorted
instructed. Even the pope did not escape his vigilan
whose influence he endeavoured to secure in condemnat
of the slave-trade.

Up to 1822 his public exertions had been confined to
universal extinction of the slave-trade, but his views of
ultimate abolition of slavery itself had not been withh
and were now more distinctly declared. His declin
health however precluded him from devoting the sa
labour to this cause that he had given to the former.
entrusted its management in the House of Commons to
Fowell Buxton, and in 1825 retired from parliament, a
having spent 46 years in public life. He spent the rem
der of his days in comparative retirement,—an affection
cheerful, benevolent, and devout old man,—devoting, a
had done through life, much of his time and from one-th
to a fourth of his income in acts of private charity. Fa
bereavements and loss of fortune were borne with p
resignation, and his last days were cheered by the abol
of slavery. He died in Cadogan Place, when nearly
years old, on Monday, July 29th, 1833; and at the very
sitting of the House of Commons on the preceding Frid
the Bill for the abolition of slavery was read a second ti
'Thank God,' he exclaimed, 'that I should have lived
witness a day in which England is willing to give twen
millions sterling for the abolition of slavery.' He was bu
in Westminster Abbey, with all the honours of a publ
funeral, and a statue by Joseph is there erected to
memory.

(*Life of William Wilberforce*, by his Sons; *Parliam
ary History and Debates; Annual Register*, 1834; *Ed
burgh Review*, No. CXXXV.)

WILBRORD, or WILLIBROD, SAINT, commo
characterised as 'The Apostle of the Frisians,' was a nat
of the Saxon kingdom of Northumbria, where he was b
about the year 657. His father's name was Widgils.
was placed, while still a child, under the charge of the
mates of Wilfred's monastery at Ripon, and he remain
there till the time when he received the tonsure, which
appears to have done before he reached his twentieth ye
At that age, he visited Ireland, and attached himself to
ministrations of Egbert and Wigbert, two members of
Anglo-Irish Church. The latter of these had been
Friesland, and had there preached Christianity two ye
in vain. Wilbrord remained for thirteen years in Irela
and then resolved to attempt the conversion which h
baffled his preceptor. He departed in the year 690, taki
with him attendants or disciples to the number of twel
as Bede and Alcuin say, though Mr. Wright states th
number at eleven. They entered the Rhine and procee
to Traject or Utrecht. Pepin had then just gained a v
tory over the Frisians, and the conqueror gave the apo
a warm welcome. The latter resolved to add to the
fluence of the monarch that of the pope, and with this vi
he visited Rome in 692. Three years afterwards he ma
a second visit to the head of the church, and, receiving

pall from the hand of Pope Sergius I., he returned with the title of bishop over the converts attached to his church at St. Cecilia, and with the ecclesiastical name of Clemens. He established his episcopal chair at Utrecht, where he built a church dedicated to St. Saviour, and restored one dedicated to St. Martin. A few years after these events Wilbrord made a proselytising tour through the territories in the vicinity of his diocese. He reached the country of the Danes, where, though Ongend their ruler resisted all his influence, he made several converts. Proceeding by sea, he reached an island called Fositisland, supposed to be the same which is now called Heligoland. Its antient name was given to it from that of an idol to whose worship it was sacred. The animals that lived upon the island were considered as consecrated, and were not to be used as human food, while the water of its fountains had a like hallowed character. Wilbrord appeased the hunger of his followers with the flesh of the sacred animals, and baptising converts in the holy fountains, roused the wrath of the heathen Frisians and their chief, who subjected him to an ordeal, or lottery, which constituted a form of trial for the indication of those who should be justly punished. The result of the ordeal was, it seems, miraculously in favour of the apostle; but though it occasioned his honourable acquittal, it does not appear to have increased the number of his converts.

In 714, the death of Pepin restored within Wilbrord's own diocese the authority of the same Pagan monarch, Radbod, who had subjected him to the above ordeal, and the people appear to have rapidly lapsed into heathenism. The successes of Charles Martel re-established the bishop in his influence, but the lapse of only two years seems to have given him a great portion of his proselytising labours to do over again. With the assistance of the missionary Wulframn, he brought the stubborn and again defeated monarch Radbod so close to the point of conversion, that he had come to the holy font and put one foot in the water, when he started the question whether there were a greater number of Frieslanders in heaven or in hell. On being incautiously told that all the unbaptised kings and nobles who had preceded him were in the latter place, he withdrew his foot, saying he would prefer going to the place where he would meet his ancestors, to that which might only happen to be peopled by some of his descendants. Continuing his missionary exertions under the patronage of Charles Martel, Wilbrord made a narrow escape, attributed to miracle, from death at the hands of the priest of an idol which he had destroyed, on the island of Walcheren. He founded the monastery of Epternach near Treves: at what time seems not clearly ascertainable. He there died and was buried, in 738, in his eighty-first year. His day in the calendar is the 7th November.

(Beda, *Hist. Eccles.* lib. v., chap. xi., xii.; Mabillion, *Annales Ord. S. Bened.* lib. xviii.; Wright, *Biog. Brit. Lit., Anglo-Saxon Period*, 250-262.)

WILBYE, JOHN. Of this admirable composer, who is unquestionably one of the brightest ornaments of the English school of music, all that is known, his works excepted, is, that in 1598 he was a teacher of music, and dwelt in Austin Friars. (Hawkins, iii., 387.) In that year he published a set of 'Madrigals, to three, four, five, and six Voices,' and a second book of the same in 1609. These include some of the most lovely, and at the same time the most scientific compositions that, in this department, the art ever produced. Among them are, 'Flora gave me fairest flowers,' 'Ladye, when I behold the roses sprouting,' 'Sweet honey-sucking bees,' 'Down in a valley,' and 'Stay, Corydon, thou swain;' but only the second of these is mentioned by Sir John Hawkins, though an active member of the Madrigal Society; and but two—the first and second of the above named—by the other musical historian, Dr. Burney. Mr. Warren (afterwards Warren Horne), the original secretary to the Catch Club, published, about sixty years ago, fourteen madrigals for three voices, selected from Wilbye's two sets: these include 'As fair as morn,' and 'Fly, love, to heaven,' with others of great merit. Recently the Society of Musical Antiquarians have reprinted in a very handsome manner his first set of madrigals, and the second is promised from the same quarter.

WILD DUCK. [Ducks, vol. ix., p. 182.]

WILD GOOSE. [Goose, vol. xi., p. 306.]

WILD SWAN. [Swans.]

WILD, HENRY, known as the learned tailor, or the Arabian tailor, was a native of the city of Norwich, where he was born about the year 1684, and where he received the usual elementary education in Greek and Latin at the grammar-school; on being taken from which, however, he was bound apprentice to a tailor, with whom he is said to have served seven years in that capacity, and then to have worked seven more as a journeyman. Long before the end of the fourteen years his Greek and Latin had probably been nearly altogether forgotten; but he was now seized with an illness, which at last obliged him to give up working, and in this state he took to reading as an occupation for his idle hours. The books which fell into his hands, or which he was either by accident or taste led to read, were some old works of controversial divinity; and the quotations from the Scriptures in the original Hebrew, with which they happened to be interspersed, are said to have first excited him to an attempt to make himself master of that language. In prosecuting this object he by degrees recovered his Latin, thus enabling himself after some time to exchange his English Hebrew lexicon and grammar for better works of that kind written in Latin; and, what was of still more importance, in the course of his studies he also recovered his health, and was enabled to resume his trade. But he did not upon this lay aside his books: he worked part of the day, and devoted the rest, and often also a portion of the night, to study, so that he gradually made himself acquainted with others of the Oriental languages as well as the Hebrew. In March, 1714, he is mentioned as having within the preceding seven years mastered Latin, Greek, Hebrew, Chaldaic, Syriac, Arabic, and Persian. This statement, which is given in a letter from Dr. Turner of Norwich to Dr. Charlett, written at the time, and published in the 'Letters by Eminent Persons' (edited by Dr. Bliss), 3 vols. 8vo., 1811, is, it may be observed, not very easily reconcileable with the common story of his having worked fourteen years as a tailor before he took to study: it would at least require that we should suppose him to have left the grammar-school and been apprenticed before he was nine years of age, instead of when he was 'almost qualified for the university,' as the common accounts say. This letter of Dr. Turner's too, in which he is spoken of as then about thirty years of age, is the authority for the date assigned to his birth. It is clear that either the time he is made to have been at school, or that assigned to the part of his life which was subsequently spent without study, must be shortened. It appears to have been shortly before the date of Dr. Turner's letter that Wild was discovered by the learned Dr. Prideaux, then dean of Norwich, who, upon inquiring one day after some Arabic manuscripts, which a bookseller of the place had some time previous offered to him and which he had then declined to purchase, learned to his alarm that they had since been bought by a tailor; Wild was instantly sent for, and the dean was not only soon relieved from his apprehension that the precious parchments had been cut down for measures, but was astonished by the tailor telling him that he had bought them to read, and proving that he could do so on the spot. A subscription was soon after raised to rescue him from the necessity of labouring with his hands, which really does not seem to have been his proper vocation: 'He is very poor,' writes Dr. Turner in his letter, 'and his landlord lately seized a polyglot Bible (which he had made shift to purchase) for rent:'—a proof that he had hardly been able to make bread by his partial application to his trade of a tailor. Eventually he was taken into the Bodleian Library at Oxford, and employed in translating and making extracts of Oriental manuscripts; and he also added something to his means of subsistence by taking pupils in the Oriental tongues. He did not meet with much encouragement however in the latter line. About the year 1720 he left Oxford and came to London, where he is believed to have spent the rest of his days under the patronage of Dr. Mead. The date of his death is unknown; but he is supposed to have been dead before 1734, in which year was published a translation by him of an Arabic legend entitled 'Mahomet's Journey to Heaven,' his only literary production that ever found its way to the press. This self-taught scholar is said to have been a very inoffensive and amiable man.

WILDENS, JOHAN, a celebrated Flemish landscape painter, born at Antwerp. He was the contemporary of

Rubens, to many of whose pictures he painted landscape backgrounds, which he knew how to harmonise with the style and colouring of Rubens better than any other landscape painter. Rubens is said to have preferred the works of Wildens to those of Van Uden, whom he employed in the same way. Wildens painted large and small pictures, in some of which there are some good figures painted by himself; but in his best works the figures are painted by other masters. He painted twelve very clever and characteristic pictures of the twelve months, which have been engraved. He died in 1644: the year of his birth is not known; 1584 and 1600 are both given by different writers. (Houbraken; Descamps; &c.)

WILFORD, FRANCIS (Lieut.-Col.), known as an Oriental scholar by numerous contributions to the 'Asiatic Researches,' went out to India, in 1781, as lieutenant of some troops which were sent from Hanover, his native country, to reinforce the British troops of the line. Soon after the peace of Mangalore, in 1784, Wilford was stationed at Russapugla, where he devoted some of the time which was not occupied by his professional duties to the elucidation of Hindu antiquities by means of whatever notices he could find concerning them in Greek and Latin authors: he found however great difficulties from a total ignorance of the Oriental languages; and in his first essay, which was published in the 'Asiatic Researches' (1787), he complains of having no time to study languages. A few years afterwards he was stationed at Benares, the centre of Hindu learning, where he engaged a Pandit to instruct him in the sacred dialect, and more especially to point out to him those passages from the Vedas and Purân'as which in some measure related to the West. The first fruit of his investigation was an essay on 'Egypt and the Nile, from the antient books of the Hindus' (1792). It is needless to say that the Pandit had forged authorities to suit the fancies of his unsuspecting employer; yet so skilful were these forgeries, that even the judicious Sir W. Jones was imposed upon by them. Wilford himself describes how the imposture was carried on, in the following manner:—'I directed my Pandit to make extracts from all the Purân'as and other books relating to my inquiries, and to arrange them under proper heads. I gave him a proper establishment of assistants and writers, and I requested him to procure another Pandit to assist me in my studies; and I obtained, for his further encouragement, a place for him in the college at Benares. At the same time I amused myself with unfolding to him our antient mythology, history, and geography. This was absolutely necessary, as a clue to guide him through so immense an undertaking, and I had full confidence in him.' That is, Wilford wished to know whether there had been any connection between Egypt and India; and the Brahman immediately substituted the word *Egypt* for the name of any other country mentioned in the Purân'as. We have thought it worth while giving the above extract, for it now renders it entirely unnecessary to give a detailed account of his works, which we shall mention, with a warning to our readers not to trust even those which he wrote after discovering the imposture in 1804. This circumstance greatly disturbed his peace of mind, and brought on paroxysms, which threatened the most serious consequences to his then infirm state of health. He was an original member of the Asiatic Society, and associé étranger of the Institut de France (Académie des Inscriptions et Belles Lettres), and died at Benares, on the 4th September, 1822. The following is a list of his essays, which show great zeal for his subject, but an utter want of sound judgment. They are all inserted in the 'Asiatic Researches:'—1, 'Remarks on the Town of Tagara,' i., p. 369 (1787); 2, 'On Egypt and the Nile, &c.,' iii., 295 (1792); 3, 'Dissertation on Semiramis,' iv., 363; 4, 'An Account of some antient Inscriptions,' v., 135; 5, 'On the Chronology of the Hindus,' v., 247 (1797); 6, 'Remarks on the names of the Cabirian Deities,' v., 297; 7, 'On Mount Caucasus,' vi., 455 (1799); 8, 'Essays on the Sacred Isles of the West,' ix., 32; x., 27; xi., 11 (1805-10); 9, 'Chronology of the Kings of Mâgadha,' ix., 82; 10, 'Æras of Vikramâditya and Salivâhana,' ix., 117; 11, 'On the Antient Geography of India,' xiv. (1822).

WILFRED, SAINT, a Saxon bishop, one of the principal instruments by which the papal authority was extended to Britain. He was descended of a noble family of Bernicia, where he is said to have been born in the year 634. He was taught the use of arms and the other accomplishments of a Saxon noble. At the age of thirteen he lost his mother, and became subject to the authority of an unkind step-mother, from which he was relieved by being received into Queen Eanfleda's household. While only in his fourteenth year he was directed by the queen to be an attendant on an aged Saxon noble named Cudda, who had resolved to spend the remainder of his days as patron of a small monastery in Lindisfarne. It is said that Wilfred here devoted himself to theological reading, in the course of which he discovered the difference between the practice of the Scottish church and that of the rest of the Christian world as to the observance of Easter, and conceived the design of visiting Rome, that he might obtain a satisfactory solution of the difficulty. In the year 653, when nineteen years old, he proceeded on this journey, accompanied by Benedict Biscop, who afterwards enjoyed a celebrity much resembling his own, and with recommendations from the courts of Bernicia and Kent. At Rome, where he remained for several months, he received special instruction on the subject as to which he had undertaken the journey, and on theological matters of more serious importance, from Archdeacon Boniface, by whom he was brought under the notice of the pope. In passing through Lyon he had secured the friendship of a powerful French prelate, Archbishop Delfinus, with whom he lived for three years on his return. Delfinus seems to have intended to establish his young friend's fortunes in France; but evil days came upon himself in the fall of the Merovingian dynasty. He was put to death by Elvenius, mayor of the palace, and Wilfred narrowly escaped from sharing in his fate. Returning from the centre of ecclesiastical learning and authority, Wilfred naturally obtained a high influence among the Saxon Christians, lay and ecclesiastical. From Alchfrid, king of Northumbria, he obtained a grant of land and a monastery at Ripon, within which, in 664, he was ordained a priest by Agilberct, bishop of the West Saxons. The ceremony was performed in time to give him a voice in the celebrated conference of Streaneshalch, or Whitby, where the Easter question and that of the tonsure were solemnly discussed. The Scoto-Irish clergy having so far diverged from the commonly received interpretation of the decision of the Council of Nice regarding the time of Easter as to solemnize it on the day of the full moon when that day fell upon a Sunday, instead of waiting till the ensuing Monday, and having also adopted a peculiar practice in the tonsure, or shaving of the head, the king of Northumbria, whose dominions were under the spiritual jurisdiction of the Scottish bishops of Lindisfarne, was desirous that his clergy should conform to the practice of the rest of Christendom, or justify their divergence by authority. The conference was held at the monastery of Whitby, at the commencement of the year 664. His own practice was vindicated by Colman, bishop of Lindisfarne, on the example of St. Columba; but Wilfred adduced the higher authority of St. Peter, and the king decided in his favour, on the ground that if he refused to obey the decision of St. Peter, he might find on his arrival at the gates of Heaven that they were locked against him. The jurisdiction of the Scottish bishops within Northumbria arose from the circumstance of the see of York having been left vacant. The king determined to fill the see, and his choice naturally fell on Wilfred. He saw difficulties in the way of being canonically consecrated in Britain, and proceeding to France, the ceremony was performed with much pomp by the same Agilberct who had ordained him priest, and who had become bishop of Paris. The ship in which he returned was driven by a storm on the coast [illegible] Sussex, where he and his followers narrowly escaped being plundered and enslaved by the barbarous and unconverted inhabitants. In the meantime the influence of the Scoto-Irish and British party in the church had got one of their own number, Ceadda, placed in the chair of York. Three years elapsed before Wilfred could get his claim enforced; but the arrival of the learned Theodore from Rome, his elevation to the archiepiscopal see of Canterbury decided the contest in favour of the Roman party in Wilfred, in possession of a bishopric, soon showed the ambition and priestly pride of his character by enlarging [illegible] power of the church and surrounding his own person [illegible] pomp and state. He exhibited within the narrow [illegible] which Christianity then filled in England the same features of character which Hildebrand and Becket displayed

ıcale. He carried on a bold contest for superiority
ide of the ecclesiastical against the kingly power,
them but imperfectly developed, and depending
r extent very much on the personal character of the
ıals who might wield them. He appears not to
en luxurious or sensual in his own personal habits;
lived magnificently, kept a great table, and was
ded by a body of attendants, which vied in number
endour with the king's court. He was the first
of ecclesiastical architecture in England. Rome
other continental cities he had visited naturally
is mind with magnificent conceptions, which he
ed in the embellishments of the cathedral church
; covering the roof with lead, and filling the win-
th glass. He built a church at Ripon of hewn
which the great size and the columns and porticoes
ubject of admiration by the ecclesiastical annalists;
ther at Hexham, which was called the finest eccle-
edifice on the western side of the Alps. He seems
ave disdained to exercise the influence of his order
domestic circle of Ecgrid, who had succeeded to
thumbrian dominions. He had a great influence
eldrytha, the queen, whom he persuaded to retire
nery. Either by this interference or his ambition
ed the anger of the victorious Ecgfrid, who re-
break his power by dividing his bishopric into
project in which Theodore, the archbishop, con-
Refusing his assent, Wilfred was deposed. He
ed to Rome to make a personal appeal to the
nd on his way, being driven on the coast of Fries-
nained there for some time, converting the natives
ianity. The pope naturally decided in his favour;
king, instead of seconding the papal decree, com-
Vilfred to prison, whence he escaped to the wastes
c, where, in his hour of tribulation, he devoted the
of his active mind to the conversion and civiliza-
the heathen inhabitants. Caedwalla, who had
ven from his kingdom of Wessex, was aided in the
of it by Wilfred, and afterwards extended his
over Sussex. Wilfred, powerfully befriended and
d by his eminent services to Christianity, was re-
his see, and had hopes held out to him of suc-
Theodore in the primacy. The bishops however
l opposed to Wilfred as the head of the Roman
and after the death of Theodore the primacy re-
acant for two years, and was then filled by Berct-
his archbishop, soon after his accession, presided
cil held in 692, at which the old question of the
of the see of York was revived. Wilfred on this
took high ground, charging his opponents with
nd apostacy in resisting the head of the church;
as deposed and excommunicated. Wilfred again
d to Rome, where he had in his favour his zeal in
of the papal authority, and the countenance of
patron Boniface. He remained some years at
nd did not reach England on his return till 705.
ority he brought with him overawed his oppo-
ut age and decrepitude seem to have quenched
tion, and he neither sought the primacy nor a res-
to his see of York. He died at his monastery at
n 709, and his body was conveyed to Ripon, where
terred.

us, *Vita Wilfridi*, apud Gale, *Historiæ Britan-*
Scriptores, i. 40-90; Wright, *Biographia Britan-*
eraria, Anglo-Saxon period, 164-184.)

IELMSTADT, a strongly fortified town in the
of the Netherlands, in the province of North
; founded by William I., prince of Orange, in 1583.
ated in 51° 42′ N. lat. and 4° 26′ E. long., on an
he sea called the Hollands Diep, and has a good
The population is about 1600 inhabitants. (Stein,
Lexicon; Hassel, *Handbuch*.)

KES, JOHN, was born at Clerkenwell, October 17th,
His father, a distiller in that place, gave him a
ducation; for after he had spent several years at
Hertford and in Buckinghamshire, he was sent,
rivate tutor, to the university of Leyden. Wilkes
eglect the opportunities afforded him, but evinced
life considerable scholarship and taste for classical
and polite learning. He translated parts of Ana-
nd printed handsome editions of the Characters
hrastus and of the poems of Catullus. His man-
re elegant, and his conversation pleasing and

witty. At an early age his accomplishments secured him many friends of rank and influence, amongst whom may be mentioned Lord Temple, and Mr. Pitt, afterwards Lord Chatham. His devotion to literature and the society of eminent men did not secure his youth from vicious excesses. He was notorious for his dissipation and extravagance, and at an early age was embarrassed in fortune and tainted in character. In 1749 he married Miss Mead, of a Buckinghamshire family, but that lady was ten years older than himself, and their dispositions were by no means suitable. They continued to live together for some time, and a daughter was born of their marriage; but at length his excesses and mutual disagreement led to a separation. This was followed by a lawsuit concerning his wife's annuity, in which his character was exposed to much obloquy. His vices however were not destined to ruin him. Neither his character nor his talents would have raised him to political eminence; but the impolitic and illegal measures of his opponents made him the idol of the people.

The first appearance of Wilkes in public was in April, 1754, when he addressed the electors of Berwick-upon-Tweed with a view of becoming their representative in parliament. He did not however succeed in obtaining a seat in the House of Commons until 1757, when he was returned for the borough of Aylesbury, for which place he was re-elected in the next parliament, in 1761. In March, 1762, he published a very successful pamphlet, being 'Observations on the Papers relative to the Rupture with Spain, laid before both Houses of Parliament on Friday, January 29, 1762.' It did not appear with his name, and Wilkes slily shifted the authorship upon others. In June of the same year he commenced the publication of his celebrated newspaper, the 'North Briton,' which he undertook in opposition to 'The Briton,' a paper written in defence of Lord Bute's administration. The unpopularity of Lord Bute was already very great, but the 'North Briton' increased it to an alarming extent, by stirring appeals to the passions and to national prejudices. The minister quailed before the clamour with which he was universally assailed, and withdrew from public affairs; but his known influence with the king, and the political complexion of the ministers under Mr. George Grenville, his successor, led to the belief that he still enjoyed a secret control over the national councils. Wilkes, with the assistance, it is said, of Charles Churchill and Lord Temple, continued his attacks upon the ministry with unabated activity. The government were watching an opportunity of punishing their mischievous opponent, and at length struck a blow which recoiled upon themselves. In No. 45 of his paper he charged the king with having uttered a falsehood in his speech from the throne; upon which a *general warrant* was issued by Lord Halifax, one of the principal secretaries of state, commanding the apprehension of the authors, printers, and publishers of the 'North Briton,' as a seditious and treasonable paper. By virtue of this warrant the house of Wilkes was entered by three king's messengers, his papers were searched, and he himself was seized and committed to the Tower. In a few days he was brought, by *habeas corpus*, before the Court of Common Pleas, and discharged out of custody on account of his privilege as a member of the House of Commons. An information however was immediately exhibited against him by the attorney-general, to which he declined to appear. He was, at the same time, dismissed from his command in the militia, and his friend, Lord Temple, was deprived of his office of lord-lieutenant of Buckinghamshire.

On the meeting of parliament in November (1763), the House of Commons were acquainted, by a message from the king, with the proceedings that had been taken against their member, and a copy of the obnoxious number of the 'North Briton' was laid before them. They immediately resolved that the paper was 'a false, scandalous, and seditious libel,' and ordered it to be burnt by the hands of the common hangman. When the sheriffs of London proceeded to execute this sentence at the Royal Exchange they were insulted by the mob, and a riot ensued, the first of many tumults in the cause of Mr. Wilkes. That which had been intended as a disgrace and punishment to Mr. Wilkes was the commencement of a series of triumphs over the ministers and the parliament. The people had regarded his imprisonment by a general warrant as illegal and oppressive, and his paper, though adjudged libellous in higher quarters, was read by them with enthusiasm, and its author greeted everywhere with the loudest applause. On his liberation from the Tower, Wilkes had brought an action against the under-secretary of state for the seizure of his papers; and the cause now coming on for trial, he obtained a verdict in his favour, with 1000*l.* damages. On this occasion Chief Justice Pratt, afterwards Lord Camden, declared general warrants to be 'unconstitutional, illegal, and absolutely void.' [WARRANT.]

Meanwhile Wilkes had been called upon by the House of Commons to answer the charge of being the author of the libel, but excused himself on account of a wound which he had received in a duel. He shortly afterwards withdrew into France, whence he forwarded to the Speaker a certificate of his ill-health and inability to attend. The House disregarded his excuse, proceeded in his absence to inquire into the authorship of the 'North Briton,' and having proved Mr. Wilkes to be the author, expelled him the house, on the 19th January, 1764. On the 21st February he was convicted in the Court of King's Bench, of re-publishing No. 45 of the 'North Briton,' and of printing and publishing an 'Essay on Woman.' The latter was an obscene poem of which he had printed only 12 copies, and one of them had been surreptitiously obtained through a printer who had been employed at his private press. By convicting him of immorality the ministers hoped to lower the enthusiasm of the people in his favour; but the means to which they had resorted in obtaining possession of the book, increased the indignation against the government, and the sympathy for the victim of ministerial persecution.

Wilkes remained abroad, and not appearing to receive the judgment of the court, he was outlawed. He travelled on the continent for some years, but did not lose sight of his interests at home. He solicited pardon for the past, and employment or a pension for the future, and it is said that he obtained a pension of 1040*l.* a year from the Rockingham administration, paid out of their own salaries, viz. from the first lord of the treasury 300*l.*, from the lords of the treasury 60*l.* each, from the lords of trade 40*l.* each, &c. (*Letter of Mr. Horne*, in *Junius*, ii, 204.) He also published at Paris, in 1767, 'A Collection of the genuine Papers, Letters, &c., in the case of J. Wilkes, late Member for Aylesbury,' by which he hoped to keep alive the public interest in his favour. In 1768 he returned to England, and in March of that year offered himself as a candidate for the representation of the City of London. He succeeded in polling 1247 votes, but in spite of the violent attachment of the populace, he failed in obtaining a majority. He then declared himself a candidate for the county of Middlesex, and on the 28th was returned by a large majority. Serious riots occurred at both these elections, and the court party declared that the City, and even the king's palace, were in danger. Although an outlawry was hanging over his head, Wilkes was imprudently allowed to be at liberty all this time, and to appear on the hustings, and harangue immense mobs in London, Westminster, and Brentford. After his election he surrendered himself before the Court of King's Bench, but the court refused to commit him upon his outlawry, as moved by the attorney-general, and he was accordingly discharged. He was arrested immediately afterwards on a writ of *capias utlagatum*. A tumult arose, and as the officers were conveying him to the King's Bench prison, he was rescued by the mob. Not thinking it prudent however to take advantage of the popular zeal, he went privately to prison after the dispersion of the mob. He was still under confinement at the meeting of parliament on the 10th of May, and a mob assembled before his prison to convey him in triumph to the House of Commons. A riot ensued—the military were ordered to fire, and killed and wounded several of the rioters. The death of one person was brought in murder by the coroner's jury, and the magistrate who had given the order to fire was tried for that crime, but acquitted. This riot was distinguished by the popular party as the massacre in St. George's Fields, and formed the subject of angry complaints against the government. Mr. Wilkes's outlawry was afterwards reversed by Lord Mansfield, but judgment was pronounced upon him for his two libels, and he was sentenced to two fines of 500*l.* each, and to imprisonment for the two terms of 10 and 12 months. Not contented with his imprisonment, the ministers devised fresh means of persecution against Mr. Wilkes, which, like their previous measures, increased his popularity and diminished their own. He had contrived to obtain a copy of a letter addressed by Lord Weymouth to the chairman of the quarter-sessions at Lambeth, before the riot in St. George's Fields; in which that nobleman recommended the early and effectual employment of the military to suppress disturbances. This letter was published by Mr. Wilkes with a preface, in which he charged the secretary of state with having 'planned and determined upon the horrid massacre in St. George's Fields' three weeks before its execution. Lord Weymouth complained of this publication in the House of Lords as a breach of privilege. A complaint was addressed by the Lords to the Commons, and a conference held upon the subject. When Mr. Wilkes was brought to the bar to be heard upon a petition which he had presented, he avowed himself the publisher of Lord Weymouth's letter, and the author of the prefatory remarks; upon which the House resolved that his remarks were a scandalous and seditious libel, and, for the second time, expelled him.

A new writ was issued for Middlesex, and Mr. Wilkes was re-elected without opposition and without expense. The House resolved that this election was void by reason of the expulsion, and issued another writ. Mr. Wilkes was again chosen without a contest, when the House declared him incapable of being elected into that parliament. Notwithstanding this declaration of incapacity, he stood once more, when Mr. Dingley, his opponent, could not even obtain a nomination, and Wilkes was returned a third time without opposition. This election was likewise declared to be void, and this time a new expedient was resorted to: the government persuaded Colonel Luttrell to vacate his seat in parliament, and to oppose Mr. Wilkes in the approaching election. Mr. Wilkes was returned by an overwhelming majority, and his opponent mustered less than 300 votes, yet the House of Commons declared that Mr. Wilkes had been incapable of being elected, and that Col. Luttrell, being next on the poll, and qualified to sit in parliament, was duly elected as member for the county. This violation of the rights of election was resented not only by the freeholders of Middlesex, but by the whole country. The battle was no longer between Mr. Wilkes and the ministers, but between the whole electoral body and the parliament. In the midst of petitions, addresses, and remonstrances, the letters of Junius inflamed the people and confounded the ministers. Truly did he say to the latter, 'You have united this country against you on one grand constitutional point, on the decision of which our existence, as a free people, absolutely depends,' (Letter XI. to the Duke of Grafton.) Meanwhile the popular champion, through whose sides the constitution had been assailed, though still immured in the King's Bench prison, was receiving substantial marks of public favour. Subscriptions were opened for the payment of his fines and personal debts, and upwards of 20,000*l.* were raised for that purpose in the course of a few weeks. Presents of all kinds were also heaped upon him; plate, jewels, wine, furniture, and embroidered purses of gold. His portrait was in universal request, and was reproduced in every form of art, from the marble bust to the village sign-board.

Another legal triumph soon followed. On the reversal of his outlawry, Mr. Wilkes had proceeded with an action against Lord Halifax for false imprisonment and the seizure of his papers. In November, 1769, the cause was tried in the Common Pleas, when he obtained a verdict, with 4000*l.* damages, which were defrayed by the crown.

In the following April, Mr. Wilkes was discharged from his confinement on giving a bond for his good behaviour during 7 years. He was shortly afterwards admitted to the office of alderman for the ward of Farringdon Without, and aspired to other civic honours. He served as sheriff in 1771. In the two following years he was elected by the livery as one of the persons to be chosen lord mayor; and on his third nomination, in 1774, was chosen by the court of aldermen. On the 10th October he was again elected for the county of Middlesex, and continued in the House of Commons for many years. But his popularity had declined: to use his own words, he was 'a fire burned out;' but the comforts of the lucrative office of chamberlain of the City of London, which he obtained in 1779, were an ample compensation for the loss of popular favour.

One political triumph however was still reserved for him. In the parliaments of 1774 and 1780 he had made many unsuccessful attempts to expunge from the journals, the resolutions of the House of Commons in regard to the Middlesex elections; but at length, on the dissolution of Lord North's administration in 1782, he accomplished his object. On the 3rd May, the House voted that the resolution of the 17th February, 1769, by which he had been declared incapable of re-election, should be expunged from their journals, 'it being subversive of the rights of the whole body of the electors of the kingdom.' All the other resolutions and orders of the House concerning the Middlesex elections were also ordered to be expunged. In 1784 he was elected for the last time by the county of Middlesex; he did not offer himself again at the dissolution in 1790, but retired into private life.

In retirement he lived to be forgotten, and died December 27, 1797, at the age of 70. He was buried in Grosvenor Chapel, South Audley Street, where he directed a tablet to be placed, with this inscription:—'The Remains of John Wilkes, a friend to liberty, born at London, Oct. 17, 1727, O.S., died in this Parish.'

(*Annual Register*, 1763-1769; *Letters of Junius*, 3 vols. 8vo., 1814; *Parliamentary History*; *Journals of the House of Commons*; *Life prefixed to his Letters from* 1774 o 1796, 1804, 4 vols. 12mo.; *Correspondence of Wilkes*, by Almon, 5 vols. 8vo., 1805; *Monthly Magazine*, 1797.)

WILKIE, WILLIAM, D.D., who enjoyed among his terary friends the title of 'the Scottish Homer,' was born t Echlin in Linlithgowshire, N. B., on the 5th October, 721. His inclination for poetry was early developed, and the ninth volume of Sir John Sinclair's 'Statistical Account of Scotland' there are some verses which he is said have written at the age of ten. He entered the university of Edinburgh at the age of thirteen. Before he ad completed his academical studies, his father, a farmer ar Edinburgh, died, leaving him the current lease of his rm, and the duty of providing for three sisters. He us became a practical farmer, and, bringing his energetic d restless mind to bear on that pursuit, he astonished s neighbourhood by the variety and the theoretical character of his operations, and still more by the success with hich many of them were rewarded. In the mean time he rtially continued his studies; and having taken orders in e Church of Scotland his clerical profession and his zeal r the cultivation of potatoes procured him the title of he potato minister.' At this time he conducted three stinct occupations: he was an active farmer, frequently bouring with his own hand, he wrote epic poetry, and occasionally preached in the parish church. In 1757 published 'The Epigoniad, a Poem, in nine books.' e name was unfortunate, for it carried no associations to nder the subject recognisable. The main incident was e sacking of Thebes by the Epigonoi, or descendants of ose who had been slain at the first siege of the city. It s an attempt to produce an epic poem, and, though it owed much energy and imagination, the attempt failed. e work is now very little known, though it has been blished in some of the collections of the British Poets. he author's prophecy, in his comparison of his own oduction with those epics which have obtained permanent fame, has been fulfilled. He says, in reference to e tradition that Homer had written a lost poem on the me subject,—

> 'I now resume the strain;
> Not from proud hope and emulation vain,
> By this attempt to merit equal praise
> With worth heroic, born in happier days.
> Sooner the weed that with the spring appears,
> And in the summer's heat its blossom bears,
> But, shriv'ling at the touch of winter hoar,
> Sinks to its native earth and is no more—
> Might match the lofty oak, which long hath stood,
> From age to age, the monarch of the wood.'

At the time when the 'Epigoniad' appeared, there was intense anxiety among Scotsmen to produce rivals of l the great names in every department of literature, d as Home was to be the Shakspere, Wilkie was to be e Homer of Scotland. The English critics found much od for ridicule in the Scotticisms of the 'Epigoniad,' d Hume wrote a vindication of it, at great length, in e 'Critical Review.' A second edition of this poem was blished in 1759, accompanied by 'A Dream, in the anner of Spenser.' In 1753 Wilkie was ordained assistant d successor to the clergyman of Ratho, a parish near dinburgh. In 1759 he was chosen Professor of Natural hilosophy at St. Andrews. In 1768 he published a volume 'Moral Fables,' in verse, which suffered the fate of his epic. He died on the 10th October, 1772. He was a man of great learning. His eccentricities are the subject of many curious literary anecdotes. His manners were rude, and his habits filthy; and the contrast between these peculiarities and the stores of learning and genius which he exhibited in conversation drew from Charles Townsend the remark, 'that he had never met with a man who approached so near to the two extremes of a god and a brute as Dr. Wilkie.'

(*Life*, in Anderson's *British Poets*, vol. xi.; Mackenzie, *Account of the Life and Writings of Home*; Ritchie, *Life of Hume*, App. ii., *Works referred to*.)

WILKIE, SIR DAVID, was born at the manse of the parish of Cults, on the banks of Eden-water, in Fifeshire, on the 18th of November, 1785. He was the third son of David Wilkie, minister of Cults, and Isabella Lister, his third wife. Wilkie displayed what may be termed an innate love for drawing when quite a child: he has been heard to say that he could draw before he could read, and paint before he could spell. When seven years of age he was sent to the school of Pitlessie, near his father's house, but he learned there little or nothing. From Pitlessie he was removed in his twelfth year to the grammar-school of Kettle, of which Dr. Strachan, now bishop of Toronto, was master; but here also he paid little attention to anything except drawing. He did not remain however more than eighteen months at the latter school. It was evident to his father that young David would turn his attention to nothing but painting, a disposition which he greatly lamented, as he did not see how a livelihood was to be obtained by pursuing such a course. His grandfather on his mother's side tried to persuade him to follow the church, but his mother encouraged him to follow his own inclination; his mind was made up, and his father consented. He was accordingly sent, in 1799, to the Trustees' Academy of Edinburgh for the Encouragement of Manufactures, with some specimen drawings, and a letter of introduction from the Earl of Leven to Mr. Thompson, the secretary of the institution. This gentleman however was not satisfied with the drawings, and he refused at first to admit Wilkie, but he did so afterwards at the particular request of the Earl of Leven. John Graham was master of the academy at this time, and Sir William Allan, John Burnet, and Alexander Fraser were Wilkie's fellow-scholars. The progress Wilkie made at this time, says Sir William Allan, 'was marvellous. Everything he attempted indicated a knowledge far beyond his years; and he soon took up that position in art which he maintained to the last. He was always on the look-out for character: he frequented trystes, fairs, and market-places.' And Mr. Burnet says of him—'In that sort of drawing in which taste and knowledge are united, he was far behind others who, without a tithe of his talent, stood in the same class. Though behind in skill, he however surpassed, and that from the first, all his companions in comprehending the character of whatever he was set to draw.'

In 1803 he won the ten-guinea premium that was awarded in that year, for the best painting of Callisto in the bath of Diana, which was sold at the sale of Sir David's effects for 48*l*. 6*s*. In the same year he made the sketch of his picture of the Village Politicians. In 1804, in his nineteenth year, he left the academy and returned home. At home he painted in the same year, for Kinnear of Kinloch, his picture of Pitlessie Fair, in which he inserted about 140 figures, mostly portraits, many of which he sketched while at church, as he had no other way of procuring them. For this picture he received only 25*l*. He painted likewise at this time many portraits in small and in miniature, and the picture called the Village Recruit, which he took with him to London soon after it was finished, and exposed for sale in a shop-window at Charing-cross, and at the low price it was marked, 6*l*., it soon found a purchaser.

After he had found a lodging in No. 8, Norton-street, Wilkie lost no time in obtaining admission as a student at the Royal Academy. In a letter which he wrote to a friend shortly after his entrance into the Academy, there is a very descriptive and characteristic remark concerning the prevailing views of art among the students of that institution. He says:—'I have got acquainted with some of the students, who seem to know a good deal of the cant of criticism, and are very seldom disposed to allow anything merit that is not two hundred years old.' The young painter's first patron in London was Stodart, the pianoforte-maker, who happened to be married to a Wilkie, and had a taste for painting as well as music. He sat to Wilkie for his portrait, ordered him to paint two pictures for him, introduced him to a valuable connexion, and procured him several sitters. The Earl of Mansfield, to whom Wilkie had been introduced by Stodart, commissioned him to paint a picture from his sketch of the Village Politicians, for which Wilkie demanded fifteen guineas; but the earl merely said, 'Consult your friends about the price.' When however the picture was finished and exhibited in the Royal Academy in 1806, it excited such universal admiration, that Wilkie was advised not to sell it for less than 30 guineas. The painter accordingly demanded 30 guineas of the earl, who paid the money, but first disputed his right to make any such demand. Wilkie pleaded the earl's advice, 'consult your friends,' in justification of his proceeding. He had been offered from two other parties 100*l.* for the picture.

From this time commissions were abundant, and instead of returning to Scotland, as he had always intended, he found it necessary to establish himself in London. He received commissions from Mr. Whitbread, Lord Mulgrave, and Sir George Beaumont, who until his death proved a most sincere and valuable friend to Wilkie. The picture of the Village Politicians was painted from the 'ale caup commentators,' in the ballad of 'Will and Jean' by Macneil. As the production of a living artist it was a thing quite new to the English painters of that time, and various comments were made upon it by the Academicians. Northcote termed it the 'pauper style,' and Fuseli, when he met Wilkie after he had seen it, said—'Young man, that is a dangerous work. That picture will either prove the most happy or the most unfortunate work of your life.' It apparently proved to be the most fortunate, and although Wilkie was only twenty-one when he painted it, as a painting he never surpassed it afterwards, though in subject he produced several happier pictures. His next works were, the Blind Fiddler, for Sir George Beaumont; Alfred in the Neatherd's Cottage, for Mr. Davidson; the Card-players, for the Duke of Gloucester; and the Rent-day, for the Earl of Mulgrave: painted in 1807 and 1808. He then painted the Sick Lady, the Jew's-harp, and the Cut Finger. After these, the sketch of the Reading of the Will, the Wardrobe Ransacked, the Game-keeper, and the Ale-house Door, afterwards called the Village Festival, painted for Mr. Angerstein for 800 guineas, and now in the National Gallery: all painted in 1809, 1810, and 1811. In 1809 he was elected an Associate of the Royal Academy, and a Member in 1811.

Wilkie was naturally of a weak constitution, and his incessant application to his profession rendered necessary at this time a suspension of all exertion; and this, together with the declining state of his father's health, induced him to pay a visit to his native place, where he arrived in August in 1811. In October of the same year he returned to his easel in some new apartments at Kensington, as being the most healthy part of the metropolis.

On the 1st of May, in 1812, he opened an exhibition at 87, Pall-Mall, of all his pictures, twenty-nine in number, including sketches (some of which however were painted after the pictures), from which he expected to derive considerable profit; but although it extended his reputation, it appears to have been a very unprofitable expedient. The expense of the exhibition amounted to 414*l.* In December of this year he lost his father, and he invited his mother and sister to come to live with him in London, where he took a commodious house in Kensington, 24, Lower Phillimore Place, to receive them in. They arrived in August of 1813. In 1813 he exhibited his picture of Blindman's Buff, which he painted for the Prince Regent. The prices Wilkie now received were very different from those which he had for his early pictures. For the Letter of Introduction and the Refusal, or Duncan Gray, both small pictures, painted in 1813, he received respectively 250 and 330 guineas, yet he was not making 600*l.* a year. He returned his income, in 1813, for the income-tax, according to the average of three years, and making the necessary reduction for his house, at 500*l.*

In 1814 he went with his friend Mr. Haydon to Paris; and in a journal of his visit he makes the following remarks upon the pictures of the Louvre:—'Studied particularly the pictures of the Flemish school, among which I was especially struck with those of Ostade and Terburg, the latter of whom has risen greatly in my estimation from what I have seen here. He possessed a most perfect style of colouring, and represents his objects with a manner of handling the most beautiful and least artificial of any I ever saw. I observed to-day that a number of pictures, which did not strike at first, began to gain upon me exceedingly. The Ostades and the Rembrandts improve greatly; the Tenierses and others in that style rather lose. The picture of the Marriage at Cana, which struck me so much at first, now begins to look common, and does not bear to be dwelt upon like the other pictures painted with more care and thinking.'

After his return to London he went to the Exhibition of the Royal Academy, and made the following entry in his journal:—'July 11. To the Exhibition, which looked very odd after what I had seen in Paris: thought that a little more correctness in drawing would have done no harm.' In 1814 and 1815 he painted Distraining for Rent, the Pedlar, and the Rabbit on the Wall. The proprietors of the British Institution purchased the first for 600 guineas. In the summer of 1816 he went with Raimbach, the engraver, to Holland and Belgium. In 1816 he painted the Breakfast for the Marquis of Stafford. In 1817 he painted his only landscape, a piece called Sheep-washing. For the Breakfast the Marquis of Stafford paid him 400*l.* In 1817 also he commenced a picture for the Duke of Wellington, the Chelsea Pensioners, and another, the Penny Wedding, for the Prince Regent. In the same year he paid a visit to Scotland and Sir Walter (then Mr.) Scott, of whom and family he painted a very interesting picture; he also made at this time a sketch for his beautiful picture of the Whiskey-Still. After his return to London the authorities of Cupar sent him the freedom of the burgh. In 1818 he painted the Errand-boy, China-menders, Death of Sir Philip Sidney, all small pieces, and finished the Penny Wedding and the Whiskey-Still. For the Wedding he received 545*l.*, including frame. In 1819 he commenced the Reading of the Will, for the late King of Bavaria, which he finished in the following year, and was paid 447*l.* 10*s.* for it: it is now in the gallery of Schleissheim, and in point of character and composition is one of Wilkie's master-pieces, but is inferior to many of his works in execution. In the sale of the effects of the late king, it was purchased for the present king, Ludwig I., for the large price of 12,000 florins, or 1000*l.* In 1821 he painted his Chelsea Pensioners, which was exhibited in 1822. This picture, painted for the Duke of Wellington for 1200 guineas, is certainly Wilkie's master-piece; it is of its class the finest work that has been painted in England, and gives Wilkie rank among the most celebrated masters of the Dutch school. The colouring is sober and true, the drawing good, and the character, composition, and execution exquisite: its only bad point is the head and figure of the female to the right; but Wilkie seldom introduced females into his earlier pictures, and when he did, he generally failed. The subject of this picture is a veteran reading to some Chelsea pensioners the Gazette of the battle of Waterloo, which had been just brought by an orderly of the Marquis of Anglesey's lancers.

We have now traced Wilkie's progress, with a few exceptions, from the first to the last of those pictures upon which his future fame will rest—the Village Politicians and the Chelsea Pensioners. After the last-named picture he produced many excellent works, but it is generally allowed that he did not add anything to his reputation. Many of his later works were sufficient to have established the reputation of a good painter, but they were not sufficient even to uphold the reputation which Wilkie had acquired. He not only changed his subjects, but he changed his style of execution also. In his own peculiar style he was without a rival; in the style which he at this time adopted he had many superiors. One of the worst and earliest of these new productions was the Entrance of George IV. into Holyrood, a picture confusedly composed, flat and ill-executed, and ill-drawn. At the death of Sir Henry Raeburn, in 1823, Wilkie was appointed limner to the king in Scotland. In 1824 he lost his mother and one of his brothers, and he suffered himself so much from ill-health, that he determined upon a protracted visit to the Continent. He set out with a friend and cousin in the summer of 1825 for Paris, from whence to Switzerland and Italy; and in a letter from Rome to Collins, the academician, he makes the following excellent observation:—'From Giotto to Michael Angelo expression and sentiment seem the first thing thought of, whilst those who followed seem to have allowed technicalities to get the better of them, until, simplicity giving way to intricacy, they seemed to have painted more for the artist and the connoisseur than for the untutored apprehensions of ordinary men.'

In Italy Wilkie remained eight months. He then visited Munich, Dresden, Töplitz, Carlsbad, Prague, and Vienna, and returned for another season to Italy. At Vienna he had the honour of dining *en famille* with Prince Metternich. At Rome, on his second visit, a public dinner was given to him by the Scotch artists and amateurs, at which the Duke of Hamilton presided. During his second visit to Italy his health began to revive, and he painted three pictures at Rome. From Italy he went through the south of France, entered Spain in October, 1827, and travelled to Madrid. In Madrid he painted a picture of a Spanish Council of War, and two other Spanish subjects, one of which was the Defence of Saragossa, in which he inserted the portrait of General Palafox, the defender of the place. In the summer he left Spain, and reached Paris in June, 1828, and returned to England in the same month, after an absence of three years. In the exhibition of 1829 he had eight pictures, four Italian, three Spanish, and a portrait of the Earl of Kellie. The three Spanish and two of the Italian were purchased by George IV. In the same year he painted a portrait of the king in a Scotch dress. Some of these pictures were much admired by his friends, but less so by the public. The principal characteristics are effect of colour and light and shade, which, with breadth and facility, he appears to have now considered the proper objects of high art, and an advance beyond the truth, simplicity, and character of his earlier works; thus voluntarily enrolling himself in that class who allowed themselves to be engrossed by technicalities, and, to use his own words—'seem to have painted more for the artist and the connoisseur than for the untutored apprehensions of ordinary men.' Of this new style in a letter from Spain he speaks as follows:—'I have now, from the study of the old masters, adopted a bolder and, I think, more effective style, and one result is *rapidity*.' In other letters he speaks of his imitation of Rembrandt, Correggio, and Velazquez. After the death of Sir Thomas Lawrence, in 1830, Wilkie was appointed in his place painter in ordinary to his Majesty: he was also a candidate for the office of president of the Academy; but there was only one vote in his favour, Sir M. A. Shee being the successful candidate.

In the same year he exhibited his full-length portrait of George IV. in a Highland dress, and the king's entrance into Holyrood. In 1831 his only works in the exhibition were portraits of Lady Lyndhurst and Lord Melville. In 1832 he exhibited his celebrated picture of John Knox preaching the Reformation in St. Andrews, painted for Sir R. Peel for 1200 guineas; and a full-length of William IV. The John Knox is a work of a very high class, though a less glowing colour and a more careful execution are wanting to constitute it a work of first-rate excellence: it has been engraved in a very masterly manner by Mr. Doo. In 1833 he exhibited a portrait of the Duke of Sussex in a Highland dress. In 1834 he exhibited six pictures, of which four were portraits, among them the Duke of Wellington and Queen Adelaide. In 1835 he again exhibited six pictures, the great attraction of which was his fine picture of Christopher Columbus submitting the chart of his Voyage for the discovery of the New World to the Spanish authorities: this is a picture of much fine character, and is the most richly coloured of all Wilkie's works: three of the others were portraits. His next principal works were, Peep-o'-Day Boy, painted after a visit to Ireland; and Napoleon and the Pope in conference at Fontainebleau, exhibited in 1836. In this year he was knighted by William IV.; and he removed to a more spacious house, in Vicarage Place, Kensington. In 1837 appeared his Mary, Queen of Scots, escaping from Loch Leven; the Empress Josephine and the Fortune-teller; and the Cotter's Saturday Night. In 1838, the Queen's First Council and a portrait of O'Connell. In 1839, his large picture of Sir David Baird discovering the body of Sultan Tippoo Saib after storming Seringapatam, painted for Lady Baird for 1500 guineas, and generally considered his greatest historical effort: Mr. Burnet is now engraving it for Mr. Moon, the publisher of so many prints after Wilkie. In 1840 Wilkie exhibited eight pieces: the most striking was that of Benvenuto Cellini presenting for the approval of Pope Paul III. a silver Vase of his own workmanship. His portrait of Queen Victoria, exhibited at the same time, was generally considered a complete failure. In the autumn of 1840 Sir David set out suddenly with his friend Mr. Woodburn upon his tour to the East: various rumours were circulated as the cause of this journey, but probably none quite correct. He went by Holland and the Rhine to the south of Germany, thence to Constantinople by the Danube. At Constantinople he painted a portrait of the young Sultan, who gave him four sittings. The following is Sir David's graphic description of the first sitting:—'12th December. Drove with Mr. Pisani to the winter-palace of the Sultan; were received inside the gate, in a room where we had pipes: after waiting some time, were conducted, through a beautiful garden, to the palace, changed shoes, and were ushered up a staircase to a most splendid and comfortable room: here I put out the colours, easel, and placed chairs; and having the windows all but one darkened, stated that all was right. After a time his Imperial Majesty the Sultan arrived: his style was simple and gentlemanly, and his reception of me very gracious. On taking his seat, his Majesty addressed me a few words, which Mr. Pisani interpreted to be, that he was most happy, at the request of a distinguished artist from England, to sit for his portrait, considering that doing so might show his consideration for the Queen of Great Britain, who was so powerful an ally of Turkey. I bowed. Then being told by his Majesty to be seated, I began the head. He came and looked at it several times: I understood he remarked I was making it too little; then asked if it was to be standing. I assured him no, but sitting on the throne as Sultan, receiving people presented. At another time he said, might not the uniform with the epaulettes be seen? But I urged that for this picture the cloak of the Sultan would be better, and that the hands and sword would be seen: this seemed to please him, and I went on; and I think he thought it like and pleasing. The marshal of the household attended him, and said I had some drawings to show his Majesty. He looked them over, as I thought, with much attention and slowly—appeared pleased with that of Admiral Walker. He asked when I should come again; I said, whenever his Majesty would command. He said Monday, at the same time. He sat about an hour and a half; got the face nearly painted in; returned, both Mr. Pisani and I, highly satisfied: left the panel and colours in the room.'

On January the 12th, Wilkie and his friend left Constantinople by steam for Smyrna, where they arrived on the 14th. They left Smyrna on the 1st of February, arrived at Rhodes on the 2nd, and at Beyrout on the 9th. At this time, says Wilkie, the weather was 'remarkably fine, mild, and beautiful, like the summer in England.' They arrived at Jaffa on the 25th and at Jerusalem on the 27th of the same month, after a journey from London of six months and twelve days. Wilkie describes as follows the impression made upon him by the first sight of Jerusalem—after ascending an eminence on the road from Jaffa, he says, 'We saw—and, oh, what a sight!—the splendid walled city of Jerusalem. This struck me as unlike all other cities: it recalled the imaginations of Nicolas Poussin—a city not for every day, not for the present, but for all time.' While in the Holy Land he visited the Dead Sea, and tested its level by the barometer of Mr. J. Harvey, who had lent it to Sir David for that purpose. At Beyrout the mercury varied from 30·186 to 30·008, the thermometer at 56 and 60 on a level with the Mediterranean: on a level with the Dead Sea it rose to 31·372, the thermometer at 68; showing that the level of the latter is much below that of the Mediterranean.

On the 17th of April they left Jerusalem for Jaffa, and that place on the 8th for Damietta in Egypt, whence they started on the 22nd for Alexandria, where they put up at Waghorn's splendid hotel. At Alexandria Wilkie complained of illness; he had felt slightly unwell for the last three months. He commenced a portrait of Mehemet Ali at Alexandria, who wished the portrait for himself, and sat very patiently two hours and a half the first sitting. On the 21st of May he embarked on board the Oriental for England; on the 26th he arrived off Malta; on the 1st of June he expired, off Gibraltar, and at half-past eight in the evening of the same day his body was committed to the deep, in lat. 36° 20′ and long. 6° 42′: the burial service was performed by the Rev. James Vaughan, rector of Wroxall, near Bath. His death appears to have been hastened by imprudently indulging in fruit and iced lemonade at Malta. On the 28th of August, 1841, a meeting of the friends of Sir David Wilkie took place at the Thatched House Tavern, St. James's Street, at which Sir Robert Peel presided. The result of the meeting was, that a subscription was commenced for the purpose of erecting a suitable monument to the painter: 2000*l*. have been collected, and a statue of Sir David Wilkie, to be executed by Mr. Joseph, is to be placed in the inner hall of the National Gallery.

Wilkie was tall and of sandy complexion, with sharp eyes, was polite and mild in his manners, was a staunch lover of everything Scotch, appears to have been of no party in politics, but shows in his letters an undue respect for the high in place and the wealthy. As a painter, he was slow, and required models upon all occasions. In the fragments of a journal printed in his Life by Allan Cunningham, there are many details relating to his studies, which may be interesting to the artist; in the same work there are a series of remarks upon painting by Wilkie, which contain many sound views, and are in parts very well written.

Wilkie's works are well known by the excellent engravings of Raimbach, Burnet, Cousins, Doo, and C. Fox. A set of coloured prints in imitation of Sir David's Oriental sketches has been lately published by Graves and Warmsley, London.

To the 'Life of Wilkie' already referred to there is an appendix containing a list of all his works, with the proprietors' names, and the prices received for them by the painter. At the sale of his effects, which realised several thousand pounds, there were many unfinished works, some of which were sold at very high prices: an unfinished picture of The School sold for 750*l*.

(Allan Cunningham, *The Life of Sir David Wilkie, with his Journals, Tours, and Critical Remarks on Works of Art, and a Selection from his Correspondence*, London, 1843, 3 vols. 8vo.)

WILKINS, JOHN, Bishop of Chester in the reign of Charles II., was, according to Anthony à Wood, 'a person endowed with rare gifts,' 'a noted theologist and preacher, a curious critic in several matters, an excellent mathematician and experimentist, and one as well seen in mechanisms and new philosophy (of which he was a great promoter) as any of his time.' He was the son of Walter Wilkins, a goldsmith and citizen of Oxford, but was born at the residence of his maternal grandfather, John Dod (a nonconformist of some note, and author of several theological works, from one of which, an Exposition of the Ten Commandments, he is styled 'the Decalogist') at Fawsley, near Daventry in Northamptonshire, in the year 1614. Wilkins appears to have remained with his grandfather until he arrived at a proper age for entering a grammar-school, when his father placed him under Mr. Edward Sylvester, an Oxford schoolmaster. In Easter Term, 1627, at the age of thirteen, he was admitted a student at New Inn Hall, whence he shortly removed to Magdalen Hall, where for a short time he was under the tuition of John Tombes, the celebrated Anabaptist and opponent of Baxter. Tombes left the university while Wilkins was an under-graduate, and he did not proceed to his first degree at the usual time; but he took the degree of B.A. October 20, 1631, and that of M.A. June 11, 1634. Having then arrived at the age of twenty-one, he took orders, and became successively chaplain to William, Lord Say; George, Lord Berkeley, and Charles, Count-palatine of the Rhine, with whom he resided for a considerable time while he was in England. The skill of Wilkins in the mathematics, to which that prince was much attached, is said to have been his chief recommendation for the last-mentioned appointment, which gave him much opportunity for prosecuting his favourite studies. During this time he wrote several small treatises on mechanical philosophy. His early education had given him a strong bias towards puritanical principles, and accordingly on the breaking out of the civil war he took part with the parliament and Presbyterians, and became a party to the Solemn League and Covenant. Academical studies at the universities being much interrupted by the disturbances of that period, Wilkins assiduously promoted those meetings in London which eventually led to the formation of the Royal Society. According to Bishop Sprat and Dr. Wallis, indeed, he was the principal promoter of the meetings referred to, at which political and theological discussions were strictly avoided, while every branch of natural philosophy was made a subject of inquiry. In 1648 he was selected by a committee appointed for the reformation of the university of Oxford to fill the office of warden of Wadham College, and on the 13th of April, having taken the degree of B.D. on the preceding day, he was put in possession of the wardenship, which was rendered vacant by the ejection of the loyalist warden, Mr. John Pitt. On the 18th of December, 1649, he became D.D., and about the same time he took the required engagement of fidelity to the new commonwealth. Being unable after his removal from London to attend the philosophical meetings, he took part in the establishment of an association of similar character at Oxford, and from the year 1752, prior to which the society had met at the lodgings of Dr. Petty, to the end of his wardenship, the meetings were held in Wadham College. In or about the year 1656 Wilkins married Robina, widow of Peter French, and sister of Oliver Cromwell, from whom he obtained a dispensation for retaining his office, notwithstanding the rules of the college, which imposed celibacy on the warden. Burnet states, in his 'History of his Own Time,' that he made no other use of this alliance 'but to do good offices, and to cover the university of Oxford from the sourness of Owen and Goodwin.' In the early part of the year 1659, after the death of Oliver, Richard Cromwell appointed Wilkins master of Trinity College, Cambridge, and there also he exerted himself to increase a taste for experimental philosophy, as well as to substitute a spirit of universal benevolence for narrow party feelings. At the Restoration, in the following year, he was ejected from his mastership, and for some time he remained out of favour, both at court and with the Archbishop of Canterbury, on account of his marriage. While his fortunes were at this low ebb, Wilkins was chosen preacher to the Society of Gray's Inn, and being thus again brought to reside in London, he entered with ardour into the proceedings of the philosophical association with which he had formerly been connected, and which now assumed a more organized form. In 1662 he was presented to the rectory of St. Lawrence, Jewry, in the gift of the crown, and on the formation of the Royal Society in the following year, he became one of the council. Having obtained favour at court, he was soon promoted to the deanery of Ripon, and in 1668 to the bishopric of Chester, to which he was consecrated on the 15th of November: Dr. Tillotson, who had married his step-daughter, preached his consecration sermon. It is related that he obtained this bishopric through the interest of the Duke of Buckingham; and Walter Pope, in his Life of Seth Ward, Bishop of Salisbury, says that he had it not only without but against the consent of the Archbishop of Canterbury (Sheldon), who subsequently, after he knew him personally, declared that the prejudice which he had entertained against him was unjust. Wilkins died November 19, 1672, of a suppression of urine, which was mistaken for stone, and mistreated. He was at the time of his death at Tillotson's house in Chancery Lane, London, and he was buried in the church of St. Lawrence, Jewry. Tillotson was appointed executor to his will, which gave 400*l*. to the Royal Society and 200*l*. to Wadham College. In Bliss's edition of the 'Athenæ Oxonienses' are notices of a few other ecclesiastical preferments of Wilkins, not mentioned above.

Wilkins's opinions on ecclesiastical subjects exposed him to much animadversion; but even those who were opposed to him in opinion bear testimony to his superior talents. Wood, whose panegyric has been quoted, observes that he could not say 'that there was anything deficient in him but a constant mind and settled principles;' and other writers allude to his character in similar terms. His avowed moderation and toleration to dissenters, and his readiness to swear allegiance to the ruling power, whatever that might be, are the points most dwelt upon by those who take an unfavourable view of his character; but his benevolence does not appear to be impugned, and he is said to have possessed a courage which enabled him to stand against the current of reproaches which less kindly-disposed clergymen were ready to heap on him.

Some of Wilkins's works are exceedingly curious, although, as might be expected from the state of science in his day, they contain much that is chimerical and absurd. The principal are the following:—1, 'Discovery of a New World; or a discourse tending to prove that it is probable that there may be another habitable world in the Moon; with a discourse concerning the possibility of a passage thither.' This work, which appeared in 1638, and was several times re-printed, excited much ridicule, although but few of the fourteen propositions which the author endeavours to establish would be questioned by modern astronomers and philosophers: the last, that it is possible for some of our posterity to find out a conveyance to the other world which he supposes to exist in the moon, and if there be inhabitants there, to have commerce with them, is perhaps the only one that could be seriously opposed or called in question. Wilkins however endeavours to prove that the construction of a flying-machine of sufficient capacity for such a voyage is by no means the chimerical absurdity which most, even in the present day, would consider it. 2, 'Discourse concerning a new Planet, tending to prove that it is probable our Earth is one of the Planets,' published in 1640. These two works appeared anonymously, but were well known to be by Wilkins. 3, 'Mercury, or the Secret and Swift Messenger; showing how a man may with privacy and speed communicate his Thoughts to a Friend at any distance.' This curious volume contains notices of a great number of schemes for telegraphic communication, writing by cipher or in sympathetic inks, and other means of secret or rapid communication. One chapter, the eighteenth, is devoted to suggestions for 'a language that may consist only of tunes and musical notes, without any articulate sound.' 4, 'Mathematical Magic, or the Wonders that may be performed by Mechanical Geometry,' a singular work, the object of which is tolerably defined by its title, published in 1648. 5. In 1668 appeared, in one folio volume, printed by order of the Royal Society, an 'Essay towards a Real Character and a Philosophical Language,' a work founded upon or suggested by a treatise published a few years previously by George Dalgarno. To this is appended an 'Alphabetical Dictionary, wherein all English words, according to their various significations, are either referred to their places in the Philosophical Tables (in the Essay) or explained by such words as are in those tables.' The first four of the preceding works were reprinted in 1708, and again in 1802, in a collected form, together with an abstract of the 'Essay towards a Real Character.' Wilkins also published several theological works, of which 'Ecclesiastes, or a Discourse of the Gift of Preaching as it falls under the Rules of Art,' passed through several editions, the first having appeared in 1646. His 'Discourse concerning the Beauty of Providence, in all the Rugged Passages of it,' first published in 1649, and 'Discourse concerning the Gift of Prayer,' published in 1651, were also repeatedly reprinted. Wilkins left his papers to the care of his friend Tillotson, allowing him to use his own discretion as to publishing any of them; and in 1675 appeared a treatise 'Of the Principles and Duties of Natural Religion,' which he had left in an unfinished state. In 1682 Tillotson published a volume containing fifteen of Wilkins's sermons, and some others were published separately during his life and also after his decease.

(Wood's *Athenæ Oxonienses*, by Bliss; Burnet's *History of his Own Time; Biographia Britannica*.)

WILKINS, SIR CHARLES, Knight and K.C.H., was born in the year 1749, at Frome in Somersetshire. His father, Walter, derived his descent from an ancestor of the celebrated John Wilkins, Bishop of Chester. His mother, Mary Wray, was descended on the female side from the Byngs and St. Los of Wiltshire, and through them from Lawrence Hyde of the same county, grandfather of the lord chancellor Clarendon. One of his maternal uncles was Robert Bateman Wray [WRAY], a celebrated engraver of gems in the antique style; another Charles, from whom Mr. Wilkins derived his baptismal name, was a partner of Messrs. Hoares, the bankers, in Fleet Street. This gentleman, having received the offer of a writership on the Bengal establishment, accepted it for his nephew, who had given from his earliest years such indications of a strong and persevering mind, that Mr. Wray had no doubt of his conferring credit on the nomination.

Mr. Wilkins arrived at Calcutta in 1770, and in the course of a few years found means amidst his duties as a writer to make considerable progress in the knowledge of Arabic and Persian, as well as of some of the spoken languages of India. He effected this at a time when such studies were generally neglected, and when no part of them had yet been made compulsory. In the year 1778 he aided the efforts of the Governor-general Hastings for improving the education of the Company's servants by printing the Bengalee grammar of Halhed, who, in his preface, informs us that after having failed to obtain types of the Bengalee character from the ablest artists in London, he had had recourse to Mr. Wilkins, whose success was complete. 'This book,' Mr. Halhed observes, 'will always bear an intrinsic value from its containing as extraordinary an instance of mechanic abilities as has perhaps ever appeared. In a country so remote from all connection with European artists, Mr. Wilkins was obliged to charge himself with the various occupations of metallurgist, engraver, founder, and printer.' Mr. Hastings, in a letter to the chairman of the Court of Directors, remarks, that 'to the ingenuity of Mr. Wilkins, unaided by models for imitation or by artists for his direction, the government was indebted for its printing-office, and for the many official purposes to which it had been applied.' Lord Teignmouth also, in his 'Life of Sir William Jones,' attests, that 'the art of printing had been introduced into Bengal by the untaught skill of Mr. Wilkins, and had advanced to great perfection, and that many publications equally useful and interesting had issued from the press which he had established.'

In the same manner Mr. Wilkins formed a set of Persian types, which, as well as the Bengalee, continued to be employed for the service of the Company. As his proficiency in the native languages advanced, he became more convinced of the importance of endeavouring to make himself master of that parent dialect which he found diffused over them all, and which is the depository of the learning and science of India. He continued therefore during the remainder of his residence in that country to follow this hitherto untrodden path of science, and thus has justly obtained the title of 'the Father of Sanscrit Literature.' He was fortunate in having been the contemporary in India of Mr. Hastings and Sir William Jones, and of enjoying the intimate friendship of those distinguished men, who took the most lively interest in his literary pursuits, and whose approbation stimulated his exertions: nor can it be doubted that his knowledge of the Oriental languages, and the salutary influence which his Sanscrit learning gave him over everything connected with the Brahmins, were often eminently useful in the civil and judicial government of India. In some MS. letters of Sir William Jones's addressed to Mr. Wilkins, which are in the possession of his family, are numerous instances of Sir William's references to him in aid of his own studies in Sanscrit, as well as relating to questions connected with his judicial office. In one of these letters he says, 'You are the first European who ever understood Sanscrit.' In another, it is of the utmost importance that the stream of Hindu law should be pure, for we are entirely at the mercy of the Hindu lawyers through our ignorance of Sanscrit.'

In the year 1784 Mr. Wilkins was instrumental, in union with the same accomplished scholar, in establishing the Literary Society of Calcutta, whose publications, called 'The Asiatic Researches,' were regarded with the greatest interest by the learned of Europe. A separate work however of his own operated perhaps still more strongly to excite curiosity, and to give hopes of an ample harvest in the field of Sanscrit letters: namely, his translation of the Bhagvatgita, one of the Episodes of the Mahabhárata, or great national poem of the Hindus. This translation having been transmitted in manuscript by the governor-general to the chairman of the Court of Directors in 1785, with a recommendation that it should be published, was printed accordingly at the expense of the Company, together with the annexed letter of Mr. Hastings before alluded to, in which that enlightened statesman took occasion to communicate his views on the encouragement necessary to be given by the government of India to the cultivation of languages and science. In the year 1786 the decline of Mr. Wilkins's health, caused by the unremitted attention given to his studies and public duties, rendered necessary his return to Europe. At Bath in the following year he published an English translation of the 'Hitopadésa of Vishnu Sarma,' being the Sanscrit original of that Persian collection of fables, the French and English versions of which are known by the name of the 'Fables of Pilpay.' Not long afterwards he began to arrange the materials for a Sanscrit grammar, which he had brought with him from India; and at his residence at Hawkhurst in Kent, following the same method which he had employed at Hoogley with the Bengalee types, he formed with his own hands a set of Devanágari characters in steel, made matrices and moulds, and cast from them a fount of types. He had already printed twenty pages of the grammar, when, in May, 1796, his house was burnt to the ground, and so suddenly that although his books and manuscripts were saved, together with the greatest part of the punches and matrices, the types were lost or rendered useless. A copy of the printed pages had been sent to his friend the late William Marsden, Esq. [Marsden], and is probably the only one extant. This misfortune, added to other circumstances, prevented the resumption of his labours till the year 1806, when, soon after the formation of the East India College at Hertford, the study of Sanscrit having become one of the most desirable branches of the system of education there established, Mr. Wilkins zealously aided this object, the grammar was speedily completed, new letters were cast, and in less than two years this, the greatest of Mr. Wilkins's works, was published.

In 1801 he had been appointed librarian to the East India Company. Under his fostering care the library and museum attained a degree of importance, utility, and interest which they had not before possessed; and became an attraction to visitors both native and foreign, who, in common with those connected with India continually resorting thither, were not less gratified by the obliging attentions of the librarian, than impressed with admiration of his profound and extensive knowledge: an elegant testimony to this effect is to be found in the amusing romance of 'Hadji Baba.' In 1805 he became visitor and examiner of the students in the Oriental department both at Haileybury and at Addiscombe. These offices he held, and performed the duties of them, with scarcely any intermission, until his death, which occurred on the 13th May, 1836, within a few days of attaining his 87th year. To such a degree did he enjoy the faculties of his mind to the last, that, not many days before the short illness which preceded his decease, he made, at the request of the president of the Board of Control, a translation of a letter from the Imam of Muscat, and forwarded it to that minister. Sir Charles Wilkins was twice married, and left three daughters.

The published works of Sir Charles Wilkins, beside those already mentioned, are, a new edition of Richardson's 'Arabic and Persian Dictionary' (1806-10), and the roots of the Sanscrit language (1815). In Dalrymple's 'Oriental Repertory' are found also a translation of the Dushwarta and Sakoontala, an episode of the Mahabhárata; and in the 'Annals of Oriental Literature' another portion of a translation of the same great poem. To these may be added some papers in the early volumes of the 'Asiatic Researches.' Among his unpublished translations from the Sanscrit are 'The Institutes of Menu,' of which he had completed more than two-thirds, when he was induced to desist by the knowledge that Sir William Jones was engaged on the same work, and which the latter published in 1794. Mr. Wilkins had the honour of being a member of the Royal Institute of Paris, and of many other learned societies abroad as well as at home. In 1825 the Royal Society of Literature presented to him their gold medal, bearing the inscription 'Carolo Wilkins, Literaturæ Sanscritæ Principi.' In 1833 George IV. conferred on him the honour of knight bachelor and knight commander of the Guelphic order.

Residing generally in London, he had a large acquaintance among literary and scientific men, and formed one of that distinguished society, consisting of Rennell, Marsden, Wollaston, Young, and others of the same class, who so often assembled around the president of the Royal Society, Sir Joseph Banks; or one of that which met periodically at the club established originally by Sir Joshua Reynolds and Dr. Johnson, of which Sir Charles Wilkins was elected a member in the year 1806. His comprehensive mind was not less alive to the advances of science, the discoveries in chemistry, mechanics, and the arts, than to philology, and no man was more ready and liberal in imparting his knowledge to others.

WILKINS, WILLIAM, was born August 31, 1778, at Cambridge, where his father was a builder. In that university he received an academic education, being matriculated at Gonville and Caius College in 1796, and graduating as sixth wrangler in 1800. Having in the following year obtained a travelling bachelorship, he visited Italy and Greece; and almost immediately after his return, published his 'Antiquities of Magna Græcia,' imperial folio, 1807, a work rather unsatisfactorily executed and not containing much of particular interest to professional students, owing to which it was coldly received by architects. It was however well calculated to recommend the author to scholars and obtain for him the patronage of the university, nor did it fail to do so. In the same year (1807) he was employed as architect of Downing College, and the buildings were forthwith begun. They are still very far from being completed, nor is it much to be regretted that there is now little likelihood of the entire design being ever carried out. It is more to be regretted that Wilkins should here have thrown away a rare opportunity, and that, biassed by his previous studies, and ambitious of giving his own university a classical piece of architecture, he should have postponed all other considerations to that alone. Enamoured of the study of the Grecian style, he seems neither to have thought how far that style could be adapted to the occasion, nor how far the occasion required what the style would not admit of. Instead of endeavouring to adapt it, he merely applied it, just as he found it, to ranges of low buildings which derive their expression merely from their columns, for in other respects they are merely so many neat houses; at all events, this college shows to peculiar disadvantage at such a place as Cambridge. Neither does the building make amends in other respects for its unsatisfactoriness as a piece of architecture, the accommodation it affords being very defective, although the cost has been enormous.

In the case of the East India College at Haileybury, Herts, which he built a few years afterwards, when he held the appointment of architect to the East India Company, on the resignation of the late Mr. Cockerell, there were at least no local associations to deter him from having recourse again to 'pure Greek' architecture; but it is somewhat strange that, instead of endeavouring to improve upon his specimen at Cambridge, he should have done little more than repeat the same design. He afterwards succeeded better when he had to adopt Gothic for the additions and alterations which he executed at the three colleges of Trinity (1823), Corpus (1823), and King's (1828) at Cambridge. While he had there to work with a style every way suited to the purpose, he was also less fettered by those pedantic scruples which prevented him from treating the Grecian style with freedom, where it must either be so treated or betray its inapplicability and its incongruousness for the actual occasion.

Greater freedom he did afterwards allow himself in the façade of University College, Gower Street, originally called the University of London, where he has not scrupled to introduce a dome in combination with a Grecian portico, and to elevate the latter upon a substructure the height of the basement floor, and forming a most picturesque arrangement of flights of steps. Of all his works perhaps this is the one which obtained for him most praise from both professional men and critics; but unfortunately the wings have not yet been erected, and those parts of the exterior to which they would have been connected still remain in their first unfinished state: as to the interior, it is anything but convenient. The reputation acquired by this edifice, the only one he had then produced in the metropolis, excepting the University Club-house, Pall-Mall East, suffered greatly by the nearly universal outcry raised against his National Gallery. No doubt he had many difficulties and adverse circumstances to contend with in that work: cramped by want of space, and thwarted in various ways, he had no little vexation to encounter, and had also to sustain what appeared to be an almost systematic opposition against him on the part of the public press. Still it is difficult to conceive how he could have fallen so far short of his preceding work. Here the dome is a most unfortunate feature—offensive in outline and mean in character. Neither is the portico itself so satisfactory as might have been, had it, as in the other instance, been made to rise above the rest of the elevation; but here the architect was restricted by being obliged to make use of the columns from the portico of Carlton House, to which however he did not restore their originally rich entablature.

While the National Gallery was incurring criticism, both well meant and invidious, the architect entered into the competition for the new houses of parliament, in 1836; but his design did not obtain one of the premiums. The remarks however attached to it by its author in the descriptive catalogue of the designs were in a tone that called attention to it there, and he immediately followed them up by 'An Apology for the Designs of the New Houses of Parliament, marked "Phil-Archimedes;"' wherein he animadverted very freely, and with no little bitterness of tone, both on the successful design and the conduct of the commissioners. To annoyances and vexations of this kind succeeded an event which raised him to a more conspicuous eminence in his profession; for on the death of Sir John Soane, in 1837, he was elected to succeed him as professor of architecture at the Royal Academy, of which he had been made a member in 1834. Yet while his acquirements were of a kind to do honour to the academic chair, it may be questioned if he would have proved a very competent instructor. His 'Prolusiones Architectonicæ,' the first part of which (the only one published) appeared just at that time, 1837, did not augur well for his future lectures, being minutely archæological, and withal fanciful; such at least is the essay intended to prove, from no better data than such dimensions as are stated, that the Temple of Jerusalem was the type of the Grecian Doric order. He did not however live to deliver any lectures at the Academy, for before the term (two years) allowed to a new professor to prepare himself for them had expired, he himself was no more. His constitution had latterly been greatly impaired by gout, and he had been visibly sinking for some time. He died at Cambridge, August 31st, 1839, on his sixty-first birthday, and was interred in the chapel of Corpus Christi, a part of the new buildings at that college erected by him, and which he considered his best work.

Among other structures by him are:—the Nelson Pillar in Sackville Street, Dublin, 1808; the Nelson Pillar at Yarmouth, 1817; and St. George's Hospital, Hyde Park Corner, which is remarkable, and not unpleasingly so, for the tetrastyle portico of square columns in its east front. Donnington Castle, the seat of Earl Moira, and a house for Mr. Foljambe, at Osberton, are also both attributed to him, and published as such in Richardson's 'New Vitruvius Britannicus;' but they are rather discreditable, the first being no better than 'Strawberry Hill' Gothic, and the second a mere parody of Grecian Doric architecture. It is more probable that they were by the elder Wilkins, his father; for if by himself, they must have been designed before he went abroad.

Besides the literary works already mentioned, he published 'Atheniensia, or Remarks on the Buildings and Antiquities of Athens,' in 1816; and 'The Civil Architecture of Vitruvius, containing those books relating to the Public and Private Edifices of the Antients,' imp. 4to., 1812, o which last it was his intention to add a translation of ome of the other books; but though such translation was nnounced about two years before his death, it never apeared.

WILL. The notion of necessity has been explained in he article NECESSITY: it remains here to consider the question of the Will.

The perplexity in which this question has been involved is perhaps mainly owing to carelessness in the use of terms; nd yet, however carefully we may select and use our erms in discussing this question, it has always been found very difficult to state it clearly. Hartley puts the quesion thus:—He 'embraces the opinion of the mechanism r necessity of human actions, in opposition to what is generally termed free-will;' and he says, 'by the mechanism f human actions, I mean that each action results from the revious circumstances of body and mind, in the same manner, and with the same certainty, as other effects do rom their mechanical causes; so that a person cannot do ndifferently either of the actions *A* and its contrary *a*, while the previous circumstances are the same; but is nder an absolute necessity of doing one of them and that nly. Agreeably to this, I suppose that by free-will is meant a power of doing either the action *A* or its contrary, while the previous circumstances remain the same. f by free-will be meant a power of beginning motion, his will come to the same thing; since according to the opinion of mechanism, as here explained, man has no such power; but every action or bodily motion arises from previous circumstances, or bodily motions, already existing in the brain, *i. e.* from vibrations, which are either the immediate effect of impressions then made, or the remote compound effect of former impressions, or both. But if by free-will be meant anything different from these two definitions of it, it may not perhaps be inconsistent with the mechanism of the mind here laid down. Thus if free-will be defined the power of doing what a person desires or wills to do—of deliberating, suspending, choosing, &c.—or of resisting the motives of sensuality, ambition, resentment, &c.—free-will, under certain limitations, is not only consistent with the doctrine of mechanism, but even flows from it; since it appears, from the foregoing theory, that voluntary and semi-voluntary powers of calling up ideas, of exciting and restraining affections, and of performing and suspending actions, arise from the mechanism of our natures. This may be called free-will in the popular and practical sense, in contradistinction to that which is opposed to mechanism, and which may be called free-will in the philosophical sense.' This passage is not selected as being a peculiarly successful statement of the question, but simply because it shows with sufficient accuracy what the matter under consideration is, and that independently of the author's theory of vibrations.

The universal language and practice of mankind imply a belief in a kind of free-will. To deliberate, to choose, to determine, and to act in pursuance of such determination, are expressions in every man's mouth, and things within every man's ordinary experience, both of himself and others. Every man also supposes that another will choose and determine pretty much in the same way that he himself would under the same external circumstances; that is, each man believes that every other man will be governed by motives, or will act according to motives, in the main pretty much as he would himself. When men act differently under the same external circumstances, the cause of the difference in conduct is not referred to the circumstances, in which it is here supposed that there is no difference, but to some difference in the persons. We believe therefore that circumstances move men to act, but that we have at least a certain power of weighing these various motives and giving the preponderance to one or another, and that different men possess and exercise this power in different degrees. This may be called, in a sense, a free exercise of the will, and every man, at least who is of sound mind, believes that he has this power, and is supposed by others to have it.

The belief that man possesses this power is the foundation of laws which forbid acts under certain penalties. All legislators have believed that the knowledge that a certain punishment will follow a certain act if detected, operates in some degree on those who are disposed to do the forbidden act; that the persons who are by any motives led towards such act may, and as a general rule will, deliberate on the penalty attached to the act before they do it, and will often be prevented from doing it by a comparison of the advantage which they expect to derive from the act, with the certain penalty attached to it. Many persons do not violate the law, because they have been brought up in habits of uniform obedience to it, and therefore the penalties of the law have little or no effect upon their conduct; but it will hardly be disputed that the fear of punishment has some effect on many men, and is a motive which, operating on the mind and operated upon by the mind, produces self-restraint. The enactment of penal laws supposes a power in men to determine how they will act; or, in other words, it supposes at least that motives can be presented to men which shall in some way and in some degree determine their conduct.

That men then do act under the influence of motives, and that they have also the power of weighing motives, is universally admitted, and for all practical purposes it is immaterial to inquire any further. A man subjects himself to a certain discipline, he educates his children in a certain method, and legislators forbid men to do a variety of acts—all acting under the belief that the discipline, the education, and the rules of law are so many motives, which, by constantly operating on the mind, will produce on the whole a certain line of conduct in those who are the objects of them.

But it has been already said that the external circumstances or the motives being the same, two persons will often act differently under them. As the external motives are by the supposition the same, there is some difference in the persons which causes the difference of conduct. Under the same external circumstances one man will violate the law, and another will not: one will steal and rob, and commit murder, and another will not. It is generally said that the transgressor of the law is punished on the supposition that his act is voluntary; that he could, if he chose, have acted differently. Practically, he who executes the law will not trouble himself with the question whether a particular individual could have acted differently under the circumstances: if it is shown that such a person possessed the ordinary understanding of mankind, he will see no reason for remitting the punishment; because he believes that in most cases, if not in all, the penalty attached to a particular act will operate to deter people from doing it. The question of an absolute free-will, then, does not concern a legislator. It is enough for him to present the proper motives for acting or not acting in certain ways, if he believes that such motives will on the whole produce the conduct which he requires. Nor does the question of absolute free-will concern any other person who has to direct or operate upon others. If he believes that he can place such circumstances around persons or present to them such motives as will ensure a determinate course of action, it is unimportant whether he believes that the course of action is necessarily determined by these circumstances, or by these concurring with other circumstances, or that the persons who are under their influence do in some way or other choose and determine to act as he wishes them to act.

But if we examine more closely any particular act of a man's life, suppose it to be an act which has about it all the marks of slow deliberation, in what sense can we say that this is an act of absolute free-will? The ordinary language of mankind assumes the existence of choice—deliberation, and yet it does not permit us to maintain that any act is an act of absolute free-will. If it is a virtuous act, we do not barely ascribe it to a man's careful consideration of all the motives which at the time operated on him; we speak of his habits, his education, his character, as the things which would ensure his acting on a given occasion in a determinate way, or, if we so choose to express it, as securing that exercise of the will which is called a proper exercise. And we make the like remarks of a man who has deliberately done a bad act. In both cases we do not attribute the whole conduct of the man, nor yet the greater part of it, to his then determination. We refer to antecedent circumstances as co-operating to this determination. This is the language of all mankind, and the language of all mankind, when rightly analyzed, is the true exponent of universal opinion. Confused and perplexed as it often is, it contains within it implicitly the elements of all philosophy. Now when we once refer to antecedent circumstances as affecting our determination under the motives that are presented on any one occasion, we give up the theory of an absolute free-will, for we make every act of will depend, in some degree at least, on something prior; and that something, again, must by the like reasoning depend on something prior to it, and thus we have an infinite chain of events, and consequently we find ourselves engaged in an inquiry which is beyond the reach of our capacity. Thus if, as Hartley says, 'by free-will be meant a power of beginning motion,' no person can consistently with his own ordinary language and that of others maintain this proposition; if he does, he will contradict himself almost as often as he speaks.

Human actions, then, are, in some degree at least, subject to the same general laws to which other events are subject. Every human action has its antecedents, on which it in some degree depends; but whether every human action is as necessary, in the sense in which Hume explains the term necessary, as the other phenomena which we see, is precisely the matter in dispute. (Hume, *Essays*, 'Of Liberty and Necessity.')

When it is said that every event and every human action has its antecedent on which it depends, it must not be understood that it is meant, here at least, to maintain anything else than this. Such antecedents are events which, according to our experience, precede the given event uniformly, or at least with sufficient uniformity to generate in our minds the notion of a certain order or continuity; for though any given antecedent event is called the cause of any event which uniformly follows it in our ordinary mode of speech, we here mean to express nothing more than the fact of this uniform sequence. The utmost that we can say is, that the antecedent event is, according to the constitution of the universe as known to us, a necessary condition to the subsequent event. Neither heat, nor moisture, nor anything else that we can name, is the cause or a cause of a seed vegetating and producing a plant like that from which it came. Heat and other things are conditions of vegetation as known to us. The efficient cause can only be one, which must be perpetual, and beyond which we seek for no other. This efficient cause is no law of nature, a term which is incapable of all strict analysis. It is the will of God, to those who admit the existence and omnipotence of the Deity. To those who do not, if there be such, it is something which has never yet been explained.

Now as all human actions have their antecedents, without which, according to our experience, they could not be, it follows that there are certain antecedents of every action which are its conditions, without which such action would never be. This cannot be denied. It is the ordinary language of mankind expressed in a different form. But still it is perfectly consistent with this to speak of man exercising his will, that is, operating on the motives which are presented to him. On any given occasion man is subjected to various momenta, and it may be admitted that each man will be directed by that which to him at the time is the strongest. But if a power of estimating different motives be admitted to exist in the mind, and to exist in different men in different degrees, the strength of the motive is not its own strength acting on the passive mind; it is the activity of the mind which according to its power comprehends the motive completely or incompletely.

If the analogy is sound between human actions and other phenomena, and if in other phenomena the antecedents or conditions are not causes, so neither are the antecedents or conditions of human actions to be viewed as their causes. Man is constantly subjected to various momenta, motives, or circumstances, as they are often called, without which he would not act as he does act. These momenta are traced back by an infinite series to the first cause of all, just as in the bare physical phenomena, if we trace them far enough, we must ascend to a first cause. If the analogy then is complete between man's acts and other phenomena, the operation of all these complicated conditions in some way determines the acts of man; but how it determines them, we cannot tell. There is no person who maintains the doctrine of absolute free-will who will contend that man can set his will in opposition to that of God. It is possible to conceive that God does will to let man have free action within certain limits, but not further; and all our forms of speech do either expressly or by implication admit that our will is free to a certain extent, which we cannot exactly define, but that it is not absolutely free. It may be objected that to deny an absolute free-will destroys the distinction between actions; that it represents the Deity as the cause of vice and misery. But even if it should be so, that will not prove a thing to be false which is established by the sound exercise of our understanding. No such consequence however does follow. To God we attribute the origin of everything; and consistently with this we must say that he permits vice and misery to exist in the world. It is a consequence of man's nature as he is constituted, and under the circumstances in which he is placed, that he has acted and does act in such a way as to cause misery to himself and others.

It must therefore be assumed that God has, for reasons unknown to us, so constituted man that he does not always act in the way that is most consistent with his own happiness and the happiness of others. The vicious conduct of many men in life is an object of disapprobation to others, and in all societies that conduct which is injurious to the existence of such society is visited with penalties. Thus a vast majority of mankind see that certain acts are injurious to the general happiness, and it is one main object of society to prevent such acts. As God permits society to exist, we may assume that he wills it to exist, and that he wills generally the means by which society attempts to secure its own existence. It is a consequence of this that he disapproves of the conduct of those whose acts endanger the existence of society. We cannot say that he does not will it: it exists, and therefore is consistent with his general will. We are compelled therefore to apply to him by analogy such terms as are applicable only to our own limited capacities: and we say that he wills generally that all things shall be as they are, but that he disapproves of some. That he permits man so much liberty of action as to render it necessary for society to be vigilant against the evil doers who would disturb its repose, is no more an imputation upon his goodness than that he permits fire, tempest, and war and pestilence and famine to thin the numbers of mankind. So far as concerns those who suffer, it is the same thing whether they suffer from the hand of man, or from causes over which man has no control. It is consistent with all experience to say that the Deity has willed that man shall suffer pain both through the agency of matter and through the agency of his fellow-men. Now if we shall assume that God only wills our happiness in the sense in which many persons understand it—which would, according to their notions, exclude all pain and suffering—whatever misery happens through man's misconduct must be against his general will, and can only result from man having an absolute free-will, and sometimes exercising it in a way different from the Deity's wishes. There is no evading this difficulty. An absolute free-will in man or in any other being is inconsistent with the omnipotence of the Deity, and it is, as already shown, contradicted by all our observation of the mode in which man is operated upon by motives and circumstances. But there is nothing which prevents us from attributing to man, as we do in our daily expressions, a power of determining his acts, under given circumstances, in one direction rather than in another, and in a wrong in preference to a right direction. And it is further admitted by the universal language of mankind, that the same man who acted wrong under one set of motives, might and would have acted right if he had been influenced by other motives; and these motives to right action, it is also admitted, may be and frequently are external circumstances over which he has no control. It is true that a man may so discipline himself, that, in any given circumstances which may arise, he may have motives at his command which shall enable him to act in the right direction, a power which Hartley speaks of in the passage at the head of this article. But if some men can do this, all cannot; and even in the case of him who can do it, we may always trace the origin of this power to some external circumstances over which he had no control. Man's will then is circumscribed by the constitution of things, of which he is a part. He is placed in circumstances in which he is operated upon by various motives to action. If it is said that he must be determined absolutely by that which is the most powerful, this is only another mode of saying that of various forces tending to make him move, the strongest will carry him in its own direction. But in truth the words force, motive, and others of the like kind, are apt to lead us to false analogies: and these terms require explanation.

Every man believes at the time when he acts with deliberation that he has a capacity for exercising a free-will. But he also knows that circumstances may prevent deliberation. Thus it is a common case for a man to allege that if he had not been alarmed or hurried, he would have acted differently; or in other words, he would have been enabled to deliberate and decide better. No man considers it to be a case where the will is properly concerned when his action is thus impeded. And there are numerous like cases in life in which in fact there is no choice or deliberation, and consequently no real exercise of the will. The power then, whatever it may be, to deliberate and act, is often suspended or not exercised. In most cases we act from habit in the general course of life; in other cases from impulse; and when we act from impulse, there is no deliberation or determinate will. It appears then that our will is not always exercised when we act, but that when it is exercised we are conscious of a capacity to weigh deliberately the various motives or grounds of action as presented by things external to ourselves and as presented by our own mental activity. Now if we say that the strongest motive thus presented must prevail and determine to action, we may, as above observed, be misled by a false analogy. The motive may be called a moving power; and if so, it must have its effect: but to deny the mind all power in itself to resist the motive, is the same thing as to consider it an inert mass operated upon solely by an external force. It is the same thing as to make the mind of man a recipient of sensuous phenomena without any power to operate on them. The systems of philosophy which view the mind as such a recipient will be consistent in making it yield to the strongest motive without an effort of its own. Those systems which assign to the mind a power of operating on impressions may consistently admit a power of determining which of them it will obey.

God the creator of the universe is omniscient. To him time past, present, and future, is one. We conceive him as knowing all things, willing all things, directing all things. But our acts of free-will then, it may be urged, are God's will, and therefore not man's. Therefore free-will in man in any sense contradicts our notion of God's power. To this we answer, that man's power to will is here considered as a fact of which our daily experience convinces us; and further, that the existence of this power is a legitimate deduction from the nature of man's mind, which is here supposed to have an activity independent of all sensuous impressions. It is admitted that if our actions are viewed in reference to the power of God, as we conceive it, we cannot reconcile our notion of the freedom of our actions with our notion of the power of God. But there is no contradiction here. Contradiction implies that the things between which it arises are equally within the cognizance of our understanding. It is no contradiction to say that God wills all men's acts, and that man wills his own. Both things may be true, though we cannot comprehend how it is so.

WILL AND TESTAMENT. Before the passing of the 32 Hen. VIII., c. 7, commonly called the Statute of Wills, and the 34 & 35 of Henry VIII., c. 5, there existed no general testamentary power over *freehold land* in England, but the power of making a will of *personal property*, including goods and chattels, and also terms for years and chattel interests in land, appears to have existed from the earliest period. It seems however that this power did not originally extend to the whole of a man's personal estate, unless he died without wife or issue, but that, as is still the case in Scotland, a man's goods were divisible into three equal parts, one of which went to his children, another to his wife, and the third was at his own disposal. If he had no wife or no children, he might then bequeath one half, and if he had neither wife nor children, the whole was disposable by will (2 Bl. *Comm.*, 492). The law however was gradually altered, in other parts of England by imperceptible degrees, and in the province of York, the principality of Wales, and in the city of London more lately by statute, so as to give a man the power of bequeathing the whole of his personal property. And now, by the 1 Vict., c. 26, for the amendment of the law with respect to wills (whereby the former statutes there enumerated with respect to wills are repealed, except so far as the same acts or any of them respectively relate to any wills or estates *pur autre vie* to which this act does not extend), it is enacted that it shall be lawful for every person to devise, bequeath, and dispose of, by his will, executed as required by that act, all real and personal estate which he shall be entitled to either at law or in equity at the time of his death. Very extensive alterations have been introduced into the law of wills by this statute; but as it does not extend to any will made before the 1st of January, 1838, it is still necessary to consider the law as it stood previous to the act.

In general all persons are capable of disposing by will of both real and personal estate who have sufficient discretion and free-will, and have not been guilty of certain offences. The power of the king to make a will is defined by the 39 & 40 Geo. III., c. 88, s. 10. By the former statute of wills, married women, persons within the age of twenty-one years, idiots and persons of insane memory, were declared incapable of making wills of real estate. These disabilities, which were all previously known to the common law, extended equally to the bequeathing of personal estate, except that infants of a certain age, namely, males of fourteen and females of twelve might dispose, by will, of personalty; and that by the 12 Car. II., c. 21, s. 8, a father under twenty-one might, by a will attested by two witnesses, appoint guardians to his children. But now, by the second section of the new Wills Act, no will made by any person under the age of twenty-one years is valid; and no will made by any married woman is now valid, except such a will as might have been made by a married woman before the passing of the new act. The disabilit of a married woman is not absolute. She may make a will of her personal property with the consent of her husband, which will be operative if he survive her. The validity of a lunatic's will depends upon the state of his mind at the time of making it. Persons born deaf and dumb are presumed to be incapable of making a will, but the presumption may be rebutted by evidence. Blindness and deafness alone do not in themselves produce incapacity. Traitors and felons are incompetent to make wills from the time of their conviction, and it seems that even an outlaw, though it be but for civil debt, is incapable of making a will of personalty till his outlawry is reversed. Devises of lands by aliens are at least voidable, the crown being entitled, after office found, to seize them in the hands of the devisee, as it might have done in those of the alien during his life.

Previously to the late act the general power of testators was subject to exceptions. Customary freeholds and copyholds were not within the Statute of Wills, and therefore, unless where devisable by special custom, could in general be passed only by means of a surrender to the use of a will. By the 55 Geo. III., c. 192, the want of a surrender was supplied in cases where it was a mere form, but the act did not apply to cases where there was no custom to surrender to the use of a will, nor to what are called customary freeholds. [Manor.] Again, a devisee or surrenderee of copyholds could not devise before admittance, though an heir-at-law might. Conditions were not devisable, nor were rights of entry or action, nor contingent interests when the person to be entitled was not ascertained: lands acquired after the execution of the will also did not pass by it; but now, by section 3 of the act, the power of disposition by will extends to all real and personal estate, and to all estates, interests, and rights whatsoever, to which the testator may be entitled at the time of his death, though acquired subsequently to the execution of his will. There is no restriction as to the persons to whom devises or bequests may be made except under the 34 Hen. VIII., which forbids devises of lands to bodies politic and corporate. Exceptions to this statute have been introduced by the 43 Eliz., c. 4, in favour of devises to charitable uses [Charitable Uses], and by the 43 Geo. III., c. 107, and 43 Geo. III., c. 108, which authorize devises of lands to the governors of Queen Anne's Bounty, and for the erection or repair of churches or chapels, the enlargement of churchyards or of the residence or glebe for ministers of the Church of England. Alienage cannot be properly called an incapacity to take by devise, as the devised lands remain in the alien till office found, when they vest in the crown. By the 9 Geo. II., c. 36, no lands or personal estate to be laid out in the purchase of or charged on land can be given to any charitable use by way of devise. [Mortmain.] By the 40 Geo. III., c. 98, no disposition of property can be made by will or otherwise, so as to accumulate the income for a longer period than for twenty-one years after the death of the settlor, or during certain minorities [Thellusson], and by what is called the rule against perpetuities, no property can be settled by deed or will so as to be inalienable for more than a life or lives in being, and twenty-one years afterwards. [Settlement.]

The law never required for the validity of a will that it should be drawn up in any particular form or be expressed in testamentary language. It is only necessary that the instrument should express the intentions of the deceased with respect to the destination of his property. Instruments in the form of deeds, agreements, bonds, letters, &c. have frequently been held to have a testamentary operation. The only essential requisite was that the instrument should be made to depend on the event of death as necessary to consummate it; for where a paper directs a benefit to be conferred *inter vivos* without reference expressly or by implication to the death of the individual conferring it, it cannot be established as testamentary. Before the late act, wills of personal estate might even be nuncupative, that is to say, might be declared by the testator without writing before witnesses, provided they were made in conformity with the directions contained in the 19th section of the Statute of Frauds (29 Car. II., c. 3). A will devising freehold lands of inheritance was required to be executed in the manner prescribed by the 5th section of the Statute of Frauds, which required it to be signed by the party devising, or by some other person in his presence and by his express direction, and to be attested and subscribed in the presence of the devisor by three or more credible witnesses. It was held that it was not necessary that the witnesses should see the testator sign, that they should be present at the same time, or know the contents of the instrument; and when the will was in the hand-writing of the testator, the occurrence of his name in any part of it was held to be a sufficient signing. The term 'credible,' which gave rise to much discussion under the old law, is omitted in the new act, and it is enacted in the 14th section that no will is to be void on account of the incompetency of any attesting witness. By the 15th section gifts to attesting witnesses or their wives or husbands are declared void. This is an extension of the 25 Geo. II., c. 26, which related only to wills then requiring the attestation of witnesses, that is to say, to wills of real estate. The words as to wives or husbands are new. The signature of the testator was not required for the validity of a will of personalty or of copyholds, whether the instrument was in his own hand-writing or in that of another. But now, by the 9th section of the act of Victoria, no will, whether of real or personal estate, is to be valid unless it be in writing, and signed at the foot or end by the testator or by some person in his presence and by his direction; and such signature must be made or acknowledged by the testator in the presence of two or more witnesses present at the same time, and such witnesses must attest and subscribe the will in the presence of the testator, but no particular form of attestation is necessary. Section 10 enacts that all appointments made by will are to be executed in the manner above prescribed, and are to be valid when so executed notwithstanding the nonobservance of any other ceremonies required by the power under which the appointment is made. By the 11th and 12th sections, it is declared that the act is not to affect the wills of soldiers on actual service or of mariners at sea, which are to remain subject to the particular provisions made respecting them by the 11 Geo. IV. and 1 Wm. IV., c. 20. Questions having sometimes arisen as to what amounted to publication of a will, section 13 expressly enacts that no other publication should be requisite than execution in the manner prescribed.

It is the rule in England, as in other countries, that a will of lands is to be governed by the law of the country where the lands are. The place where and the language in which such a will is written are unimportant, the locality of the lands being the only point to be considered. Thus a will made in France and written in French, of lands in England, must contain expressions which when translated into English would properly designate the lands in question, and must be executed according to the forms required by the English law. For the same reason lands in England belonging to an English subject domiciled abroad and dying intestate, will descend according to the English law. With respect to personalty, on the other hand, in cases both of testacy and intestacy, the law of the domicile affords the rule for the construction of the will and the distribution of the property. Thus if a British subject becomes domiciled abroad, the law of his domicile at the time of his death would be the rule which the English courts would follow in determining the validity of his will and administering his personal property in England, and *vice versâ* in the case of a foreigner dying domiciled in England. The question of domicile is one more of fact than of law, and cases sometimes arise where it is matter of difficulty to determine what was the actual domicile at the time of the death of the party, and consequently what rule is to be followed in the distribution of his personal estate. Where an Englishman domiciled abroad has real property in England, he ought, on account of the difference of the doctrine with respect to real and personal property, to make two wills, one duly executed according to the English law, devising his real estate, and another framed according to the law of his domicile disposing of his personal property.

A will is, in all cases whatever, a revocable instrument. It was an established rule of law that the will of a *feme sole* was revoked by her marriage, but marriage alone was not considered as a revocation of the will of a man; though marriage and the birth of a child, whom the will would disinherit, conjointly had that effect, on the ground that these circumstances together produced such a total change in the testator's situation, that it could not be presumed he could intend any previous disposition of property to ne unchanged. Still it was supposed that these might be modified by circumstances. But by sec- 18 of the new act every will made by a man or an is revoked by marriage, except a will made in ex- of a power of appointment when the real or personal thereby appointed would not, in default of appoint- , pass to the heir, personal representative, or next of the appointee. And by the 19th section no will is considered as revoked by any presumption of inten- n the ground of an alteration in circumstances. By 0th section no will or codicil is revocable except as mentioned, or by another will or codicil executed in er required by the act, or by a writing declaring an tion to revoke, executed in the same manner, or by ng, tearing, or otherwise destroying the will by the or himself, or by some other person in his presence, by his direction, with intent to revoke. And by the section no obliteration, interlineation, or other altera- made in any will after execution is to have any effect, t in so far as the words or effect of the will previous alteration cannot be made out, unless the alteration ecuted as a will, such execution to be in the margin ite or near to the alteration, or to a memorandum re- g to the alteration. By the Statute of Frauds witnesses will were required to sign in the testator's presence, was not necessary that he should sign in their pre- , whereas by section 6 of that act a mere revocation iting must have been signed by the testator in pre- of the witnesses, but they were not required to sign presence. This inconsistency is now removed. The ion to destroy is what the law regards, and which it res should be expressed by one or other of the modes ed out in the act. The 21st section alters the law as effect of obliterations where the words remain e, and of cancellation by drawing lines across the or any part of the will. These acts will now be of ect unless properly executed and attested. By the ection no conveyance or other act made or done quently to the execution of a will of real or personal , except an act of revocation, is to prevent the ope- of the will upon such estate or interest as the testa- s power to dispose of at the time of his death: and by th section every will is to be construed with reference real and personal estate comprised in it, to speak ake effect as if it had been executed immediately the death of the testator, unless a contrary inten- ppear on the will.

above-mentioned enactments on the subject of re- on, taken in conjunction with the two last-mentioned ns, do away with most of the old doctrine as to the revocation of wills depending on alterations in the f the property subsequent to the date of the will.

ublication of a will is in fact a re-execution of it, a repetition of the ceremonies required for its ori- alidity; therefore before the recent act a devise of ould only be republished by signature and attestation ee witnesses, while with respect to copyholds and alty a will might be republished without any formal ion, and even by the mere parol acts and declara- f the testator.

22nd section of the act provides that no will or , or any part thereof, which shall have been in any r revoked, shall be revived otherwise than by the cution thereof, or by a codicil executed in manner ed by the act, and showing an intention to revive the and when any will or codicil which shall be partly terwards wholly revoked, shall be revived, the revi- not to extend to such parts as had been revoked the revocation of the whole, unless a contrary in- appear. Under the old law, if a second will or which revoked a former will was afterwards can- the first, if it had been kept undestroyed, was held evived. It had previously been determined (4 Ves., at a subsequent codicil, merely for a particular pur- nd confirming the will in other respects, did not to a republication of parts of the will revoked by r codicil. This section extends the doctrine to the here a will had been first partially and afterwards revoked.

rules of law as to settlements of real or personal y deed or will have already been explained. [Set- t; Use.] Estates or interests in property created of executory devise or bequest, that is to say, such as are made expectant on the determination of prior estates in the same property, may be, like estates created by way of remainder in a deed, either vested or contingent. So far as depends upon the nature of the limitations themselves, the same rules are in general applicable to executory devises or bequests as to remainders [Remainder]; but testamentary instruments are not construed with the same strictness as deeds, and in determining the question of vesting or contingency, many considerations, depending on expressions in the will or other circumstances appearing upon the face of it, are admitted as affording presumptions of the intention of the testator. It is impossible here to give any enumeration of the numerous rules which have been laid down on this subject, and which are of course liable to be modified according to the circumstances of each particular case. It may however be observed generally that when a future gift is preceded by a gift of the immediate interest, it is *primâ facie* to be presumed that the enjoyment only is postponed, and that the future gift is vested in interest; whereas when there is no gift of the immediate interest, the contrary presumption obtains: and again, that when the enjoyment of a gift is postponed, not on account of circumstances personal to the object of the gift, but with a view to the circumstances of the estate, the gift is to be presumed vested. With respect to pecuniary legacies, some distinctions, borrowed from the civil law, are admitted which have no place as to real estate, and which have probably arisen from the control exercised by the ecclesiastical courts over wills of personalty. One of these distinctions is that where futurity is annexed to the *substance* of the gift, the vesting is in the mean time suspended; but where the *time of payment* only is future, the legacy vests immediately. If however the only gift is contained in the direction to pay, it is held that the case is not to be ranked with those in which the payment or distribution only is deferred, but is to be regarded as one in which time is annexed to the substance of the gift. When a future gift of a principal sum is coupled with a gift of the interest in the mean-time, a strong presumption exists in favour of vesting. It is generally considered that a very clear expression of intention must exist in order to postpone the vesting of residuary bequests, on the ground that intestacy may often be the consequence of holding them to be contingent.

Numerous questions arise and various rules have been laid down with respect to the construction of what are called gifts to classes in wills, such as gifts to persons under the general denominations of children, issue, descendants, relations, next of kin, legal or personal representatives, &c., both as to the description of persons entitled and the mode of distribution among them; but it is impossible to notice them in detail within the limits of this article.

Great changes have been introduced in the law, as to the interpretation of wills by the above-mentioned 24th section of the act declaring that wills are to be construed to speak from the death of the testator, and the six following clauses. The 25th section enacts that, unless a contrary intention appear on the will, a residuary devise shall include all estates comprised in lapsed and void devises. This alters the former law, whereby such estates devolved on the heir. The 26th clause enacts that a general devise of the testator's lands shall include copyhold and leasehold as well as freehold lands, unless a contrary intention appear. This also effects a considerable alteration in the law of devises. Formerly neither copyholds (unless surrendered to the use of the will) nor leaseholds would pass by a general devise of lands or other general words descriptive of real estate, unless the testator had no freehold lands on which it might operate. Since the statute of the 55 Geo. III., c. 192, dispensing with the necessity of surrenders in certain cases, copyholds stood upon nearly the same footing as freeholds, in respect to a general devise. But leaseholds still continued subject to the old rule of law. By the 27th section, unless a contrary intention appear, a general devise of real estate and a general bequest of personal estate are respectively to include estates and property over which the testator has a general power of appointment. It was never considered necessary in the execution of a power of appointing real estate, whether general or special, to refer expressly to the power. It was sufficient if the intention to exercise it appeared from a description of the property in the will or by other means.

If the testator had no other lands answering the description, a general devise would have been a good execution of the power. But it was otherwise if he had any other lands which would satisfy the terms of the devise. The enactment applies only when the testator has a general power of appointment. Where the power is limited or special, it seems that the old rule of construction will still hold. As to personal property the rule was, that there must be some reference to the power, on the somewhat unsatisfactory ground that as any person must be supposed possessed of some personalty, there was enough to make a general bequest operative without reference to the property comprised in the power. As with respect to devises, it seems that the old rule must still prevail where the power is special or limited. By the 28th section a devise of real estate without words of limitation is, unless a contrary intention appear by the will, to be construed to pass the fee. This clause introduces a very considerable alteration of the old law, under which, in accordance with the doctrince that the heir was not to be disinherited by implication, it was settled that a devise of lands without words of limitation conferred on the devisee an estate for life only, even notwithstanding the appearance of a contrary intention in other parts of the will. The 29th section enacts, that in any devise or bequest of real or personal estate the words 'die without issue,' 'die without leaving issue,' or 'have no issue,' or any other words of the like import, shall be construed to mean a want or failure of issue at the time of the death, and not an indefinite failure of issue, unless a contrary intention appear; except in cases where such words import, if no issue described in a preceding gift shall be born, or if there shall be no issue who shall live to attain the age or otherwise answer the description required for obtaining a vested estate by a preceding gift to such issue. Under the old law, when a testator gave an estate to A and his heirs, and directed that if A died without issue it should go to B, though his meaning in most cases was that B should have it unless A had issue living at the time of his death, the word 'issue' was held to comprise descendants of every degree existing at any distance of time, and the consequence was, that where the subject of the devise was real estate, A took an estate tail and acquired the absolute dominion over the property [REMAINDER], and where it was personalty the ulterior disposition to B was void for remoteness. [SETTLEMENT.]

By the 30th section every devise of real estate (not being a right of presentation to a church) to a trustee or executor is to be construed to pass a fee simple, unless where a definite term of years or an estate of freehold less than the fee simple is expressly given to him. And by the 31st section trustees under an unlimited devise to them, when the trust may endure beyond the life of a person beneficially entitled for life, are to take the fee. When the limitation in a will was made to a trustee by way of use, he took the legal estate by the operation of the statute of uses, without reference to the nature of the trust. But in other cases the question was determined by the intention of the testator, as collected from the nature of the trust; and the trustee was considered to take only that quantity of estate which the exigencies of the trust required. Such a rule of construction was obviously of very difficult operation, and it was often not easy to determine in whom the fee was vested at any given period, and therefore who were the proper parties to deal with the property and to join in a conveyance of it. The enactments contained in the two last-mentioned sections will in a great measure remedy this inconvenience.

It follows from the nature of wills that the devises and bequests contained in them are liable to failure from the death of the devisee or legatee before the testator. This is called the doctrine of lapse. It applies equally to devises of real estate and to bequests of personalty. It is a general rule that words of limitation to heirs or executors superadded to a gift have no effect in preventing lapse in case of the devisee or legatee dying before the testator, they being considered not as words of gift, but merely as indicating the legal devolution of the property. When the gift is to several persons as joint tenants, unless all the objects die before the testator, there can be no lapse; for as joint tenants are each takers of the whole, any one existing at the death of the testator will be entitled to the entirety. The same is the case where the gift is to a class, unless where the individuals of the class were ascertained before the lapse. The changes have been introduced into the law of lapse by the new act. The 32nd section enacts that devises of estates tail shall not lapse, but that where the devisee in tail dies during the life-time of the testator, leaving issue, the devise shall take effect as if he had died immediately after the testator, unless a contrary intention appear by the will; and, by the 33rd section, gifts to children or other issue who shall die before the testator, having issue living at the testator's death, are not to lapse, but, if no contrary intention appear by the will, are to take effect as if the persons had died immediately after the testator. As a will of personalty operated upon all the property of that kind belonging to the testator at the time of his decease, there could obviously be no intestacy with regard to any part of the personal estate while there was a valid residuary bequest. The same will now be true of wills of real estate in which there is a valid residuary devise, so that there will no longer be room for many of the questions that arose as to whether the residuary devisee took beneficially or as a trustee, and as to the devolution of real estate directed to be sold.

It should be observed that where an ambiguity exists on the face of a will, or, as it is technically termed, is patent, parol evidence cannot be admitted to remove it, because to admit evidence to explain what the will has left uncertain would be in effect to make a new will by parol. Where however the ambiguity is not apparent on the face of the will, but arises from circumstances disclosed when an attempt is made to carry the will into effect, it may be removed by evidence of the same nature.

(Powell *On Devises*, and Jarman's *Notes* to Bythewood's *Precedents*, *Wills*.) [EXECUTOR; LEGACY.]

WILL. (*Scotland.*) The right of bequest in Scotland is confined to moveable or personal property. It does not extend to heritable or real property—which comprehends lands and tenements, fixtures, those appurtenances of a family mansion (such as the pictures, plate, and library) which are called 'heirship moveables,' the machinery in mines and manufactories, the stock on farms, and every description of security or other right over any of these kinds of property. Settlements may be made of heritable property in the manner which will be described below, but it is a principle of the greatest importance, and one the neglect of which is often productive of the most serious consequences, that no such settlement can be made in the form of a will. All persons of sound mind above the age of puberty (14 in males, and 12 in females) may execute wills; and persons under guardianship, as wives and minors who have curators, may do so without the consent of their guardians. Until very lately the will of a bastard was ineffectual, and the moveable goods of such a person, lapsing to the crown on his death, were distributed by a gift in exchequer; but this peculiarity has been abolished by 6 & 7 W. IV., c. 22. A verbal or 'nuncupative' will, if uttered in the presence of two witnesses who bear testimony to it, is valid to the extent of a hundred pounds Scots, or 8*l*. 6*s*. 8*d*. sterling; and if the bequest should exceed that sum, the legatee may recover to the extent of the hundred pounds Scots. A will, sufficiently formal in all points to prove its terms and its date, must be executed in the following manner:—The granter's usual signature must be given at the end, and, if there be more than one sheet, on each sheet: the usual practice is to sign each page. Any interpolation in the margin must have the christened name or the initial letter of it above, and the surname or its initial letter below. He must either sign in the presence of, or show and acknowledge his subscription to two witnesses, who must be males, above fourteen years old. The witnesses sign the deed at the end, each putting after his name the word 'witness.' The will must terminate with 'a testing clause,' setting forth that the granter has signed the deed in presence of the witnesses, who are named and so designed as to be distinguishable from other persons, at a certain place on a certain day. The testing clause must contain the name and description of the writer of the deed, the number of pages it consists of, the number of words written in erasure or interlined, and the number of marginal notes. There are some of these formalities of which the absence is fatal to the deed—others in which it will throw the onus probandi on the holder.

Where the will is holograph, or written by the granter

f. it does not require to be attested; but if it be tested, it in the first place does not prove itself holograph, and the statement that it is in the riting of the granter must be proved by ex- us evidence to be true; and, secondly, it does not its own date; and if there be any other com- title, it will be presumed to have been granted a time as will give that title the preference. If the nnot write, he can execute a will through a notary, eives authority in presence of two subscribing wit- sign for the testator, and describes the transaction tarial docquet. A clergyman of the Established f Scotland may act as a notary for the signing of t is usual to nominate an executor of the will, but ssential to do so; and if there be no one named, or is supplied by operation of law. Wills executed by persons domiciled out of Scotland, if they be according to the form which would carry such property in the place where they were executed, will be effectual to convey moveable property in Scotland; but no will, whatever be the law of the place where it is made, can dispose of heritable property in Scotland. The last dated will is the effectual one, and all others are considered as revoked by it in so far as they are inconsistent with it.

The peculiar feature of the law of Scotland out of which arises the circumstance that heritable or real property cannot be bequeathed is, that no deed conveying such property is effectual unless it be expressed in what are called dispositive terms,' or terms making over the property at he moment of the signing of the deed. Thus the terms 'I rant, convey, and make over,' are sufficient to carry he- itage; but the terms 'I leave and bequeath' are not. The eculiarity arose during the time when the holder of a fief ould not part with it to another person unless that person ere accepted as a vassal by the feudal superior. A con- eyance not intended to take effect until after the cedent's eath did not admit of the superior's using his privilege, and e method of creating a settlement of landed property was nstructed on the forms by which the feudal usages were adually adapted to the conveyance of land from a seller a purchaser. A deed of settlement relating to landed operty must thus be essentially a conveyance de præsenti, t to accomplish the purposes of a virtual bequest, the llowing methods have been adopted by conveyancers:— the granter may convey to himself, with a 'substitution' remainder to his destined successor; 2, he may grant a rect conveyance, reserving to himself the life-rent; 3, he ay grant such a conveyance, reserving power to alter. It of the nature of a conveyance of land that to be effectual, livery of the deed to the assignee, or an equivalent, must ve taken place, and thus a settlement of land to be effec- al after the granter's death must have been delivered to e person favoured by it, or some one for his behoof, or ist have been entered in a public register, or must con- in a clause dispensing with delivery. The formalities ove mentioned as necessary to the execution within Scot- nd of wills carrying moveables are necessary to settle- ents conveying heritable property in Scotland, but with is difference, that in the settlement of heritable property, the party cannot write, the deed must be executed by o notaries before four witnesses; and in this case a cler- man cannot act as notary. To be an effectual deed, a tlement of landed property must also contain authority r completing the feudal title to the property, and this thority will vary with the nature of the holding. When wever there is an effectually attested deed, containing clear terms a conveyance de præsenti, although the for- alities necessary for completing the feudal investiture be nitted, and it be thus insufficient of itself to carry the tate, it may give a right of action to compel the heir-at- w to make it over. If the heir-at-law found upon the ed, he is by that act bound to make good its provisions favour of all other persons. Thus, if the deed be in the rm of a bequest, and in itself incapable of carrying he- age, if it convey moveable property to the heir which he ould not have otherwise succeeded to, he is bound, if he ke advantage of it, to fulfil its destination of the heritage. o settlement of heritable property to the prejudice of the ir-at-law can be validly granted on a death-bed. Three ements are necessary to constitute the legal exception of ath-bed: 1st, that the granter was ill of the disease of ich he died when he granted the deed; 2nd, that he d within sixty days after executing it; and, 3rd, that he did not go to church, or to a market, unsupported, during the sixty days. The act 7 Wm. IV. and 1 Vic., c. 26, and the other enactments relating to wills in England, do not apply to Scotland.

WILL, ROMAN. A Roman will was called Testamentum. Testamentum was defined by the jurists of the Imperial period to be 'a legal mode of a man's declaring his intention in due form, to take effect after his death.' The person who made such declaration was called testator.

The power of making a Roman testament only belonged to Roman citizens who were sui juris, a rule which excluded a great number of persons: those who were in the power of another, as sons not emancipated, and daughters; Impuberes; dumb persons, deaf persons, insane persons, and others; and, as a general rule, all women. The circumstances under which a woman could make a will were peculiar; and they would require a very particular statement. A male of the age of fourteen years complete, unless under some special incapacity, could make a valid will. A female, so far as respected age only, acquired this capacity on the completion of her twelfth year.

Originally Roman citizens made their wills at Calata Comitia, which were held twice a year for this purpose. It is not said that these wills were made in writing; and it is here assumed that they were made at the Calata Comitia only for the purpose of securing the proper evidence of the testator's intention. It has been maintained by Niebuhr, that wills were made at the Calata Comitia in order that the Gentes might give their consent to the testamentary disposition, but this conjecture is not supported by evidence. If a man died in the interval between two such Comitia without having made his will, he must have died intestate. But wills could also be made In Procinctu, that is, by a soldier under arms and in presence of the enemy. Another mode of testamentary disposition was introduced, apparently for the purpose of preventing intestacy. If a man, says Gaius (ii. 102), had neither made his will at the Calata Comitia nor In Procinctu, and was threatened with sudden death, he transferred, by the form of mancipatio, his familia, that is, his patrimonium, to a friend, and told him what to give to each person after his death: this was called the testamentum per æs et libram, because the transfer was effected by mancipatio. Thus it appears that the testamentum per æs et libram was a formal transfer of the property during the lifetime of the owner to a person who undertook to dispose of it as he was directed. As it was a substitute for the testament made at the Calata Comitia, it is a probable inference that it only differed from the testament made at the Comitia in wanting that publicity. The two old forms of testamentary disposition, adds Gaius, fell into disuse, and that per æs et libram became the common form. Originally the formal purchaser of the testator's estate (familiæ emptor) occupied the place of the heres at a later time; when Gaius wrote, and long before his time, the old form of testamentary disposition was retained as to the familiæ emptor, but a heres was appointed by the will to carry into effect the testator's intention. The formal purchaser was only retained out of regard to antient custom, and the institution of a heres became necessary to the validity of a will.

The form of testamentary transfer per æs et libram is described by Gaius (ii. 104). As in other acts of mancipation, so in this, there were five witnesses of full legal age (puberes). These five witnesses are considered by some modern writers to be the representatives of the five classes of the Roman people, and that as the original act of mancipation was rendered valid by the consent of the five classes, so here it was rendered valid by the presence of the five witnesses. In this article it is supposed that they were present as witnesses only.

Written wills, as already observed, were not necessary, for neither mancipation nor the institution of a heres require a writing. But written wills were the common form during the later Republican and the Imperial period. Wills were written on tablets of wood or wax; hence the word 'cera' (wax) is often used as equivalent to tabula. A Roman will was required to be in the Latin language until A.D. 439, when it was enacted that wills might be written in Greek. A Roman will in the later periods was sealed and signed by the witnesses. The sealing consisted in making a mark with a ring or something else on the wax, and the names were added. The seals and names were on the outside, for, according to the old law, there was no occasion for the witnesses to know the contents of the will. The old practice was for the testator to show the will to the witnesses, and to call on them to witness that what he so presented to them was his will. It was not unusual for a man to make several copies of his will, and to deposit them in some safe keeping. Augustus, the emperor, made two copies of his will (Sueton., *Aug.*, 101); and also his successor Tiberius (Sueton., *Tib.*, 76). The Vestal Virgins were often the keepers of wills, or they were deposited in a temple or with a friend. At the opening of the will the witnesses or the greater part, if alive and on the spot, were present, and after acknowledging their signatures the will was opened.

It has been mentioned that in order to make a Roman will valid, it must appoint or institute a heres. The heres was a person who represented the testator, and who paid the legacies which were left by the will. He stood in the place of the familiæ emptor, or formal purchaser of the property in the old form of will. A heres might be appointed in such words as follow: 'Titius heres esto,' 'let Titius be my heres;' or 'Titium heredem esse jubeo,' 'I will Titius to be my heres.' Generally all Roman citizens who could make a will could be heredes; but persons could be heredes who could not make a will—slaves for instance, and others who were not sui juris.

Fraud in the case of wills and other instruments was punished by severe penalties under a Lex Cornelia.

The development of the Edictal or Praetorian law at Rome introduced a less formal kind of will. If there were seven proper witnesses and seven seals, and if the testator had the power of disposition both at the time of making his will and at the time of his death, the edict dispensed with the ceremony of mancipation and gave to the heres or heredes the bonorum possessio. This mode of testamentary disposition existed under the Republic, and accordingly a man could either make his will by the civil form of mancipatio, or he might make it after the praetorian form with seven seals and seven witnesses, without any mancipatio. The form of testamentary disposition by mancipatio was ultimately superseded by the more convenient praetorian form. The legislation of Justinian required seven male witnesses of proper age and due legal capacity; and it was sufficient, if the testator declared his will orally before these witnesses.

A Roman will, as already observed, was valid if the testator had a disposing power at the time of making his will and at the time of his death. It follows that his will, though made at any time before his death, was sufficient to dispose of all the property that he had at the time of his death. This rule of law is now established in the case of an English will by the recent act (1 Vic., c. 26) as to real property; it always applied in the case of an English will to personal property. But an English will is valid if the testator subsequently loses his disposing power, as for instance if he become insane. A Roman will was not valid under such circumstances; and it also became invalid in other cases.

In order to render a Roman will valid, it was necessary that the heredes sui of a man (his sons and daughters were in the class of heredes sui) should either be appointed heredes or should be expressly excluded from the inheritance. A will which was illegal at the time of being made was testamentum injustum, that is, 'non jure factum,' not made in due legal form. A will which was justum might become invalid; it might become ruptum (broken) or irritum (ineffectual).

A second will duly (jure) made rendered a former will invalid (ruptum); and it was immaterial whether the second will took effect or not. If it was duly made, it rendered a former will of no effect, and the testator died intestate.

If a testator sustained a capitis diminutio after making his will, that is, if he lost any part of his status of a Roman citizen which was essential to give him a full testamentary power, the will became Irritum, ineffectual. A prior will might become Ruptum by the making of a subsequent will; and such subsequent will might become Irritum in various ways; for instance, if there was no heres to take under the second will.

Though a will became Ruptum or Irritum, and consequently lost all its effect by the Jus Civile, it might not be entirely without effect. The bonorum possessio might be granted by the Praetorian law, if the will was attested by seven witnesses, and if the testator had a disposing power, though the proper forms required by the Jus Civile had not been observed.

The rule of Roman law which required heredes sui to be expressly exheredated applied to posthumous children. If a suus heres was born after the making of the will, and was not recognised as heres or exheredated in due form, the will became Ruptum. This rule of law was thus expressed: 'adgnascendo rumpitur testamentum.' There were also cases in which a will might become Ruptum by a quasi-adgnatio.

A testament was called Inofficiosum when it was made in due legal form, but not 'ex officio pietatis.' Thus when a man did not give the hereditas, or a portion of it, to his own children or to others who were in a near relation to him, and when there was no sufficient reason for passing them by, the persons so injured might have an action called Inofficiosi Querela. The persons who could maintain this action were particularly defined by the legislation of Justinian. If the Testamentum was declared by the competent authorities to be Inofficiosum, it was rescinded to the amount of one-fourth of the hereditas, which was distributed among the claimants.

The ground of the Inofficiosi Querela is explained by Savigny (*System des Heutiges Röm. Rechts*, ii. 127, &c.) When the testator in his will passed by persons who were his nearest kin, it was presumed that such persons had merited the testator's disapprobation. If this was not so, it was considered that the testator had by his will done them a wrong, and the object of the action was to get redress by setting the will aside. The main object however was the establishment of the complainant's character, to which the obtaining of part of the testator's property was a subsidiary means. The expression Testamentum Inofficiosum occurs in Cicero and in Quintilian; but it is not known when the Inofficiosi querela was introduced.

A Roman codicil (Codicilli, for the word is not used in the singular number till a late period under the Empire) was a testamentary disposition, but it had not the full effect of a will. A heres could not be appointed or exheredated by codicilli; but codicilli were effectual so far as to bind a heres, already appointed by a will, to transfer a part or the whole of the hereditas to another. Codicilli were in fact useless unless there was a will prior or subsequent, which confirmed them either retrospectively or prospectively. (Gaius, ii. 270; *Dig.*, 29, tit. 7, s. 8; Pliny, *Ep.*, ii. 16, which has been sometimes misunderstood.)

Codicilli were originally informal writings; it was only necessary to prove that they were by the testator. The later legislation required codicilli which were in writing to have five witnesses, who subscribed their names to the codicilli.

The subject of Roman wills is of great extent, and it involves questions of considerable difficulty. The principal authorities have been mentioned in this article, to which may be added Ulpian, *Fragmenta*, tit. 20; *Dig.*, 28, tit. 1, &c.; 29, tit. 1, &c.; *Cod.*, 6, tit. 23.

WILLAERT, ADRIA'NO, a composer much celebrated when musical learning was more cultivated than musical genius, was born at Bruges, in the Netherlands, in the latter part of the 15th century. He first studied law in the university of Paris, but, as often has happened, the most winning of the muses seduced him from so dry a pursuit, and thenceforward devoting himself to harmony, he soon became famous for his motets. These procured him the high situation of *Maestro di Cappella* of St. Mark's, Venice, which he held till his decease at an advanced age. He was the master of Costanza Porta, of Cipriano Rore, and also of the famous Zarlino, who, in his *Istituzioni Harmoniche*, mentions him in the most eulogistic terms.

WILLAN, ROBERT, was born on the 12th of Nov., 1757, at the Hill, near Sedbergh in Yorkshire, where his father had an extensive practice as a medical man. His parents belonged to the Society of Friends, he was brought up in the principles of this body, and received his early education in the grammar-school of his native place. His progress as a boy in his classical and mathematical was very remarkable, and in 1777 he went to Edi well prepared to commence his medical studies. the usual residence of three years, he graduated in on which occasion he presented an inaugural disser on inflammation of the liver. It was published und title 'De Jecinoris Inflammatione.' He subsequently ondon for the purpose of further improvement, and about to settle there, when a relative in a good prac- at Darlington died, and Willan became his successor. remained at Darlington about a year, and he returned ondon in 1782. During the time he was at Darlington nalysed the sulphureous mineral-spring of Croft, and lished the result in an octavo volume, with the title servations on the Sulphur Water at Croft near Darling- ' A second edition of this work was published in 1786. his work is one of the earliest notices of the peculiar is of vegetation that inhabit various mineral-springs. chemical analysis of the waters is not to be depended naving been made at a time when analytical chemistry d ensure little accuracy. He recommends these waters icularly in skin diseases, and perhaps here may found the germs of inquiry that led to his future urs.

1783 the Public Dispensary in Carey Street was ned, and Willan was made physician. In 1785 he was itted a licentiate of the College of Physicians, on which sion he addressed to that body some congratulatory k verses. In 1786 he commenced a course of lectures he Dispensary on the principles and practice of medi- ; but his success appears to have been small. He was equently appointed physician to the Finsbury Dispen- . He was remarkable for the punctuality with which ttended to his public duties, and it is said he never ht relaxation by absence from London for thirty s.

om an early period of his professional career Willan s to have been dissatisfied with the existing nomen- re and classification of cutaneous diseases. He sought n accurate distinction of external forms to render their ification more simple, and their recognition more cer- . In 1789 he had succeeded so far in this object, that per which he read before the Medical Society of Lon- obtained for him the Fothergill gold medal of that . This laid the foundation for the publication of his t work, the 'Description and Treatment of Cutaneous ases.' This work was illustrated with coloured plates he various diseases which were described in the letter- s. The first part was published in London in 1798, contained the first order into which he had divided neous diseases, the papulous eruptions of the skin. second order, scaly diseases of the skin, was published 801. He did not live to complete this work. Two e volumes appeared in 1805-7, containing a part of third order, the rashes, in which the varieties of scarlet er and measles were treated. A fourth part, containing remainder of the rashes and the Bullæ, or large vesi- ions, was published in 1808. The subject of vaccina- n having excited great interest, Willan was induced publish a volume on this subject out of the regular der of his work, and this appeared in 1806, with the title On Vaccine Inoculation.' In this work he gave a full count of Jenner's disease the cow-pox, also of the hicken-pox, and of other cutaneous diseases which might e confounded with the vaccine disease. The remaining ortions of the work, including the pustular, vesicular, tuber- ular, and macular orders, were not published as a com- pletion of Dr. Willan's work; but all the materials having een committed by him to the care of Dr. Bateman, were fterwards published by him in a work entitled 'Delinea- ons of Cutaneous Diseases, exhibiting the characteristic ppearances of the principal genera and species comprised the classification of the late Dr. Willan, and completing e series of engravings begun by that author,' London, 17. By the simple classification which he adopted, and pplication to a large number of cases, Willan did more the advancement of the knowledge of diseases of the than any previous writer, and laid the foundation for ccessful labours of Bateman, Rayer, and subsequent s on this subject.

ides this great work, Willan published several papers rnals and Transactions, upon various professional sub- During some part of the time that he was connected e Dispensary in Carey Street, he published monthly of the cases, with observations. These reports con- much valuable information, and those from 1796 to ere published in a separate volume, with the title s on the Diseases of London,' London, 1801, 12mo. early part of his life he published a little volume t 'History of the Ministry of Jesus Christ, combined from the Narrative of it in the four Evangelists.' This was published in 1782, and a second edition, with notes and observations, appeared in 1786.

Willan was fond of antiquarian pursuits, and read several papers before the Antiquarian Society, of which body he was elected a fellow in 1791. One of the most elaborate of his papers was an essay on the practice of lustration by need-fire, a practice which still continues in some of the northern counties of England. He was elected in 1809 a fellow of the Royal Society.

During the latter part of his life he resigned his public situations. He took an active interest in the establishment of the Fever Hospital, and was made one of its first physicians extraordinary. His health, which was never strong, began to decline in 1810, and his friends persuaded him to embark for Madeira, where he died on the 7th of April, 1812.

At the time of his death he was engaged in investigating several points connected with the antiquities of medicine. Among other questions which occupied him was the nature of the *ignis sacer*; the evidences of the prevalence of small-pox, measles, scarlet-fever, and other epidemic diseases amongst the ancients; the history of leprosy, and also of lues.

Dr. Willan was a man of retiring and studious habits, devotedly fond of his profession. He had few connexions, and modest manners, so that his course to practice was slow, although it was ample in the end. He was much esteemed by his medical brethren, and beloved by the poor, to whom he was ever kind and attentive. He was a sound observer, and a good practical physician; and his classification of the diseases of the skin must ever be regarded as a great step for the advancement of the knowledge of the forms of disease.

(Bateman, *Memoir of Dr. Willan*, in 32nd number of *Edinburgh Medical and Surgical Journal.*)

WILLDENOW, CARL LUDWIG, a botanist, was born in 1765, at Berlin, where his father was an apothecary. He received his early education at Berlin, and studied medicine at Halle, whence he proceeded to Langensalza, for the purpose of studying chemistry in the laboratory of Wiegleb. He took his degree of Doctor of Medicine at Halle, and returned to his native city, and, having married, commenced the practice of his profession. He early turned his attention to botany, and before he had graduated he published his Prodromus of the Berlin Flora, with the title 'Prodromus Floræ Berolinensis,' Berlin, 1787, 8vo. On the occasion of his graduating at Halle he presented as his thesis a botanical work, which was entitled 'Tractatus de Achilleis et Tanaceto,' Halle, 1789, 8vo. Shortly after this he published his 'Historia Amaranthorum,' at Zürich, illustrated with 12 plates. Nor did he confine his natural history studies to plants. He took great interest in zoology, and had collected in his museum many specimens of rare animals; and in 1789 he published a catalogue of butterflies in the Mark of Brandenburg, entitled 'Tabellarisches Verzeichniss der in der Churmark Brandenburg einheimischen Schmetterlinge,' Berlin, 8vo. In 1790 he published a memoir of Gleditsch the botanist, and in 1792 his elements of botany, with the title 'Grundriss der Kraüter-Kunde,' Berlin, 8vo. This was one of the best elementary works on botany of the day, and was extensively used throughout Germany as a class-book. It was also translated into French and English, and in fact became the model on which most of the subsequent introductions to botany were written. He afterwards published a work of the same nature in 1804, entitled 'An Introduction to the Self-Study of Botany' ('Anleitung zum Selbst-Studien der Botanik'), but this is an inferior work to the first. In 1794 he published, in folio, a work on new and rare plants, with the title 'Phytographia, seu Descriptio rariorum minus cognitarum Plantarum,' Erlangen. This was followed, in 1796, by a work on the trees and shrubs growing in the open air in the Garden of Berlin, with some account of their culture. Of this work a second edition appeared in 1811.

The successive publication of these works had acquired for Willdenow the reputation of a first-rate botanist, and obtained for him in 1798 the appointment to the chair of Natural History at Berlin. He was also appointed superintendent of the Botanic Garden at Berlin. Previous to his appointment this garden had been much neglected, but by his diligence it became the depository of some of the rarest plants growing in Europe. Willdenow corresponded with most of the botanists of his day, and from Klein he received plants from India; from Humboldt and Bonpland, those of America; from Labillardière and Smith, those of New Holland; and from Desfontaines, those of Africa. It was thus that, instead of 1200 species he found growing in the garden, he left 6000. He also collected a large herbarium, consisting of above 20,000 species of plants.

The great work of the life of Willdenow was his 'Species Plantarum' of Linnæus. He commenced this work in 1797, and continued publishing it at intervals till 1810, when his health became too enfeebled to enable him to go on. He proceeded as far as the first part of the fifth volume, which contained descriptions of the species of the natural order Filices. A second part of the fifth volume, including the mosses, was published by Schwagricher in 1830; and Link, in 1824, published two parts of a sixth volume, including the *Fungi*, *Hyphomycetes*, and *Gymnomycetes*. This work was the most important one of its day for systematic botany, as it included descriptions of all species that had been described since the first publication of the 'Species Plantarum' by Linnæus. The first volumes of the book are not so well executed as the last, which is easily accounted for when the different position in which the author was placed is considered. There are also many manifest errors in the references to works, and in the quotation of synonyms, which diminish its value, and which have produced some very severe criticisms. Every allowance however should be made on account of the magnitude of the work; and, whatever might be its faults, there was nothing to supply its place till the publication of the 'Prodromus' of De Candolle, and where this is incomplete, the aid of the 'Species Plantarum' of Willdenow must still be called in. The whole work is arranged according to the Linnæan system. From 1803 to 1809 Willdenow published at intervals descriptions with coloured plates of plants growing in the Botanic Garden at Berlin, under the title 'Hortus Berolinensis,' Berlin, folio. He also contributed many essays and papers to various Journals and Transactions of societies.

In 1811 Willdenow went with his family to Paris for the purpose of studying and describing plants in the collections there. He however was able to effect little, on account of his health, and he returned to Berlin, where he died on the 10th of July, 1812. He was a quiet reserved man, and too little communicative to make an efficient teacher, and comparatively few of his pupils have distinguished themselves as botanists. He was an ardent admirer and follower of Linnæus, and, having adopted his system, does not appear to have been cognizant of those principles of classification or the physiological facts that have latterly contributed so greatly to the advance of botany as a science.

(Bischoff, *Lehrbuch der Botanik*; *Biographie Médicale.*)

WILLIAM I., King of England, styled THE CONQUEROR (in Latin *Conquestor* or *Conquisitor*, in French *Conquereur*, meaning only, in the language of the feudal system, the *acquirer*), was the illegitimate and only son of Robert, Duke of Normandy, surnamed *Le Diable* (the Devil), and was born in 1027. The vulgar story makes his mother the daughter of Fulbert le Croy, a tanner or skinner of Falaise, whom Robert first saw and became enamoured of as she was dancing with some of her female companions: her name, it is said, was Arlette or Harlotta, whence our English *harlot*. This is a very suspicious etymology. According to the contemporary historian William of Jumieges (Gemeticensis), the Conqueror's mother was Herleva, the daughter of Fulbert, an officer of Duke Robert's household. After Robert's death she married a Norman knight (*miles*) named Herluin, by whom she had two sons, both of whom made a great figure in their time: Robert, who was created earl of Mortagne in Normandy, and Odo, who became bishop of Bayeux; besides a daughter, who was married to Odo, earl of Albemarle.

The history of the early part of William's life has been given in the article NORMANDIE (xvi. 281). He succeeded to that duchy as William II., on the death of his father in 1035. The commencement of his transactions with England and his acquisition of the crown of that country by the victory of Hastings, or rather Senlac, gained Saturday, 14th of October, 1066, have been detailed in the articles EDWARD THE CONFESSOR (x. 285) and HAROLD II. (xii. 52).

On the death of Harold, Edgar Atheling (ix. 221) was unanimously declared king by the Witan assembled in London; and the further management of the war with the Norman invader was committed to the two distinguished brother Earls Edwin and Morcar. But this opposition soon gave way. After a few days a deputation from the nobility, the clergy, and the citizens of London, headed by the two Saxon earls and the rival king, or pretender to the throne, Edgar himself, waited upon William at Berkhamstead, swore allegiance to him, gave him hostages, and made him an offer of the crown; and his coronation took place in Westminster Abbey on the 25th of December, from which day accordingly is dated the commencement of his reign.

The Conqueror's first measures were eminently gracious and conciliatory; even in rewarding his Norman followers, we are told, he deprived no Englishman of anything to which he had a just claim: he probably limited his seizures to the lands and other property of those who had fallen in arms against him. He respected also the public liberties, as well as private rights; the police of the kingdom was made much more efficient, and at the same time the taxes were collected with lenity; and probably England had not since the days of Alfred, or at least since those of Canute, been governed either more ably and wisely or less oppressively (in all respects except that it was under a foreign domination) than it was now.

But circumstances made it impossible that this state of things should last long. On the one side a numerous people, the old occupants of the country, exasperated by defeat, and on the watch for revenge; on the other, a handful of foreign intruders, flushed with recent victory, and feeling that in their swords alone lay their safety, as well as their rights: these were elements sure to produce a speedy explosion, even if William's own passions had been much more temperate or more under control than they were. The Saxons and the Normans, it is to be remembered, although both belonging to the same great Teutonic race, had been rivals and enemies, as far as their history can be traced, from their first appearance in Western and Northern Europe, and this island, originally wrested by the Saxons from their common prey the Celts, had been their chief battle-field for the last two hundred and fifty years; for the Danes, as they were commonly called, who had made repeated descents upon Britain ever since the beginning of the ninth century, were the same people who, under the name of Northmen, or Normans, had in the beginning of the tenth century effected a settlement in France, and had now, in the middle of the eleventh, achieved the conquest of England. It can hardly be doubted, too, that the mildness of William's government in the commencement of his reign was only an artful policy adopted to enable him the better to establish his power before proceeding to carry out what in that age, and down to a much later date, were held to be the unquestionable rights of conquest. In fact he could not have retained the dominion of the country, if he had not made it furnish lands and lordships for his followers, as well as a crown for himself.

A few months sufficed to make an end of the apparent good agreement between the English and their new rulers. In March, 1067, William, as if with no object beyond showing himself in triumph among his old subjects and receiving their congratulations, returned to Normandy, leaving the government of England in the hands of his half-brother, Bishop Odo, upon whom he had conferred the earldom of Kent, and of William Fitz-Osbern, also one of his relations, whom he had created earl of Hereford. Whether it was that these regents attempted any new exactions or other acts of oppression, or only that advantage was taken of the absence of their master, not many weeks passed before the natives were up in arms in various parts of the country. William returned from Normandy in December. The ensuing two years witnessed a far more severe contest than that which had been decided on the field of Hastings; in fact it was now, in 1068 and 1069, and not in 1066, that the subjugation of the country was really effected, and the Norman dominion established. At first the enemy seemed to be everywhere—nor were the insurgent natives the only power that threatened to dispute with William the possession of the country. His first movement was against the city of Exeter, the head-quarters of the south-western insurrection; but with all his vigour. it was not till after a siege of eighteen days that he forced his way into the place, and even then he engaged that the inhabitants should not be injured either in their lives, their properties, or their municipal privileges. In this quarter of the kingdom, as yet at least, the revolt scarcely seems to have been a Saxon or national movement; it might have grown to that, but at present it was apparently little more than a resistance to some oppressive proceedings, or apprehended proceedings, of the established authorities. William was satisfied therefore with merely putting down the dangerous example, perhaps even at the cost of some concession or compromise: it was necessary that he should not leave such a flame behind him to gather strength while he should be engaged with the more formidable rebellion in the north. That occupied him with little intermission for the whole of the next and a great part of the succeeding year. At the head of it, when it had broken out, were the two earls Edwin and Morcar; they were fallen upon and compelled to make their submission; and for a time the attempt seemed to be crushed. A second rising was as speedily put down; but in the course of the succeeding summer of 1069, first the three surviving sons of Harold landed at Plymouth from Ireland, in June, with a fleet of sixty-four sail, and then, in July, Canute the son of Sveno, the Danish king, appeared on the eastern coast at the head of a much more formidable armament: the Irish invaders were driven back after having plundered the adjacent country; the Danes were joined by the newly quieted inhabitants of Yorkshire and Northumberland (themselves mostly of Danish lineage), and a final struggle ensued, which did not indeed last long, and in which William came off victorious, but which left that part of his kingdom literally a desolate wilderness; for, after he had subdued all armed resistance, he found no other way which promised to be effectual in preventing a new insurrection, except actually to depopulate the country by fire and sword, and to reduce a large tract of it to the solitude and silence of death. It is affirmed that above a hundred thousand men, women, and children were destroyed in this terrible operation, and that for nine years thereafter not a patch of tillage was to be seen between York and Durham; nor were the ruins of the buildings that had been thrown down in the reckless devastation cleared away for more than a century.

From this time William ruled his kingdom like a true conqueror. The natives of the country were rapidly deprived of everything, and reduced to a state of complete slavery. All the offices both in the church and the state, from the highest to the lowest, were, with scarcely an exception, filled with Normans and other foreigners. On any pretence or no pretence at all, by confiscations and unjust decrees, by force or by fraud, nearly every Englishman was in the course of a few years ejected from all proprietorship of the soil, which was not merely, according to the principle of the feudal system, treated as derived from and held of the crown, but, by a practical application of that principle such as is not known to have ever been ventured upon to anything like the same extent in any other country, was actually seized by the crown, and either retained by it or redistributed at its pleasure. In other respects also feudalism was carried out with a rigour and to an excess that had nowhere else been exemplified. The people were ground to the earth by various new and oppressive imposts. Fortresses were erected and garrisoned in all the considerable towns to overawe the inhabitants. In short the country was reduced to a vast encampment, in which the only freedom, public or private, that was left was the right of a small number of insolent masters to tyrannize at will over a multitude of toiling and helpless bondsmen.

All this however, and the deluge of blood in which the northern rebellion had been quenched, had the full effect that was intended, of breaking the spirit of the nation and hushing for the future the very sound of resistance. The only further trouble that William had with the native English was in putting down a band of outlaws, who, headed by the intrepid and skilful Saxon Hereward, for a short time set his power at defiance amid the fens and morasses of the Isle of Ely; and they were rooted out in the course of the year 1071. In 1072 the Conqueror, all England being reduced to submission, found himself at leisure to lead a great army across the northern border to chastise the Scottish king Malcolm Canmore, who, besides having received and protected Edgar Atheling, whose sister he had married, had two years before, immediately after the suppression of the Northumbrian insurrection, made an inroad into the western parts of York and Durham, and spread almost as much devastation in that quarter as the vengeance of the English king had done along the eastern coast. As William advanced, the inhabitants not only fled before him, but, setting fire to their farm-houses and villages, and carrying away with them everything of value which the flames did not consume, left the land a bare and silent desert. He continued his unresisted march however as far as the Tay, and there, at Abernethy, Malcolm met him, and made his submission, which, according to the English chroniclers, went the length of swearing fealty to him for the kingdom of Scotland, but most probably amounted only to an acknowledgment of him as king of England by the performance of homage for Cumberland and the other English possessions annexed to the Scottish crown. Malcolm moreover is stated to have given hostages for his observance of the peace thus concluded; but no friendship was established between the two; the Scottish king continued to adhere to the cause of his brother-in-law, and a few years after this, in 1079, seizing his opportunity while William was in Normandy, he again crossed the border, and carried fire and sword into Northumberland as far as the Tyne. In the autumn of the following year William sent an army into Scotland under the command of his son Robert; but after advancing only a few miles (to a place which Simeon of Durham calls Eglesbreth), it returned without having effected anything. It was soon after this that the fortress of Newcastle was erected on the Tyne, with the view of checking these Scottish inroads.

Meanwhile, in 1075, during another visit of William to his continental dominions, a number of his Anglo-Norman barons, with Roger, the son of William Fitz-Osbern, and his successor in the earldom of Hereford, at their head, offended, as they professed, at his generally haughty bearing and oppressive government, but chiefly moved, it is probable, by dissatisfaction at the lion's share he had taken to himself in the fruits of their common conquest, had entered into a confederacy to drive him from the throne. But their conspiracy being detected, they were hurried into an armed rising before their plans were mature, and their forces were dispersed by the grand justiciaries William de Warrenne and Richard de Bienfait, in a battle fought at a place called, by Ordericus Vitalis, Fagaduna, by which is supposed to be meant Beecham, or Bicham, in Norfolk. On his return home William, the Saxon chronicler states, led a powerful army into Wales, and established his dominion over that country.

The next and only other attempt which was made in William's lifetime to shake his throne, though it wore at first a formidable aspect, came also to nothing, as all the rest had done, defeated partly by his vigilance, promptitude, and energy, partly, as one would say, by his good fortune. In 1085 Canute, the son of Sveno, who had now succeeded his father as king of Denmark, put himself at the head of a great naval armament with the avowed design of asserting his hereditary claim to the English crown: William immediately collected a great army to oppose him, by bringing over multitudes of mercenaries from every part of the continent; but the matter never came to the arbitrement of the sword: the sagacious English king is supposed to have employed his treasure in corrupting the forces of his enemy, as well as in hiring mercenaries for his own defence: be that as it may, one cause or another always prevented Canute from putting to sea; the wind was contrary, or he was disappointed in a supply of provisions, or some of his captains were not to be found or were not in readiness to start: at last, after he had lain for more than a year in the port of Haithaby, or Haddeby (on the right bank of the Schle, opposite to Schleswig), a mutiny broke out in the fleet, and the enterprise was abandoned. It was to help him to meet this danger that William revived the odious tax called the Danegelt.

The origin and progress of the dispute between the Conqueror and his eldest son Robert, to whom he had promised, but afterwards refused to resign, his hereditary duchy, are narrated in the article NORMANDIE. It came to a contest of arms, in which the father and son are said to have on one occasion encountered without knowing one another when the old king was wounded in the hand in the unnatural combat. This was while William was besieging the castle of Gerberoi, into which his son had thrown himself. They were eventually reconciled by the intercession of Queen Matilda. It was another quarrel about Normandy however with Philip I. of France, who had taken the part of Robert, that cost William his life. In the summer of 1087 a sarcasm of Philip's on the corpulency of his brother of England, who was then confined to his bed by illness at Rouen (lying-in, as Philip phrased it), infuriated the proud Norman: he swore that at his churching he would set all France in a blaze: as soon as he was able to be on horseback, he collected an army, and made a dash at the city of Mante, formerly belonging to Normandy, which he took, and immediately ordered to be set on fire. This was on the 10th of August. He was enjoying the sight of the conflagration, in which many of the inhabitants perished, when his horse stumbled on some hot embers, and threw him forward on the pommel of the saddle, by which he was so much injured that, being carried back to Rouen, he never again left his bed, but died there on the morning of the 9th of September following, in the fifty-ninth year of his age and twenty-first of his reign.

What manner of man the Conqueror was may be sufficiently gathered from this outline of his history. His character has been graphically sketched by the Saxon chronicler from personal knowledge—'For we looked on him,' says the writer, 'and some while lived in his herd (on his hirede).' The feature that had chiefly impressed itself upon this close observer was what he calls his starkness, by which he seems to mean his unbending strength of will and firmness or tenacity of purpose. Three times in the course of his description he remarks this. But while he was stark beyond all measure, and very savage to those who withstood him, the honest chronicler states, on the other hand, that he was mild to good men who loved God, and that he was a very wise man, as well as very rich, and more worthful and strong than any of his ancestors. William indeed was far from being all devil, any more than his father (Robert le Diable), whom he seems to have a good deal resembled, and who was complimented by his contemporaries with the epithet of the Magnificent, as well as with the other expressive surname by which he is commonly remembered. With all his ferocity, William evinced throughout his life a reverence both for the ordinances and the ministers of religion; and, although he would not suffer either his clergy or the pope to erect within his kingdom an ecclesiastical dominion separate from and independent of that of the crown, he showed himself anxious on all occasions to maintain the respectability of the church by promoting able men to the chief places in it, as well as by upholding it in its legal rights and powers. That he was eminently endowed with the qualities, both moral and intellectual, that raise men above their fellows, is abundantly proved by what he did. Few men have projected the influence of their genius across so wide an expanse both of time and space as the founder of the Norman dynasty in England. In moral disposition William was passionate and ruthless; but he does not appear to have been vindictive, nor even, properly speaking, cruel or bloodthirsty, notwithstanding the destructive character of some of his military operations. There was nothing weak, nothing little about this great king. In his latter days, the chronicler intimates, he fell into the vices of avarice and greediness; but this love of money was only one of the forms assumed by his love of power, the natural passion of all superior minds. So one of the forms in which the energy and ardour of his character were displayed was his passion for the chace. 'So much he loved the high-deer (*hea deor*),' naïvely writes the Saxon annalist, 'as if he had been their father.' It is plain indeed that the deer and other *ferae naturae* had quite as much of his affection as his children, and somewhat more than his subjects. 'He made laws,' says the chronicler, 'that whosoever should slay hart or hind, him man should blind. As he forbade the slaying of harts, so also did he of boars. He also decreed about hares, that they should go free.' (Upon this head see further in Forest Laws, x., 358; and New Forest, xvi., 173.)

The principal portion of the laws of the Conqueror that has come down to us consists of a capitulary which is said to have been drawn up and agreed upon in an assembly of the principal persons of the realm whom he called together about the year 1070. It is for the most part a selection of the laws previously in force in the Saxon times, according to their last general revision by Canute the Great. It exists both in Latin and in Romance, or old French; and the Latin version, which is preserved in the history attributed to Ingulphus, has usually been reckoned the original; but Sir Francis Palgrave, who has printed both versions from better manuscripts than had been before employed, in his 'Rise and Progress of the English Commonwealth,' Proofs and Illustrations, lxxxviii.-civ., has advanced some reasons for believing that these laws of the Conqueror were most probably originally written in Latin, which was the language in which legal documents were commonly drawn up in England for some ages after this date. The common statement that William attempted to abolish the English tongue and to substitute the French, whether in the courts of law or in the ordinary intercourse of life, rests upon no good authority, and is irreconcilable with well-ascertained facts. For an account of the memorable survey of the kingdom completed by order of William in 1086, see the article Domesday-Book (ix. 71).

The wife of William the Conqueror was Matilda, daughter of Baldwin V., Earl of Flanders, surnamed the Gentle. He married her before he acquired the crown of England, and she died 2nd November, 1083. Their children were, Robert, whom his father called Gambaron (Roundlegs), and Courthose (Shorthose), who died a prisoner in the castle of Cardiff in 1134; Richard, who was gored to death by a stag in the New Forest; William, by whom he was succeeded on the English throne; Henry, who succeeded William; Cecilia, who became abbess of the monastery of the Holy Trinity at Caen, and died there 13th July, 1126; Constance, who was married to Alan, Earl of Bretagne and Richmond, but died without issue; Adelina, who died young before the Conquest; Adela, who married Stephen, Earl of Blois, by whom she became the mother of Stephen, king of England, and who afterwards took the veil, and died in the nunnery of Mareigny in France about 1137; Gundred, who married William de Warrenne, Earl of Surrey, and died in childbed at Castleacre in Norfolk, 27th May, 1085; and Agatha, who was contracted to Alphonso, king of Leon and Castile, but died before her marriage. He had also a natural son, William de Peveril, by Maud, daughter of Ingelric, a Saxon nobleman, who afterwards married Ranulph de Peveril.

WILLIAM II., King of England, surnamed by his French and Norman contemporaries *Le Rouge*, and by the English *The Red* (meaning the Ruddy-faced), which epithets the Latin chroniclers have inaccurately translated not by the proper term *Ruber*, but by *Rufus* (which means the Red-haired), was the second of the three surviving sons of William the Conqueror, and was born in Normandy in 1056. He was educated under the care of the celebrated Lanfranc, whom, in 1063, his father had called from his retirement at Bec to preside over the newly-founded monastery of St. Stephen, at Caen, and whom he afterwards, in 1070, made archbishop of Canterbury. Lanfranc was the young prince's instructor not only in learning and piety, but in the art of war, and it was from Lanfranc that Rufus received his knighthood. He appears to have been from his boyhood a favourite of his father, who saw reflected in him much more of his own character than in his eldest son, the thoughtless and indolent Robert. A few days before his death, the Conqueror, having assembled around his bed those of his prelates and barons who were with him at Rouen, declared to them that he was willing to leave the dukedom of Normandy, which he had received from his ancestors, to his first-born, but that as for the succession to the kingdom of England, which he had acquired by his own good sword, he would leave that to the decision of God. He added, however, that he earnestly hoped it might fall to William; and he advised that prince, who was present (Robert was not), to repair immediately to England, giving him at the same time a recommendatory letter to Archbishop Lanfranc. William lost no time in setting out for the sea-coast; he heard of his father having breathed his last as he was about to embark at Wissant, near Calais, having probably waited till he should be able to carry over that news; he concealed it however, after he had landed, till he had obtained possession of the fortresses of Dover, Pevensey, and Hastings, on pretended orders from his father; he then hastened to Winchester, where he easily induced the master of the royal treasury, William de Pont de l'Arche, to give him his keys; and finally he presented himself before Lanfranc, to whom he had already forwarded his father's letter by a confidential messenger. Lanfranc a few days after assembled a council of the prelates and barons; no one opposed his proposition that William should be declared king; and he was accordingly crowned by the archbishop at Westminster, on Sunday the 26th of September, 1087. The commencement of his reign is dated from that day.

The first business to which the Red King had to address himself, was to defend the throne which he had thus mounted against his elder brother. Robert, who at the time of his father's death had been living in exile and poverty at Abbeville in the dominions of the king of France, soon made his appearance at Rouen, and was at once acknowledged as duke of Normandy. It may be doubted whether he would not have been satisfied with this ancestral inheritance if he had been left to himself; but this, in the circumstances, could hardly be. His chief instigator was Odo, the bishop of Bayeux, who, in the latter years of the preceding reign, had fallen under the displeasure of his half-brother the Conqueror, and was now eager to avenge himself by the dethronement of Rufus. Many others of the English barons also who held possessions in both countries were strongly averse to their separation, as involving the inconveniences and risks of a divided allegiance. Odo is said to have arranged his plans with his friends at the festival of Easter, 1088, which was kept by William at Winchester with great state. The insurrection broke out immediately after in all parts of the kingdom. But no efficient assistance came from Robert; William with prompt sagacity appealed to his Saxon subjects to stand by him against their hated Norman lords; the castles of Pevensey and Rochester, with Odo in the former, and Eustace, earl of Boulogne, in the latter, were both compelled to surrender; and the rebels, after some further ineffectual resistance, soon everywhere threw down their arms. This unsuccessful attempt to make a revolution in England was speedily followed by a revolt of many of the Norman barons against Duke Robert, who with difficulty was able to maintain his ground, even with the assistance of his brother Henry, to whom in his necessity he parted with about a third of his dominions for the sum of 3000*l.* [HENRY I., vol. xii., p. 118.] After this civil war had gone on for some time, and Normandy had been reduced to a state of almost complete anarchy, William landed in that country at the head of an army, in January, 1091. But the two brothers did not try their strength in battle: Robert applied for protection to his feudal lord, Philip I., king of France, and by his mediation a peace was concluded between them at Caen. By this treaty William retained possession of all the Norman fortresses of which his partisans had already made themselves masters, and that was the only actual result of the pacification. It was also indeed agreed that Robert should have compensation in England for the territory thus taken from him, and that, whichever of the two brothers should survive the other should inherit both countries; but these engagements, which cost William nothing at the time of making them, were certainly never looked upon by him, nor perhaps even by Philip (whose desertion of his brother at a critical juncture he had already, some time before this, obtained by a judiciously administered bribe), as good for anything except to serve the purpose of the moment. Robert and William, now converted from enemies into allies, next turned their united arms against their remaining brother, and Henry was in his turn driven into exile. When Rufus returned to England, Robert accompanied him; but he soon found that his promised indemnity was not to be obtained, and he returned to Normandy in disgust. Meanwhile the Red King, in the latter part of 1091, had marched an army into Scotland to avenge himself on Malcolm Canmore, who had taken advantage of his absence in Normandy to invade Northumberland; the two kings settled their differences without fighting, by a treaty, in which Malcolm consented to do homage to William—whether for his kingdom of Scotland or for his English possessions is, as in other like cases, matter of dispute. This Scottish war broke out again two years after; Malcolm made another furious inroad into Northumberland in the winter of 1093, and, in an attempt to make himself master of Alnwick Castle, he was slain, on the 13th of November in that year, with his eldest son. In the spring of 1094, Rufus again passed over into Normandy, where his brother had once more called to his assistance the French king, and the war between the two recommenced. Finding it to be going rather against him, Rufus had recourse to his old policy, in the conduct of which however he introduced a new stroke of ingenuity: having sent his commission over to England for an immediate levy of 20,000 men, when that force had assembled for embarkation at Hastings, an order suddenly came that they should all return home, each man merely leaving behind him, in lieu of his services in the field, the sum of ten shillings, which is supposed to have been what each had received from his lord to maintain him during the campaign; the money thus procured William handed over to Philip, who thereupon withdrew from the war. Rufus was prevented from immediately taking full advantage of this arrangement by being recalled to England by a rising in Wales, and being afterwards further detained by a conspiracy of his Norman subjects in the northern counties, at the head of which was Robert Mowbray, earl of Northumberland, one of the most powerful of his barons. He made two campaigns, with little success, against the Welsh in the summers of 1094 and 1095, and was at last obliged to rest satisfied with curbing them, and guarding the western counties from their incursions, by a chain of fortresses; but Mowbray and his adherents were, after a short contest of arms, effectually put down. Soon after this, in 1096, Robert, seized with the new spirit of taking the cross and setting out to fight the infidels in Palestine, freed William from all further trouble about Normandy by characteristically offering to put him in immediate possession of the whole duchy for 10,000*l.* The terms appear to have included a right of redemption by Robert either within or after five years; but the transaction could not have appeared to anybody to amount really to anything else than a complete and final surrender. Such at any rate we may be certain that William determined it should be, whatever were the precise terms of the conveyance. Rufus at this moment had no more money than his needy brother; but by the instrumentality of the famous Ralph Flambard, who ever since the death of Archbishop Lanfranc, in 1089, had been at once his prime minister and chief agent of his oppressions, and the favourite companion of his debaucheries, he soon managed to raise the required sum, not, as an old writer expresses it, by merely fleecing his poor subjects, but rather, as it were, by flaying off their skins. The people of Normandy in general submitted quietly enough to this transference of themselves and their country to a new lord; but the Manceaux, or inhabitants of the district of Maine, Robert's right to which was disputed, rallied around his rival claimant, Helie de la Flèche, and attempted to set William's authority at defiance. This opposition called over the English king once more to the Continent in 1100; he was hunting in the New Forest when a messenger arrived with the news that Helie had surprised the town of Mans, and was besieging the Norman garrison in the castle. Rufus instantly rode to the nearest seaport, and, stepping on board the first vessel he found, directed the crew to hoist sail and begone, asking them, in answer to their entreaties that he would wait till the weather was calmer, if they had ever heard of a king that was drowned. 'If I understand,' he also said, 'the temper of the youth of this land, I shall have plenty of followers.' Nevertheless it does not appear that any considerable force accompanied him; but as soon as Helie heard of his arrival, he dismissed his troops and took to flight, upon which William shortly after returned to England. This was the last time that the Red King took the field. On the 2nd of August following he was shot dead by an arrow as he was hunting in the New Forest, by whose hand was never certainly known, although the popular story of the time, dressed up with many striking circumstances by the monkish chroniclers who subsequently recorded it, attributed the act to Sir Walter Tyrrell, otherwise, from his estates in France, called Sir Walter de Poix, a bolt aimed by whom at a deer is said to have been turned aside by a tree, and, striking the king under his raised right arm, to have pierced his heart. The dead body was left unattended till a late hour in the evening, when it was found by a poor charcoal-burner, who put it in his cart and so conveyed it to [illegible] William's successor on the English throne was [illegible]

William Rufus was never married, and [illegible] have not even assigned to him any natural children, notwithstanding all the licentiousness that is attributed to him in general terms. The chroniclers, who were all ecclesiastics, have drawn his character in the darkest colours, and it may be presumed that he is indebted for some portion of the infamy and malediction they have heaped upon him to the manner in which he treated the church, of which he was throughout his reign the systematic oppressor and despoiler. His conduct in regard to that matter is detailed in the article ANSELM (ii. 57). At the same time it is sufficiently clear that neither as a man nor as a king did he much care for restraints of any kind more than those of religion. He was not only dissolute, but rapacious, crafty, unscrupulous, and in the main regardless of everything except his own interests and passions. He was also however not without some of the better points of his father's character, sharing largely not only in his courage and energy, but likewise in his political talent. Rufus, with all his ruffianism, too, had a taste for some of the true splendours of civilization, and showed that he was not altogether sunk in sensuality by devoting part of his wealth to architecture, the only one of the fine arts which a king could in his day do much to encourage. Besides other erections of less magnificence, he was the builder of the first Westminster Hall. The commissioners of the Fine Arts, in their Report, dated 24th March, 1843, state that 'they have reason to believe that the original hall of King William Rufus occupied the same area as the present building.'

WILLIAM (HENRY) IV., king of England, was the third son of King George III., and was born at Buckingham House, on the 21st of August, 1765. He was placed, with his elder brothers, the Prince of Wales and Prince Frederick (afterwards duke of York), under the care of Dr. Majendie, till the year 1771, when a separate establishment was formed for the two elder princes, and Prince William was left at Kew with his younger brother Edward (afterwards duke of Kent), under the superintendence of Colonel Bude, a native of Switzerland, who afterwards became private secretary to the duke of York. It having been determined that he should enter the navy, he was, on the 15th of June, 1779, rated as a midshipman on board the Prince George, of 98 guns, then bearing the flag of Rear-Admiral Digby at Spithead. The Prince George soon after joined the Channel fleet, under the command of Sir Charles Hardy, and in the end of the year sailed as one of the squadron sent out with Rodney to Gibraltar with supplies for the garrison. On the passage out they fell in, on the 8th of January, 1780, with a Spanish fleet of storeships, under the convoy of seven men-of-war, and took them all, twenty-two in number: the largest man-of-war, the Guipuscuano, of 84 guns, Rodney named the Prince William, 'in respect to his royal highness, in whose presence she had the honour to be taken.' In this first affair however in which his royal highness met the enemy there was no fighting. But eight days after a Spanish squadron of fourteen ships of the line, commanded by Don Juan de Langara, was encountered off Cadiz, and a sharp though short engagement ensued, which ended in the capture of several of the enemy's ships and the destruction or dispersion of the rest. Rodney, having then proceeded to the Bay of Gibraltar and thrown in his supplies to the garrison, lay there for about three weeks, during which time his royal highness often visited the rock. The Prince George returned in the division under the command of Admiral Digby, who was dispatched home with the prizes, and who on the passage fell in with a French convoy bound for the Mauritius, of which he captured three store-ships and a man-of-war; and his royal highness found himself again in England by the beginning of May.

Having made two or three more short cruises in the Prince George, he then went out a second time to Gibraltar in that ship in the spring of 1781, in the fleet commanded by Admiral Darby. After this Admiral Digby, with the Prince George and three other ships, proceeded to New York in America, which he reached on the 24th of August. While his royal highness remained here, which he did throughout the winter, lodging in the town, it appears that a plan was arranged by some of the revolutionary partisans, with the sanction of Washington, for getting possession of his person; but the attempt was never actually made. In the autumn of 1782 he was, at his own request, transferred on board the Warwick, 50 guns, commanded by Captain Elphinstone, afterwards Lord Keith; from which however he was soon after, by the king's orders, removed to the Barfleur, commanded by Sir Samuel Hood. It was while he was in this ship, then lying off Staten Island, that he made his first acquaintance with Nelson, at the time commanding the Albemarle frigate, whose fast friend he ever afterwards continued. In the early part of 1783 Sir Samuel, now Lord Hood, arrived with his fleet at Port Royal, Jamaica; and his royal highness remained here and at the Havanna, to which he proceeded in the Fortunée frigate on the sailing of Lord Hood for England, till midsummer, when he returned home in the Fortunée, in which he reached Spithead on the 26th of June. The next two years were spent in a continental tour, on which he set out 31st July, 1783, attended by General Bude and Captain Merrick, and in the course of which, after being joined at Hanover by his brother Frederick, now styled Bishop of Osnaburg, he visited Berlin, where the two young English princes saw a great deal of Frederick the Great, Lüneburg, where they spent a winter, Göttingen, Hesse-Cassel, &c., after which Prince William proceeded alone through Switzerland to Savoy and Piedmont, and, after a visit to Prague, returned to Italy, where he spent the winter. Having come back to England in the spring of 1785, he was, after the usual examination, passed as a lieutenant on the 17th of June, and appointed third lieutenant of the Hebe frigate, in which he soon after made a voyage round the British Islands. In April, 1786, his royal highness, having previously risen to be second lieutenant of the Hebe, was removed to the Pegasus, and received his commission as captain. In this ship he soon after sailed to Newfoundland, thence to Halifax in Nova Scotia, and then to Antigua, where he found his friend Nelson commanding on the Leeward Islands station. In June, 1787, he was ordered to Jamaica, from which however he soon after took upon him to return without instructions to Halifax: for that irregularity he was ordered to Quebec, but, after staying there a short time, he ventured again to take his own course, and set sail for England. He arrived at Cork in December, but was immediately ordered to repair with his ship to Plymouth; and when he got there he was by another Admiralty order expressly forbidden to quit that port without permission. In the end it was directed that his punishment should be to remain at Plymouth for as long a time as he had absented himself from his station without orders, and then to return to Halifax and the West Indies, and to remain there till he should be ordered home. He went out accordingly in command of the Andromeda, and remained, principally at Jamaica, till the spring of 1789.

The disposition he had shown to break through the ordinary rules of discipline, and the impossibility that was found to exist of imposing an adequate punishment on a prince of the blood, probably led to the determination that his royal highness's further professional career should be confined to a formal ascent through the successive honours or nominal distinctions of the service. In May, 1789, immediately after his return home, he was raised to the peerage, with the titles of Duke of Clarence and St. Andrew's and Earl of Munster; and an income of 12,000*l.* a year was settled upon him by parliament. The next year, after commanding for a short time the Valiant, of 74 guns, on that ship being paid off he was promoted to the rank of rear-admiral of the blue; he was made rear-admiral of the red in 1793, vice-admiral of the blue in 1794, vice-admiral of the red in 1795, admiral of the blue in 1799, and admiral of the fleet in 1801. During all this time however his royal highness remained without employment, living on shore as a private individual with Mrs. Jordan, with whom he had formed a connection in 1791, which lasted for twenty years, and produced a family of five sons and five daughters, of whom the eldest son was created Earl of Munster in 1831, and is since dead; the second son died young; and the eldest daughter, Lady Delisle, is also dead. The duke however frequently took part in the debates of the House of Lords, and was at least a tolerably fluent if not a very elegant or logical speaker. One of the subjects in reference to which he particularly distinguished himself was the abolition of the slave-trade, of which he was one of the most determined opponents, not a little to the injury of his popularity for some years. From 1797, when he was appointed to the office of ranger, he usually resided at Bushy Park.

In his general politics the Duke of Clarence attached himself, with his brother the Prince of Wales, from his first entrance upon public life, to the party of the Whig opposition; but he also followed the prince in giving his support to Pitt after the commencement of the war with France in 1793. On the return of Pitt to power however, after the ejection of the Addington administration, in 1804, he again joined the opposition with the prince and the Duke of Sussex; and after Pitt's death he gave a zealous support to the new ministry of Fox and Grenville on all subjects except only the abolition of the slave-trade, which he opposed to the last, in common with all his brothers. The ministry of 1806 raised his parliamentary allowance, and that of each of the other male branches of the royal family, from 12,000*l.* to 18,000*l.* per annum.

Towards the close of the war his royal highness was permitted for a short time to hoist his flag in the Jason to view the military operations going forward on the Dutch coast; and after the peace he performed the holiday services of bringing over the duchess of Oldenburg to Sheerness, and accompanying Louis XVIII. to the French coast n that ship, and afterwards of bringing the emperor of Russia and the king of Prussia to England in the Impregnable.

On the 11th of July, 1818, the duke was married at Kew o the princess Adelaide Louisa Theresa Caroline Amelia, eldest daughter of George Frederic Charles, duke of Saxe-Meiningen, now the queen-dowager Adelaide. Their union produced two daughters, one born in March, 1819, the other in December, 1820, both of whom died in infancy. Upon his marriage 6000*l.* was added by parliament to the ncome of his royal highness.

In 1827, when the death of the Duke of York had placed he Duke of Clarence in the situation of heir presumptive o the throne, a further increase of 3000*l.* was made to his nnual allowance, and the sum of 6000*l.* a year was at the ame time settled upon the duchess. On the elevation of Mr. Canning to the premiership in April of this year, he placed the duke at the head of the Admiralty, with the ffice of lord high admiral, but without a seat in the abinet. This office however his royal highness only held ill the following September; and he returned again to rivate life, till the death of George IV., on Saturday, the 6th of June, 1830, raised him to the throne.

The course of events during the reign of William IV. erived its direction and character from the memorable movements on the continent of Europe with which the ccession of a new king in England chanced to be co-ncident. The publication of the ordinances of Charles X. gainst the press in France took place exactly a month fter King William's accession: then rapidly followed he revolution of the Three Days in Paris, the dethronement of Charles, the transference of the French crown o the duke of Orleans, and after the lapse of another month the commencement of the similar revolution in Brussels, which terminated in the separation of Holland nd Belgium. In England the first symptom of wide-spread opular uneasiness, disaffection, and tendency to outbreak was given by the numerous incendiary fires which alarmed he country in the months of September and October. The ew parliament, elected since the accession of the new ing, met on the 26th of October. On the 7th of November immense excitement was occasioned in the metropolis nd elsewhere by the announcement of the resolution come to by the responsible advisers of his majesty that he ould not venture with safety to his person to dine on that vening with the lord mayor and corporation of the city of ondon in Guildhall. This was followed on that day week y the resignation of the duke of Wellington, Sir Robert eel, and the other ministers, on Sir Henry Parnell carrying his motion in the House of Commons for referring the ettlement of the civil list to a select committee, by a maority of 233 against 204; and within another week the Grey dministration was in office under the banner of parliaentary reform. Meanwhile commotion and confusion ere spreading on the Continent. Besides some minor ruptions of the same kind, the insurrection in Poland roke out in the end of November—an unhappy attempt, hich was entirely unsuccessful.

On the 1st of March, 1831, Lord John Russell, as the rgan of the cabinet, and, as was universally believed, with he concurrence of his majesty, moved in the House of Commons the first reading of the first Reform Bill. On he 22nd of the same month the second reading was carried by a majority of one; or by 302 votes against 301. But on the 20th of April ministers were beaten by 299 against 291 on General Gascoigne's motion for striking out the part of their reform scheme which diminished the number of members of the House of Commons; and two days after parliament was dissolved, with the avowed design of ascertaining by a new election the sense of the people on the measure which had been thus for the present defeated or abandoned.

The new parliament assembled on the 14th of June, and the success of the ministerial appeal to the people was shown by the second reading of a second Reform Bill being carried in the House of Commons on the 4th of July by a majority of 367 to 251. It was not till the 19th of September that the House came to a vote on the third reading; but that too was carried by a large majority, by 349 against 236. The measure however was defeated in the Upper House on the 3rd of October, by the second reading being negatived by a majority of 199 to 158. On the 20th parliament was prorogued.

A new session commenced on the 6th of December; and on the 12th Lord John Russell introduced the third Reform Bill, the second reading of which was carried on the 17th by a majority of 324 against 162. If the friends of the measure had not become more numerous, it was evident that its opponents were growing weary of the contest, and were hopeless of ultimately averting it. On the third reading nevertheless, the vote upon which did not take place till the 19th of March, 1832, the opposition mustered again in their former force, and the motion was resisted by 239 against 355. This time the measure was also so far successful in the Lords that the second reading was carried in that House, on the 13th of April, by a majority of 184 against 175. But on the 7th of May ministers were defeated by a majority of 151 to 115, on Lord Lyndhurst's motion for postponing the consideration of the first (or disfranchising) clause of the bill; on which they immediately resigned. A ministerial interregnum of nearly a fortnight's duration ensued; but by the 17th Earl Grey and his friends were again in power: the most stringent methods are understood to have been employed, with the consent of the king, to keep back the refractory peers; and on the 4th of June the Lords passed the bill by a large majority, 106 voting for the motion and only 22 against it. It received the royal assent, and became law, three days after.

The bringing about of this change thus occupied, almost to the exclusion of all other measures or questions, the first two years of the reign of William. The action of the new machinery of representation then commenced. The parliament which had passed the Reform Bill was dissolved on the 3rd of December; and the first parliament elected under the new system assembled on the 29th of January, 1833. The reform of the representation was now followed by the abolition of colonial slavery, the reform of the poor laws, and the reform of the Irish church. At the same time the Reform ministry underwent a succession of changes. First in March, 1833, Lord Durham resigned the privy seal from illness; next followed, in the end of May, 1834, the retirement of Mr. (now Lord) Stanley, Sir James Graham, Lord Ripon, and the duke of Richmond, on an avowed difference with their colleagues; and, finally, on the 9th of July, Lord Grey himself and Lord Althorpe relinquished office in consequence of a misunderstanding with Mr. O'Connell in regard to the Irish Coercion Bill. Lord Althorpe was induced to return after about a week; but the cabinet is understood by this time to have lost the confidence of the king; and on the 16th of November, shortly after Lord Althorpe had been called to the Upper House by the death of his father, Earl Spencer, and it became necessary to make a new arrangement with regard to his office of the chancellorship of the exchequer, his majesty sent for the duke of Wellington, and directed him to construct a new ministry. On the 8th of December Sir Robert Peel was gazetted as first lord of the treasury, the duke of Wellington as foreign secretary, and the cabinet was completed by other names belonging to the Conservative or anti-reform party. On the 30th parliament was dissolved.

This arrangement however did not stand long. On the day on which the new House of Commons assembled, the 19th of February, 1835, ministers were beaten on the question of the speakership by a majority of ten votes, or by 316 against 306; and on the 24th they were again defeated on the address by 309 against 302. They maintained the struggle for six weeks longer; but at last, upon Lord John Russell carrying a motion against them on the Irish tithe question (the famous appropriation clause) by a majority of 285 to 258, on the 7th of April, they resigned the next day. The king, understood to be now thoroughly hostile to his old friends, in vain attempted a further resistance; by the 18th the Reform party were again in power, with Lord Melbourne as premier. But to Lord Durham, Lord Stanley, Sir James Graham, Lord Ripon, the duke of Richmond, Earl Grey, and Earl Spencer, who, having all belonged to the original Reform cabinet, had since ceased to hold office, was now added Lord Brougham. Lord Melbourne's administration lasted for the remainder of the reign. Its most important measures were the several municipal reform acts. [Borough.] William IV. died at Windsor, after a short illness, on the morning of the 20th of June, 1837. He was succeeded by Queen Victoria.

WILLIAM III. of England. [Nassau, House of.]

WILLIAM I. of Orange. [Nassau, House of.]

WILLIAM of MALMESBURY. [Malmesbury, William of.]

WILLIAM of WYKEHAM. [Wykeham, William of.]

WILLIAM OF NEWBURY (in Latin, Gulielmus Neubrigensis) is said to have been born at Birdlington, in 1136, and to have been properly called William Little, whence he sometimes designates himself Parvus, or Petit. His common name he derived from the monastery of Newbury in Yorkshire, of which he was a member. Nothing more is known of his personal history, except that he is said to have been a disappointed candidate for the bishopric of St. Asaph on the death of Geoffrey of Monmouth in 1165, and that he appears to have been alive in 1220. He is known as the author of a Chronicle of England, which comes down to the year 1197, and is written in better Latin than was then common. It was first printed in 12mo. at Antwerp in 1597, under the title of 'Gulielmi Neubrigensis Rerum Anglicarum Libri V.' The subsequent editions are, 'Gulielmus Neubrigensis de Rebus Anglicis, cum notis J. Picardi,' 8vo., Paris, 1610; and 'Gulielmi Neubrigensis Historia sive Chronica Rerum Anglicarum, Libris quinque, e codice MS. pervetusto in Bibliotheca Thomae Sebright, Bar.; Studio atque Industria Th. Hearnii, qui ei praeter Joan. Picardi annotationes, &c. . . . . suas adjecit,' 3 vols. 8vo., Oxon. 1719. William of Newbury is a keen castigator of the British legends detailed by Geoffrey of Monmouth.

WILLIAMS, JOHN, lord keeper of the great seal of England, and afterwards archbishop of York, was the son of Edward Williams of Aber-Conway, in Caernarvonshire in Wales, where he was born on the 25th March, 1582. He received his earliest education at the public school at Ruthin, and entered a student of St. John's, Cambridge, on the 5th November, 1599. Connected with a great Welsh family, he was early looked upon as one likely to bring distinction on the principality. 'One thing,' says his entertaining biographer, Hacket, 'put him to the blush and a little shame, that such as had gigling spleens would laugh at him for his Welsh tone. For those who knew him at his admission into St. John's Society, would often say that he brought more Latin and Greek than good English with him. This also plucked advantage after it: for it made him a very retired student, by shunning company and conference, as far as he could, till he had lost the rudeness of his native dialect.' His studious retirement does not seem to have been of long duration. He was largely supplied with money, and distinguished himself at college by a gay life and profuse expenditure. 'From a youth and so upward,' continues Hacket, 'he had not a fist to hold money, for he did not only lay out, but scatter, spending all that he had, and somewhat for which he could be trusted.' Yet he was a diligent and ardent student. He had a powerful memory, and great facility in learning languages and applying terms of art. When he afterwards sat on the bench of the Court of Chancery, and lawyers who professed a contempt for his legal acquirements endeavoured to puzzle him with pedantic technicalities, it is recorded that he used to retort, to the mirth of the whole court, by drawing upon his old studies in scholastic logic. He required little rest, and three hours of sleep contented him. 'He surrendered up his whole time to dive into the immense well of knowledge that hath no bottom. He read the best, he heard the best, he conferred with the best, excribed, committed to memory, disputed: he had some work continually upon the loom. And though he never did so much in this unwearied industry as himself desired, he did far more than all that did highly value him could expect. . . . . All perceived that a fellowship was a garland too little for his head, and that he that went his pace would quickly go farther than St. John's walks.' In 1605 he took the degree of master of arts. He entered into holy orders in 1609, accepting a small living in Norfolk, and in 1611 he was instituted to the rectory of Grafton Regis in Northamptonshire. In the same year the foundation of his subsequent greatness was laid by his being chosen chaplain to the lord chancellor Egerton. He had been able to secure the favourable notice of King James by his conduct in relation to a slight dispute between his majesty and the university of Cambridge; and his new office, 'a nest for an eagle,' as Hacket calls it, gave him such access to the royal person as enabled him to profit by the favourable impression. 'The chaplain understood the soil upon which he had set his foot, that it was rich and fertile, able with good tendance to yield a crop after the dimensions of his desires.' Fortunately for himself, he refused the offer of remaining in his chaplaincy under Bacon—perhaps his worldly shrewdness taught him that the soil was undermined beneath.

Having been made one of the chaplains in ordinary to the king, in 1619, he preached before James at Theobalds, and the sermon was printed by command of his majesty, who soon afterwards gave him the rich deanery of Salisbury. But James could only issue his favours through one channel; and desiring to befriend Williams, recommended him to seek the patronage of Buckingham. He adopted the friendly hint, and acted the part of apostle in reconciling the conscience of the favourite's Roman Catholic bride to the Church of England. Of a paper, containing the elements of the doctrinal belief of the Church of England, which he drew up on this occasion, twenty copies were printed by order of the king. It was by the advice of Williams that Buckingham adopted the bold project of sacrificing Bacon to save himself from public indignation. The project was more successful than ordinary human foresight could have anticipated, and though it was an unpopular measure to renew the practice of committing the great seal to the hands of an ecclesiastic, the favourite's gratitude overcame his caution. Williams was sworn in as lord keeper on the 10th July, 1621. In the same month he was made bishop of Lincoln, and he was allowed to hold the deanery of Westminster (in which he had been installed in 1620) and the rectory of Walgrave in commendam. He managed to preserve possession of so many ecclesiastical preferments, that, according to Dr. Heylyn's remark, 'he was a perfect diocese within himself, as being bishop, dean, prebend, residentiary, and parson, all at once.' Bacon was not the only person on whose ruin Williams desired to rise; he was indefatigable in his endeavours to have Archbishop Abbot deprived of his office, on account of his having accidentally shot Lord Zouch's deer-keeper. [Abbot.] It was part of Williams's policy to employ, with the vast funds which were at his command, a crowd of court spies, whose information he turned to his own advantage. When the Marquis Inoiosa, the Spanish ambassador, had succeeded in terrifying James into the belief that he was a prisoner in the hands of Buckingham, Williams was able to inform the favourite of the cause of the king's altered conduct, and to suggest a remedy. Buckingham however appears to have soon entertained a fear that the lord keeper was acquiring too great a share of independent power, and his ruin was resolved on. Laud, whom he was the first to patronise, had also become his deadly enemy, and when he perceived that the keeper was sinking, 'he shunned him,' says Hacket, 'as the old Romans, in their superstition, walked aloof from that soil which was blasted with thunder.' Laud's tell-tale diary is full of ominous dreams about Williams, in which the wish is father to the thought. In the meantime Buckingham himself sunk in the favour of James, and Williams remained lord keeper till the accession of Charles, when, in October, 1626, he was deprived of his office. Williams was ordered not to continue in his seat in the House of Lords, but he was not a man to be intimidated. He retained his place on the bench of bishops, and, as far as his High Church principles would permit, supported the popular cause, and exerted himself in promoting the Petition of Right. His relentless rival Laud raised against him, in the Star Chamber, a charge of betraying the king's secrets, contrary to his oath as a privy councillor. He was convicted of subornation of perjury in defending himself from this charge,—fined 10,000*l*., suspended from his offices, and condemned to imprisonment during the royal pleasure. At the meeting of the Long Parliament in 1640, he was released, and resumed his seat in the House of Lords. A revolution had now taken place in the court; he was received into favour, and in the following year translated to the archiepiscopal see of York. He retired during the civil war to Aber-Conway in Wales, and held out Conway Castle for the king. He died on 25th March, 1650. Clarendon charges Williams with being vain, perfidious, and revengeful. Weldon and others accuse him of having been a corrupt judge—a charge receiving support from the lavish scale of his expenditure. The same writer charges him with profligacy; but according to Hacket, who would not be likely to mention such a circumstance if it were not true, he accidentally suffered a mutilation in youth, which made continence in his case be no virtue. In Collier's 'Annals of the Stage' (ii. 27) the curious circumstance is stated of his having been charged with having the 'Midsummer Night's Dream' exhibited in his house on Sunday, 27th September, 1631. In 1637 he published, in quarto, 'The Holy Table, name and thing, more antiently, properly, and literally used under the New Testament than that of Altar.'

(Hacket, *Memorial offered to the great deservings of John Williams, D.D.* &c.; Philips, *Life of John Williams*, &c.; Brodie, *British Empire*, ii. 349-373; Works cited.)

WILLIAMS, SIR CHARLES HANBURY, was born in the year 1709, and was the third son of John Hanbury, Esq., a South Sea Director. The name of Williams was assumed in pursuance of the directions of the will of his godfather, Charles Williams, Esq., of Caerleon. He was educated at Eton; after leaving school, he went abroad for some time, and after his return from foreign travel married, in 1732, Lady Frances Coningsby, daughter of Thomas, earl of Coningsby. The year after his marriage he became member of parliament for the county of Monmouth. In parliament he steadily supported Sir Robert Walpole, but took no prominent part as a speaker. He gave the minister however a more effective assistance than that of speeches, by frequent political ballads, which he composed with much skill, and to which he owes a great part of his reputation. In 1739 he was appointed paymaster of the marines; in 1746 he was made a knight of the Bath, and was sent as envoy to Dresden. In 1749 he succeeded Mr. Legge as minister plenipotentiary at Berlin, but in 1751 he returned again to Dresden. He acquitted himself in these diplomatic employments greatly to the satisfaction of his employers, and showed a diligence and regularity in business which surprised those who had known him only as a man of fashion and a wit of private circles. He was sent from Dresden on a very important mission to St. Petersburg, which had for its object to engage the empress of Russia in a triple alliance with Austria and England against France. His first efforts at St. Petersburg were attended with remarkable success, but the negotiation ultimately failed, and its failure operated severely on Sir C. H. Williams's mind and health. He left St. Petersburg in 1757, in a bad state of health, and with his mind in some degree affected. When he arrived in England he was quite insane. He died on the 2nd of November, 1759. He left two daughters, the elder of whom married William Anne, fourth earl of Essex, and the younger the Hon. Robert Boyle Walsingham, a younger son of the first earl of Shannon.

Sir Charles Hanbury Williams is known creditably as a poet by his Odes (12mo., 1775). His principal fame during his life was derived from his political squibs, which are of a superior order of excellence, and his talents for conversation. He was the intimate friend of Horace Walpole, Henry Fox, the first Lord Holland, and his brother Stephen Fox, the first Lord Ilchester. He is the author of a paper in the 'World,' No. 37, which describes with much humour the miseries of a great lady's dependent companion.

WILLIAMS, EDWARD. [WELSH LANGUAGE AND LITERATURE.]

WILLIAMS, REV. JOHN, 'the apostle of Polynesia,' was born June 29, 1796, at Tottenham, near London. He enjoyed the instruction of a pious mother, and his early years were distinguished by a most amiable disposition and a degree of intelligence which entitled him, according to the information furnished to his biographer, to the character of 'a handy lad;' but during his youth he showed no signs of extraordinary intellectual powers, nor was he the subject of those deep feelings of regard for religious truth which subsequently became the ruling principles of his life. In 1810 he was apprenticed to a furnishing ironmonger in the City Road, but as the circumstances of his family rendered it unnecessary that he should apply himself to any handicraft employment, his indentures exempted him from the more laborious part of the business, and his employers engaged to confine him to the commercial department. Young Williams soon displayed an inclination for the workshop rather than the counter, and frequently availed himself of the absence of the workmen during their meals to step into their places at the bench or the forge. By such means he became a skilful workman, and his master, Mr. Tonkin, found it to his interest to employ him in executing orders which required peculiar delicacy and skill. He would also frequently volunteer his services for bell-hanging and similar out-door employments. While thus employed, Williams became connected with companions whose irreligious habits threatened to exert a most fatal influence upon his character; but on a Sabbath evening early in 1814, while waiting in the street for some dissipated companions with whom he had agreed to spend the evening at a tavern, he was recognised and accosted by Mrs. Tonkin, the wife of his employer, who was then on her way to the Tabernacle, Moorfields. She persuaded him to accompany her, and he there heard a sermon by the Rev. Timothy East, of Birmingham, which so deeply impressed his mind as to lead to an entire change of life. Instead of a wild and thoughtless youth, Williams became a diligent hearer and an anxious inquirer after religious knowledge, and before long he united himself with the religious community assembling at the Tabernacle, joined a class of young men formed for the purpose of mutual improvement, and became an active Sunday-school teacher. Missionary operations were then exciting a very lively interest at the Tabernacle, where the Rev. Matthew Wilks was exerting himself to extend a sense of their importance; and at one of the numerous meetings held with this view, Williams became impressed with a strong desire to devote his talents to the service of the heathen. After much deliberation, he offered his services to the London Missionary Society, in July, 1816, and being accepted, he was allowed to leave Mr. Tonkin before the expiration of his apprenticeship.

The islands of the Pacific Ocean, the inhabitants of which had been made known to the British public by the voyages of Captain Cook and others, were selected by the founders of the London Missionary Society as the scene of their earliest labours. [MISSIONS, vol. xv., p. 271.] For many years the pioneers of the benevolent enterprise laboured with very little success; but before the time when Williams offered himself to the Society, many of the natives had embraced Christianity, and in some islands the cruel rites of idolatry had been entirely abandoned. So far from the difficulties of the missionaries being removed by this happy change in their circumstances, they were rather increased by their success; the number of agents in the field being totally insufficient to supply the necessities of those people who were already emerging from barbarism, and making the most touching appeals for religious instruction, as well as for assistance in acquiring the arts of civilization. The most urgent demands for more missionaries were sent to the Society in England, the directors of which had no alternative but to leave their former agents to sink under the weight of their responsibilities, and the half-awakened savages to relapse into their former superstitions, or to send out men imperfectly qualified for a work requiring so much prudence and skill, as well as unconquerable zeal. Under these circumstances Williams and several other young men were sent out with only a few months' preparation for labours which rather called for years of preliminary study. During the short period allowed for the purpose, Williams did not confine himself to literary and theological studies, but also visited manufactories, and made himself acquainted with such processes as he might have to teach in accordance not only with [illegible] own views of the missionary work, but also with the ins[illegible] tions received from the Society with which he had [illegible] nected himself, whose aim it has always been, in [illegible] tion to the great design of teaching the gospel, to introduce among the heathen the arts of civilized society. In October, 1816, Williams married Miss Mary Chauner, who proved an invaluable coadjutor in his future labours; and on the 16th of November following Mr. and Mrs. Williams, in company with several other missionaries, embarked for Sydney, whence after a short stay they proceeded, after calling at New Zealand, to Eimeo, one of the Society Islands, which they reached exactly twelve months after leaving London. Here they remained for some months, Mr. Williams assisting the missionaries previously stationed there, and perfecting himself in the Tahitian language. During this time he also made the iron-work for a small vessel which the missionaries were building for Pomare, king of Tahiti. After a time a party of the missionaries, including Mr. and Mrs. Williams, removed to Huahine, another island of the same group, where they were very gladly received by the natives. The fame of their arrival brought visitors from the surrounding islands, and the urgent solicitations of Tamatoa, king of Raiatea (the Ulitea of Captain Cook), induced Messrs. Williams and Threlkeld to remove to that island, which is the largest and most central of the Society group. Its population was at that time about 1300, but its political influence was far greater than might be expected from its population, and its principal chiefs received divine honours, as well as civil allegiance and tribute, from the neighbouring isles. 'From time immemorial,' observes Mr. Prout, 'this island had been the focus and source of the abominable idolatries which had darkened, demoralized, and destroyed the inhabitants of its own and the surrounding shores. Here were to be found the types of the manifold usages, even the most debasing and cruel, which had become the customs of the race; here were the archives of their religious legends; the temple and altar of Oro, the Mars and Moloch of the South Seas; and this had been the theatre of more sanguinary deeds than were to be found in the dark records of all the other islands around it. Hither hecatombs of human victims had been brought from near and distant shores to be offered in the blood-stained marai of Opoa.' Upon this interesting island the truths of Christianity had been first proclaimed by the Rev. Mr. Wilson, who, with Pomare and nineteen other Tahitians, had been accidentally driven thither in a storm; and the inhabitants had received their instruction so well as to be exceedingly desirous of obtaining missionaries for themselves. While however the people were willing to adopt Christianity as a national religion, and to give a cordial welcome to its teachers, Mr. Williams found their moral condition to be extremely debased, and their idleness apparently inveterate. They were also so scattered over the island as to render collective instruction almost impossible. It was indeed evident that their habits must be entirely remodelled before the missionaries could hope to prosecute their labours with success. Without neglecting the primary object of his mission, Williams induced the Raiateans to collect themselves to one spot, and to build habitations for themselves, as well as a chapel and school-house. For his own use he erected a comfortable house in the English style, presenting a model to which the natives were encouraged to look both in its structure and conveniences, and in the furniture with which it was adorned; almost everything being done by his own hands. The natives were thus taught not only to appreciate the comforts of civilized life, but to obtain them for themselves, by constructing houses with two or more apartments, with wooden floors, framed walls plastered with coral lime, thatched roofs, well-stocked gardens, tables, chairs, sofas, and bedsteads with turned legs, carpets, and hangings. They were also instructed in boat-building, and their diligence and ingenuity were excited by judicious rewards in the form of nails, hinges, and other useful articles which the missionaries procured from England. Proceeding cautiously, first to make the natives feel their necessities, and then to put them in the right way for supplying them, the missionaries were at length gratified by a request to attend a meeting convened by the natives for the purpose of improving their social condition by the establishment of legal marriage. This is not the place to rebut the charges which have been brought against the missionaries, of substituting a despotism of which they were the heads for that previously existing under the chiefs. The best answer that can be given to such is in the lucid and circumstantial statements contained in such works as those mentioned at the end of this article; statements which bear the most undeniable internal evidence of sincerity and truth, and which have been corroborated by several persons whose testimony stands clear of the slightest suspicion of partiality. In May, 1820, upon the occasion of the opening of a new chapel at Raiatea, at which more than 2400 persons were present, a complete code of laws was established by the votes of the people, and it differed from those previously introduced in other islands of the South Seas in the important point of the introduction of trial by jury. An efficient executive government was also organized, everything being done by the natives, though under the immediate superintendence of their instructors. Being desirous of extending to others the benefits which they enjoyed themselves, the Raiateans formed an auxiliary missionary society, which was supported by liberal donations of such articles as they had learned to prepare for sale; and Mr. Williams laid the foundation of future commercial wealth by teaching the people to cultivate tobacco and the sugar-cane, and to prepare sugar for the market. With this view he constructed a sugar-mill, the rollers of which were turned in a lathe formed by his own hand.

The benevolence which prompted Williams to such exertions could not rest content within the narrow limits of Raiatea and such places as might be reached from it by occasional boat-voyages. The intelligence received from time to time from other islands gave him a strong desire to extend the peaceful conquest in which he had borne so distinguished a part, and he perceived that nothing was so much wanted for the political advantage of the civilized communities at the mission stations as a market for their produce and a ready means of communication with it. He therefore conceived that if a small ship were permanently engaged in the service of the missionaries, it would tend greatly to facilitate their labours for the civil and religious elevation of the islanders. Although not seconded in these views by the directors of the Society, he was so fully convinced of the importance of the scheme that he determined to undertake a very heavy pecuniary responsibility, rather than abandon his project. He therefore visited Sydney about the commencement of 1822, and purchased a schooner of from eighty to ninety tons, called the 'Endeavour,' in the hope that the Society would, upon full explanation of the circumstances, share the responsibility of the purchase. He also made arrangements for promoting the rising commerce of the islands, and returned with several cows, calves, and sheep, presented by Sir Thomas Brisbane, governor of New South Wales, for the use of the chiefs and missionaries. In July, 1823, Williams sailed from Raiatea in the 'Endeavour,' for the Hervey Islands, calling at the mission-station of Aitutaki, after which he endeavoured to carry into effect a long-cherished scheme for the discovery of the island of Rarotonga, which was then only known to the missionaries by the report of a few of its natives upon other islands. Failing in his first attempt, he visited Mangaia and some other islands, but at length, as is described in the sixth chapter of his 'Missionary Enterprises,' he discovered the desired island, which is the finest and most populous of the Hervey group. Leaving a native teacher there, with a promise of sending further assistance, the 'Endeavour' shortly returned to Raiatea, whence she soon sailed upon another expedition to Rurutu and Rimatara. Small as the vessel was for such a purpose, the indefatigable missionary was preparing for a more distant expedition to the Navigators' and other islands, when his projects were suddenly checked, and he himself was involved in most painful embarrassments, by the intelligence that certain interested merchants had procured the enactment of fiscal regulations by the governor of New South Wales, which greatly impeded the development of trade from the South Sea Islands, and rendered the retention of the 'Endeavour' hopeless. At the same time he received intelligence from England that the directors of the Society disapproved of the steps he had taken with regard to the ship, they having a very commendable jealousy of anything that could, even in appearance, impart a worldly character to their proceedings. He was thus compelled to send the ship, laden with the most marketable produce that he could collect, to Sydney, with orders for the sale of both ship and cargo. Grievously as he felt this disappointment, he did not abandon his favourite design, but only allowed it to remain in abeyance for a time, while he devoted his energies to Raiatea, where it was found necessary, from the frequency of destructive storms, to remove the settlement to the opposite side of the island.

In the autumn of 1825 Rarotonga and other of the Hervey islands were revisited by the Rev. Mr. Bourne, one of Williams's fellow-labourers, in the 'Haweis,' a vessel chartered for the purpose by the Society. In December of the same year Williams was joined by Mr. and Mrs. Pitman, who were appointed to occupy the new station at Rarotonga, but remained with him for some months at Raiatea before proceeding to their destination. In April, 1827, they obtained a passage to Rarotonga, accompanied by Mr. and Mrs. Williams, who contemplated staying a few months to assist their less experienced friends. What has been stated in reference to Raiatea will indicate the nature of the labours to be performed in other islands; but here was a new difficulty occasioned by the difference of the Rarotongan dialect from that with which the missionaries were acquainted under the name of the Tahitian, and in which all their books were printed. Having conquered the difficulties of the language so far as to be able to speak and preach to the Rarotongans, Williams next engaged himself in preparing books, and translating portions of the Bible into the language, which, of course, he had o reduce to a written form and a grammatical system. When at length prepared to return to Raiatea, he waited month after month for an opportunity of doing so, and, when there seemed to be no hope of a vessel passing withn sight, he determined upon building a ship, notwithstandng his limited knowledge of naval architecture, the total bsence of assistance beyond what the natives could ender, and the lack of iron and tools, of which he had a ery insufficient supply. One of the first steps in this unertaking was the construction of a pair of smith's bellows, o obtain leather for which three of the four goats on the sland were killed. It must have proved extremely mortiying to find that when the machine was completed it did ot act properly, owing to a little oversight in the contruction, but the perplexity was abruptly terminated by he entire destruction of everything but the boards by rats, hich swarmed at Rarotonga. Undismayed by this misap, Williams contrived a blowing-machine, which is fully escribed in his 'Missionary Enterprises,' in which no eather was required. In relating the difficulties exerienced on this occasion, Williams remarks on the defiiencies of dictionaries, encyclopædias, and similar works, n not giving sufficiently explicit directions for the contruction of articles of common use, or 'such simple intructions and explanations as would direct to the accomlishment of an important and useful object by means less omplex than the machinery of civilized countries.' Having o saw, the trees used were split by wedges, and having o steaming-apparatus, bent planks were procured by plitting curved trunks. Cordage was manufactured of the ark of the *hibiscus;* sails were made of native matting; nd for oakum were substituted cocoa-nut husk, banana tumps, native cloth, &c. Sheaves were formed of the *ito*, or iron-wood, by means of a lathe constructed for the urpose, and the pintles of the rudder were made from a iece of a pickaxe, a cooper's adze, and a large hoe. By uch contrivances, in the short space of fifteen weeks, was ompleted a sea-worthy vessel about sixty feet long and ighteen wide. Supplied with anchors of wood and stone, nd with a crew consisting only of natives, Williams first ried his vessel, which he styled the 'Messenger of Peace,' n a voyage of about 170 miles, to Aitutaki, which was ccomplished without any more serious casualty than the reaking of the foremast through the inexperience of the ative crew; and after a few days the vessel returned to Rarotonga with a valuable cargo of pigs, cocoa-nuts, and *ats.* Shortly afterwards Mr. and Mrs. Buzacott arrived at Rarotonga, having among their stores a supply of iron, hich enabled Mr. Williams to strengthen his ship before ailing for Tahiti, a distance of 800 miles, which he accomlished in safety. Being now fully determined to underake his long-contemplated voyage to the more westerly lands, Williams immediately set about preparations for it. He however returned to Raiatea, and was actively engaged that and neighbouring islands for a considerable time efore the great expedition could be commenced. On the 4th of May, 1830, the 'Messenger of Peace' left Raiatea n this important voyage, for the circumstances of which e must refer to the interesting narrative of the missionary voyager himself, merely stating that after calling at Mangaia, Rarotonga, and other out-stations, the vessel proceeded westward to Savage Island, Tongatabu, Savaii, and many other islands of the Hapai and Samoan or Navigators' groups, after which she returned to Raiatea. Towards the latter end of 1832, after conveying a supply of provisions, horses, asses, and cattle to Rarotonga, Williams again sailed in the 'Messenger of Peace' to the Samoas, after which he returned to Rarotonga, where, with Messrs. Pitman and Buzacott, he completed the Rarotongan version of the New Testament. Having now determined to visit England, he sent the 'Messenger of Peace' to Tahiti, with directions that she should be sold, if a purchaser should offer, and that another vessel should be chartered and sent for him. Not hearing again from Tahiti, he eventually completed a small vessel which had been commenced by an American then at Rarotonga, and in July, 1833, sailed in it for Tahiti. The business of the mission required another visit to Rarotonga before he finally embarked for England, but at length, having once more visited Raiatea, he took passage in a homeward-bound whaler, and reached London, in June, 1834. The interest of his adventures rendered him immediately an object of attraction at the numerous missionary meetings at which he took a part, and so great was the desire to hear him in all parts of the kingdom, that his labours at home were little less arduous than they had been in the South Seas.

While however his labours in speaking, preaching, and lecturing were almost incessant, Williams never lost sight of engagements more immediately connected with the welfare of Polynesia. He submitted to the directors of the London Missionary Society, and subsequently to the Christian public, plans for a theological college at Rarotonga, for the education of native missionaries, and of a school at Tahiti, which might both afford superior education to the sons of chiefs and serve the purpose of a normal school for training native schoolmasters. He laid his MS. of the Rarotongan New Testament before the British and Foreign Bible Society, and subsequently superintended the printing of that and several other works for the use of the islanders; and he wrote an account of some of the most important circumstances of his extraordinary career, which appeared in April, 1837, under the title of 'A Narrative of Missionary Enterprises in the South Sea Islands, with remarks upon the natural history of the islands, origin, languages, traditions, and usages of the inhabitants.' This volume immediately excited the deepest interest, not only among those who had heard the statements of the author, or whose habits and connections would naturally lead to its perusal, but also among the dignitaries of the established church, men eminent for their scientific attainments, and some of the nobility. The society of the humble-minded dissenting missionary was sought by many who had been accustomed to view such proceedings as those which he had narrated as Utopian and fanatical, and many noble donations were made through him to aid the general objects of the mission, as well as those special objects which the Society preferred leaving under his individual management, such as his cherished project of procuring a missionary ship. Of the universality of this interest an idea may be formed from the fact that of the three successive editions of the work, published in different forms, of which the first was charged twelve shillings, and the last only two shillings and sixpence, 38,000 copies were sold in five years. Referring to Prout's 'Memoirs' for many other pleasing illustrations of the effect produced by this volume, as well as by Williams's personal appeals, it may be stated that, having submitted to the common council of the city of London his ideas of the importance of the expedition he was about to undertake, in a commercial point of view, that body unanimously voted a sum of 500*l.* towards its support. For this purpose alone about 4000*l.* were subscribed, with which the 'Camden' was purchased, repaired, and fitted out, and on the 11th of April, 1838, she sailed from Gravesend, with Mr. and Mrs. Williams, and sixteen other missionaries and missionaries' wives, who were to be left at their respective stations.

After a short stay at the Cape of Good Hope, and another at Sydney, the 'Camden' made for the Samoas. Williams visited many of the surrounding islands, then sailed to Rarotonga, and subsequently to Tahiti, Raiatea, and others of the Society group, whence the 'Camden' again sailed for Samoa, the devoted missionary hoping at last to carry out his long-cherished design of visiting the islands yet farther westward, where as yet nothing had been done for the instruction of the savages. The expedition was proceeding successfully, and had reached the New Hebrides, when, on the 20th of November, 1839, a party from the ship landed at Dillon's Bay, in the island of Erromanga, where the natives, irritated, there is reason to believe, by the barbarities perpetrated by the crew of a vessel that had previously visited the island, attacked them, and murdered Mr. Williams, then in the forty-fourth year of his age, and Mr. Harris, who was intending to become a missionary to the Marquesas. The intelligence of the melancholy event produced the most intense excitement both in the numerous islands where the apostolic labours of Williams had been performed, and in his native country, and the universal esteem which his character had obtained called forth the warmest expressions of respect and regret. Such remains of the body of Williams as could be subsequently procured (the greater portion having been devoured by the cannibals of Erromanga) were interred at Apia, in the island of Upolu. It is most gratifying to know that the benevolent work to which Williams devoted his life has not been checked by his untimely end, but that even upon the very island on which he fell the truths of Christianity have since been received with gladness.

Of the character of Williams it is unnecessary to attempt to form an estimate in this brief notice. To comprehend his self-denying zeal, his unconquerable perseverance in the pursuit of the philanthropic objects of his mission, the universality of his talents as an agent of civilization, and the benevolence which marked his public and private actions, it is necessary to peruse the circumstantial narrative of his 'Missionary Enterprises,' a book replete with interest even to those who do not duly appreciate the motives which actuated him and his coadjutors. Much additional information upon these, as well as more purely personal history, is to be found in the volume of 'Memoirs' recently published by his friend the Rev. Ebenezer Prout, of Halstead; while the 'Martyr of Erromanga,' by the Rev. Dr. Campbell, presents at once an eloquent tribute to his memory and an impressive exposition of the importance of the noble work to which he devoted himself.

WILLIAMS, ROGER. [RHODE ISLAND.]

WILLIAMSBURG. [VIRGINIA.]

WILLIAMSON, SIR JOSEPH, a statesman of the reign of Charles II., was the son of the Rev. Joseph Williamson, rector of Bridekirk in Cumberland. He came up to London, while yet a boy, in the capacity of clerk or secretary to Mr. Richard Tolson, member of parliament for Cockermouth, and, on the recommendation of his patron to Dr. Busby, the head master of Westminster School, he went from his service to that school. His assiduity and talent gained for him a recommendation from Dr. Busby to Dr. Langbaine, the provost of Queen's College, Oxford, by whom he was admitted on the foundation of that college. He took his degree of B.A. in 1653, and immediately after went to France as tutor to a nobleman to whom he was recommended by Dr. Langbaine. He was afterwards elected a fellow of Queen's College, and in 1657 he took his Master of Arts degree.

After the Restoration he was appointed secretary to Sir Edward Nicholas, secretary of state, and on Sir Edward Nicholas being succeeded by Lord Arlington, he became secretary to the latter. He was appointed by Lord Arlington keeper of the State Paper Office in Whitehall. In 1667 he was appointed one of the clerks of the council in ordinary, and received the honour of knighthood. He was one of the plenipotentiaries, together with the earl of Sunderland and Sir Leoline Jenkins, at the treaty of Cologne. On the 27th of June, 1674, he was appointed secretary of state in the room of Lord Arlington, to whom, according to the custom of the time, he paid 6000*l*. in order to succeed him. He was at the same time introduced into the privy council. The period during which Sir Joseph Williamson was secretary of state was one of subservience by Charles II. to the interests of France, with which power he entered into secret alliances, and of fears in the nation of the introduction of popery into England. Sir Joseph Williamson was one of the first victims of the fear and excitement caused by the celebrated Popish plot. He was committed to the Tower by the order of the House of Commons, on the 18th of November, 1678, on a charge of granting commissions to Popish officers, but he was released by the king on the same day. On the 9th of February following he resigned the secretaryship of state, and was succeeded by the earl of Sunderland. In December, 1679, he married the baroness Clifton, widow of Henry, Lord O'Brien, and sister and sole heiress to Charles Stuart, duke of Richmond, by whom he acquired large property and the hereditary office of high-steward of Greenwich. Sir Joseph Williamson died in 1701, and his wife in the year following. He left 6000*l*. and a valuable collection of heraldic manuscripts and of memoirs relating to his foreign negotiations to Queen's College, Oxford; and he left 5000*l*. for the purpose of founding a mathematical school at Rochester, by which town he had been frequently returned to parliament. He had sat also several times for Thetford. In the year 1678 he was elected president of the Royal Society.

Sir Joseph Williamson appears to have been a diligent and respectable public servant, who, in those times, could not have risen from so humble a beginning to the important situation of secretary of state, without possessing talents for business, or without some talents for courtiership. Evelyn gives a disparaging account of him, from which the following is an extract. Having mentioned his appointment as secretary to Sir Edward Nicholas, he proceeds:—'Sir Henry Bennet, now Lord Arlington, succeeding, Williamson is transferred to him, who, loving his ease more than business, though sufficiently able had he applied himself to it, remitted all to his man Williamson, and in a short time let him into the secret of affairs, that, as his lordship himself told me, there was a kind of necessity to advance him; and so by his subtlety, dexterity, and insinuation, he got now to be principal secretary, absolutely Lord Arlington's creature, and ungrateful enough. . . . . Sir Joseph was a musician, could play at *jeu de goblets*, exceeding formal, a severe master to his servants, but so inward with my Lord O'Brien, that, after a few months of that gentleman's death, he married his widow, who, being sister and heir of the duke of Richmond, brought him a noble fortune. 'Twas thought they lived not kindly after marriage as they did before. She was much censured for marrying so meanly, being herself allied to the royal family.' (Evelyn's *Diary*, ii., 394.)

WILLIBROD. [WILBRORD.]

WILLIS, THOMAS, was born at Great Bedwin in Wiltshire, on the 27th of January, 1621. He received his early education at the school of Mr. Sylvester, in the parish of All Saints, Oxford, and in 1636 he was admitted a member of Christ Church. He took his degree of B.A. in 1639, and that of M.A. in 1642. The civil war having broken out, Willis took up arms in defence of Charles. He does not appear however to have been actively engaged, and he turned his attention to medicine, and took his degree of B.M. in 1646. He then commenced practice in Oxford, and, as was the custom of medical men in his day, regularly kept Abingdon market. He lived in a house opposite Merton College, and being attached to the worship of the episcopal church of England, he opened a room in his house for the performance of divine service according to the ritual of that church. His loyalty and attachment to episcopacy were not unrewarded at the Restoration: he was appointed Sedleian professor of natural philosophy in the university in 1660. He soon after received the degree of M.D. In 1659 he published his first work, entitled 'Diatribæ Duæ; prior agit de Fermentatione, de Febribus altera; his accessit Dissertatio Epistolica de Urinis,' the Hague, 1659, 12mo. In this work he shows himself to be one of the chemical physicians of his day, and a follower of the doctrines of Sylvius de la Boe. Mixed up with a good deal of sound observation, the most absurd views with regard to the action of medicine and the causes of the phenomena of disease are to be found in this volume. He was much more successful as an anatomist, and in 1664 published his great work on the anatomy of the brain, 'Cerebri Anatome; cui accessit nervorum descriptio et usus,' London, 4to. In this work he gave a new method of dissecting the brain, and a much more accurate account of its anatomy than had been previously done. This book contains the germs of those modern views of the physiology of the brain which are adopted by phrenologists. Willis referred the faculty of common sense to the corpus striatum; the imagination he supposed had a locality in the corpus callosum, and memory its seat in the cineritious matter of the brain. The cerebellum he believed controlled involuntary motion.

wever much these views may differ from those of mo-
rn physiologists, the idea of the brain being a congeries of
gans is distinctly recognised. Whilst at Oxford Willis
s a member of a philosophical society which is said to
ve led to the foundation of the Royal Society of London,
which body he was elected one of the earliest fellows.
the solicitation of Sheldon, who was then bishop of
ndon, Willis determined to commence practice in Lon-
n, and went there in 1666, shortly after the great fire,
d was immediately appointed physician in ordinary to
king. In 1667 he published a work on the pathology
the brain and nervous system, 'Pathologiæ Cerebri et
rvosi Generis Specimina,' Oxford, 4to. This work, in
ich he gave an explanation of the phenomena presented
convulsive diseases, hysteria, and hypochondriasis, was
terly attacked by Highmore, who maintained that the
t of those diseases was in the heart, stomach, lungs, and
er, and not in the nervous system. To the attack of
ghmore, Willis replied in a work entitled 'Adfectionum
æ dicuntur Hystericæ et Hypochondriacæ; Pathologia
asmodica vindicata,' &c., London, 1670, 8vo.

About the time of the publication of this last work, he
t his first wife, who was a daughter of Dean Fell. This
ent afflicted him much, and as a relief to his mind he
mposed his work on the souls of brutes, entitled 'De
ima Brutorum, quæ Hominis vitalis ac sensitiva est,'
ford, 1672, 4to. In this work he maintains that the
l of brutes is like the vital principle in man, that it is
poreal in its nature, and perishes with the body. This
rk, though written for consolation, brought him much
uble. Although it was dedicated to the archbishop of
nterbury, it was looked upon as an invasion of the rights
theologians, and his orthodoxy, a matter that Willis re-
rded much, was called in question. These disputes
ected him much, and he sought relief for his anxiety in
econd marriage. He began to publish another work,
ich he never finished, entitled 'Pharmaceutica Rationa-
' of which the first part was published at Oxford in
3, and the second in 1675. This work, like his first,
s an attempt to explain all the phenomena of disease on
principles of the chemical philosophy. His Latin style
neat and elegant. All his works abound in hypothesis,
they contain a great amount of sound observation,
ich renders them well worth perusal. Most of his works
e gone through numerous editions, and the whole of
m, with the title 'Opera Omnia Willisii,' have been pub-
ed several times in this country and on the Continent.
e comparative neglect into which they have fallen may
attributed to the superior practical character of the
tings of Sydenham, his successor in reputation, who re-
ted much of the hypothesis that burdened the works of
vious writers.

Villis died of pleuritis, on the 11th of November, 1675.
was remarkable for his piety, and procured a service to
performed in the church in St. Martin's Lane, every
rning early, in order that he might attend before he
ted his patients. At his death he left a bequest of 20*l.*
ear for the continuance of this service. He also appro-
ated all his Sunday fees to charitable purposes. He
covered the mineral-spring at Astrop near Berkeley in
rthamptonshire, and made it very famous, till the people
he place offending the well-known Dr. Radcliffe, made
declare that he would put 'a toad in their well,' which
did by decrying its virtues wherever he went. There
two English works said to be written by Willis, which
e published after his death: the one 'A Plain and Easie
thod for preserving (by God's Blessing) those that are
from the Infection of the Plague,' written in 1666; and
ther, a collection of receipts selected from Dr. Willis's
lical works.

Haller, *Bib. Med.*; *Biog. Med.*; *Biog. Brit.*; Aikin,
g. Dict.)

VILLIS, BROWNE, an English antiquary of note,
ndson of the still more celebrated Dr. Thomas Willis,
by his mother's side of Robert Browne, of Frampton
Dorsetshire, was born at Blandford in that county, Sep-
ber 14th, 1682. After passing through Westminster
ool, at which time he is said to have first imbibed a
e for the study of architectural and ecclesiastical anti-
ies, the neighbouring abbey being his favourite haunt,
entered Christ Church, Oxford, as gentleman-com-
ner. In 1707 he married Catherine, daughter of Daniel
ot, of an antient family, who bore him ten children.
This lady, who died in 1724, was herself a person of some literary pretension, and was author of a work entitled 'The Established Church of England the Catholick Church,' London, 1718, a performance which her husband appears to have thought very meanly of. On the Society of Antiquaries being revived, 1717-18, he became a member of it, and in 1740 the degree of LL.D. was conferred upon him by the university of Oxford. In the following year he testified his sense of the compliment by presenting to that body his valuable cabinet of English coins; he was also a considerable benefactor to the Bodleian Library, by his donations of MSS. Nor did his liberality confine itself to munificence of that kind; for, in 1746, he contributed towards rebuilding Stony Stratford church, and in 1752 gave 200*l.* towards repairing the fine tower of that at Buckingham, for which place he had been returned to parliament nearly half a century before, in 1705. He died at his seat, Whaddon Hall, Feb. 5, 1760.

That Browne Willis had a decided and disinterested passion for antiquarian researches cannot be doubted, since he devoted himself to it at a time when little regard was had to such studies, and indulged it beyond what prudence altogether warranted, considering the largeness of his family—five sons and as many daughters. As little doubt can there be that his publications promoted a taste for similar studies. His greatest and most important work is his 'Survey of the Cathedrals of England,' 3 vols. 4to., with plates, which appeared in 1727, 1730, and 1733. Of his 'Notitia Parliamentaria,' the conclusion was not published till 1750, although the first part had been printed in 1715. His last production was a 'History of the Town of Buckingham,' 4to., 1755.

(Chalmers's *Biographical Dictionary*; Nichols's *Literary Anecdotes.*)

WILLIS, FRANCIS, was a student of Brazennose College, Oxford, and took holy orders in the year 1740. He was soon after appointed to the living of St. John's, Wapping, and afterwards to Greatford in Lincolnshire. Having a taste for the practice of medicine, he used to prescribe for his poor parishioners, which incensed the medical men in the neighbourhood so much, that in his own defence he obtained the degree of doctor of medicine from Oxford in 1759. His medical and theological studies induced him to take up the subject of insanity, and he was very successful in its treatment. It was on this account that he was called in to take charge of George III., when the king was for the first time deprived of the use of his mental faculties. His treatment was successful in this case, and gained for him a great reputation, in addition to a pension of 1500*l.* per annum for twenty-one years. After curing the king, he was sent for to attend the queen of Portugal, who was labouring under aberration of mind. He succeeded in restoring her majesty to perfect health, and received for his services 20,000*l.* He kept an establishment for the treatment of the insane at Greatford, in Lincolnshire, where he died on the 5th of December, 1807, in the 90th year of his age.

Willis has left behind him no work on the subject of insanity, and he would perhaps have found it difficult to explain his own success in the treatment of this disease. He was a man of acute mind, and his treatment seemed rather the result of an instinctive perception of what each individual case required, than of the application of any known principles. His personal influence over his patients was immense, and it is said that his mode of looking at a maniac 'would make him quail more effectually than chains or manacles.'

(Winslow, *Physic and Physicians*; *Gent.'s Mag.*, vol. 77.)

WILLOCK, WILLOCKS, or WILLOX, JOHN, one of the earliest champions of the Reformation in Scotland, is supposed to have been born in Ayrshire, about the beginning of the sixteenth century, and to have studied at the university of Glasgow. In his earlier years he was a friar, but whether Franciscan or Dominican is not clearly ascertained. He visited England in the year 1541, having before that time become a convert to the opinions of the Reformers, and he was there subjected to imprisonment, as a mitigation apparently of the severer punishment attending a breach of the six articles of Henry VIII. He became afterwards chaplain to the duke of Suffolk, and on the accession of Mary of England he fled to Friesland. He was there patronized by the Duchess Anne, who employed him in several missions to Scotland. About the year he returned to reside in his native country, and preached the doctrines of the Reformation in the town of Ayr. He distinguished himself as a controversialist, and carried on a debate with the principal champions of Catholicism in Scotland. In 1559 he was cited, along with other reformers, to answer for the opinions promulgated by him, and was outlawed for not appearing, a circumstance attributed with apparent justice to breach of faith on the part of Mary the Queen Regent. He now rose in popularity; large masses of people flocked to his ministrations; and as the head of a party he became sufficiently powerful to cause the rejection of a proposal by the humbled Regent, that the Romish as well as the Protestant service might be placed at the option of the people. He was one of the four ministers appointed to assist the council of government on the deposition of the Regent. In 1561 he was appointed one of the 'superintendants' who succeeded to some of the duties of the Catholic bishops. He spent a great part of the remainder of his life in England, but was moderator of several General Assemblies in Scotland from 1563 to 1568. The time of his death is not known.

(Wodrow, *Biographical Collections printed for the Maitland Club*, pp. 99-116, 449-453.)

WILLOUGHBY, SIR HUGH. The history of this unfortunate voyager is very obscure. A portrait is shown at Wollaton Hall in Nottinghamshire (an antient seat of the Willoughbies of Risby in Derbyshire) as that of Sir Hugh. Collins conjectures that 'Sir Hugh Willoughby, Knt., of Risby in Derbyshire, grandson of Sir Henry Willoughby, who died in 1528, by his son William, who died before his father, was the voyager.' If this conjecture be correct, Sir Hugh was the son of William, by his wife Helena, daughter and co-heiress of Sir John Egerton, of Wrine Hall in the county of Chester, and had himself a son Henry (created a baronet by James I. in June, 1611), by his wife Johanna, daughter of Sir Nicholas Strelly, Knt.

Clement Adams, in his narrative of Chancellor's voyage, mentions Sir Hugh in these terms:—'To which office and place [commander of the expedition fitted out by the merchants adventurers in 1553], although many men (and some of them void of experience) offered themselves, yet one Sir Hugh Willoughbie, a most valiant gentleman and well born, very earnestly requested to have that care and command committed unto him; of whom before all others, both by reason of his goodly personage (for he was of a tall stature) as also for his singular skill in the services of war, the company of merchants made greatest account; so that at the last they concluded, and made choice of him for the governor of this voyage, and appointed to him the admiral, with authority and command over all the rest.' This appointment was confirmed in a licence to discover strange countries from the king Edward VI., of which a MS. copy is contained in a volume (Faustina, C., ii.) of the Cotton collection in the British Museum.

The only narrative of this voyage that we have been able to discover is that contained in the first volume of Hakluyt, purporting to be the journal of Sir Hugh Willoughby himself, and incidental notices in Clement Adams's account of Chancellor's adventures, and in the voyages of Burrough and Jenkinson in 1756, in the same collection. Among the Cotton MSS. already alluded to (Otho, E., viii.) there is a list of the three ships fitted out for the expedition, and of the names and offices of all persons embarked in them; and a journal of the voyage from the 10th of May to the end of September, 1553. It has been much injured by fire, but enough remains to show that it corresponds exactly with what is printed in Hakluyt's work. It appears to be in the hand-writing of Michael Lok. Purchas (vol. iii., p. 463) mentions 'a will of Gabriel Willoughby, his kinsman, subscribed by Sir Hugh, which will I now have, and keep as a relic of that worthy discoverer.'

The expedition of which Sir Hugh Willoughby was appointed commander was fitted out by 'the mystery and company of merchants adventurers for the discovery of regions, dominions, islands, and places unknown,' whose governor was Sebastian Cabot. It consisted of three vessels:—the Bona Speranza, of 120 tons, commanded by Sir Hugh Willoughby, admiral of the fleet, captain, with a master and mate, and 36 seamen; the Edward Bonaventura, Richard Chancellor, pilot-major of the fleet, captain, of 160 tons, with a master and mate, minister, surgeon, and [illegible] n; and the Bona Confidentia, of 90 tons, under a [illegible] d mate, with 22 seamen. The vessels were victualled for fifteen months. Six merchants embarked in the admiral's ship, nine in the pilot-major's, and three in the third vessel. The entire direction of the adventure was vested in a council of twelve. The council consisted of the admiral and pilot-major, the masters of the three vessels, the minister, three merchants, and the three masters' mates.

The expedition sailed from Deptford on the 10th of May, 1553, but was detained in the river and off the coast by baffling winds till the 23rd June. It fell in with the Norwegian coast some way south of the Rost Islands, on the 14th of July. On the 30th of July, while bearing up for Wardhus, east of the North Cape, and the most easterly station of the Danes in Finmark, the vessels were separated by a storm. Next day the Bona Speranza and the Bona Confidentia once more joined company, but Chancellor's vessel did not again fall in with them. Clement Adams's account of their separation, derived from some mariners of the Edward Bonaventura, is as follows:—'The very same day in the afternoon, about four of the clock, so great a tempest suddenly arose, and the seas were so outrageous, that the ships could not keep their intended course, but some were per force driven one way and some another, to their great peril and hazard. The general with his loudest voice cried out to Richard Chancellor, and earnestly requested him not to go far from him; but he neither could nor would keep company with him if he sailed still so fast, for the admiral was of better sail than his ship. But the said admiral (I know not by what means) bearing all his sails, was carried away with so great force and swiftness, that not long after he was quite out of sight; and the third ship also, with the same storm and like rage, was dispersed and lost us. The ship-boat of the admiral (striking against the ship) was overwhelmed in the sight and view of the mariners of the Bonaventura; and as for them that are already returned and arrived, they know nothing of the rest of the ships what has become of them.' The narrative in the diary attributed to Sir Hugh Willoughby corresponds with this account in all essentials.

It appears from the journal just referred to, that the Bona Speranza and Bona Confidentia were tossed about in the North Sea from the 30th of July to the 18th of September, vainly attempting to make Wardhus. On that day they entered a harbour which we learn from Jenkinson was the mouth of the river Arzina, six days' sail east of Wardhus, and one day's sail west of the Swiatoi Nos, the western headland of the White Sea. 'This haven,' says the journal, 'runneth into the main about two leagues, and is in breadth half a league, wherein are very many seal-fishes and other great fishes; and upon the main we saw bears, great deer, foxes, with divers strange beasts, as ellans and such others, which were to us unknown and also wonderful. There remaining in this haven the space of a sevennight, seeing the year far spent, and also very evil weather, as frost, snow, and hail, as though it had been the depth of winter, we thought it best to winter there. Wherefore we sent out three men south-south-west to search if they could find people, who went three days' journey, but could find none. After that we sent other three westward four days' journey, which also returned without finding any people. Then sent we three men south-east three days' journey, who in like sort returned without finding of people or any similitude of habitation.' They entered 'the harbour of death' (as it is called in the margin of the Cotton MS., Otho, E., viii., p. 15) on the 18th of September: they remained a week before resolving to winter there; and they sent out three exploring parties, two of which appear to have been at least six and one eight days absent. This brings us to the latter part of October. The date of Gabriel Willoughby's will, which Purchas says was in his possession, shows that some of the party must have been alive in January, 1554. Nothing more is known of their fate. In 1557 Stephen Burrough was despatched from Colmogro to search for the Bona Esperanza, the Bona Confidentia, and the Philip and Mary, another ves sel belonging to the merchants adventurers, whic [illegible] also missing. At Kegor he learned from a Dron skipper that the Philip and Mary had returned to En and that h bought her sails for his ship. Of the fate of the Bon peranza he does not appear to have obtained any in gence. Anthony Jenkinson, in his account of his vo to Russia, written apparently between January and A

558, speaks with certainty of Sir Hugh Willoughby having erished with all his company. Purchas mentions that the ona Speranza was discovered in the spring of 1554 by ussians, who found all the crew dead. We are left to fer from these vague statements that the journal of the oyage published by Hakluyt, and the will which came to Purchas's possession, were obtained from the Russians. he pilot-major, Richard Chancellor, to whom we owe the rliest English accounts of Russia, reached Colmogro on e Dwina in safety; but his ship was wrecked on his turn in Pitsligo Bay (Scotland), on the 10th of Novem- r, 1556, and himself, along with several of his seamen, owned. Of the three vessels which composed the expe- tion to which England owed the commencement of its ade to Archangel, not one returned to this country, and their crews only a few of the common seamen of the dward Bonaventura.

(Hakluyt, vol. i. (edition of 1599); Purchas's *Pilgrim- ge*, vol. iii.; MSS. in the Cottonian Collection, British useum, Otho, E., viii., 23, c.; Faustina, C., ii., 27, f.)

WILLOW-HERB, the common name of the plants be- nging to *Epilobium*, an extensive genus in the natural der Onagraceæ. The genus Epilobium is composed of rbs with opposite or alternate leaves; axillary or solitary wers, or disposed in terminal spikes, each flower fur- shed with a bractea; the corollas purple, rose-coloured, flesh-coloured. The calyx has four sepals connected a long tube; the petals four; stamens eight; the cap- le linear, bluntly tetragonal, 4-celled, 4-valved, many- eded, and inseparable from the calyx; the seeds pen- lous and covered with pappus. About forty-five species this genus have been described: they are natives of cooler parts and mountainous districts of Europe, Asia, d America.

E. *angustifolium*, Narrow-leaved Willow-herb, or nch Willow, has a creeping root; erect, nearly simple m; subsessile, lanceolate, undulated, glabrous leaves, h pellucid veins; the flowers bracteated in spicate emes; the style reflexed, pilose at the base, and shorter n the stamens. It is found in mountains, woods, and adows in Europe and Siberia. In Great Britain it is nd in moist shady places in the north of England and the south of Scotland: it has crimson inodorous flowers h blue pollen. It is a very ornamental plant, and is en introduced into gardens; but it requires great atten- n, as its roots spread very rapidly, and are got rid of h great difficulty. In Kamtchatka the pith of this nt is dried and boiled, and, on being fermented, is con- ted into ale and vinegar. The young shoots are said be eatable, but the matured plant possesses narcotic perties. As this plant is very common in some places, o or three varieties have been observed and described.

E. *hirsutum*, Hairy Willow-herb, or Codlings-and-Cream, s creeping roots; branched hairy stems; lower leaves posite, upper ones alternate, ovato-lanceolate, hairy, othed, half stem-clasping; stigma 4-cleft, the segments flexed. This plant is found in wet places in Europe nd Siberia. In Great Britain it is a common plant in itches, on the margins of rivers, amongst reeds and coarse grasses. The whole plant is downy and clammy. It exhales a peculiar acidulous scent, which, from its resemblance to that dish, has procured it the name of Codlings-and-Cream. This scent is not unlike that of hot apple-pie.

Although this genus is numerous, the species offer no great variety of character. None of them possess active medicinal properties, which is a character of the family to which they belong; nor do they yield secretions which render them available as food for man or beast. All f them are ornamental plants, and may be introduced o gardens. They require little care in their cultivation, hey will grow in any common garden-soil, and may be y propagated by sowing the seed or by dividing the

ILLOWS. [Salix.]

LLUGHBEIA, a small East Indian genus of the na- family of Apocynaceæ. It was so named by Dr. urgh in honour of Francis Willughby, F.R.S. The is characterised by having the calyx small, 5-cleft, ment; corolla regular, hypogynous, monopetalous, shaped; limb of 5 oblique segments, deciduous. ens 5, included within corol. Anthers 2-celled, ovate, Ovary 2-celled. Styles didymous. Stigma conical. Ovules attached to two opposite parietal placentæ. Fruit a large berry, solitary, half 2-celled, many-seeded. Seeds naked, in rows imbedded in pulp. The species form climbing shrubs with opposite leaves, and the inflorescence in axillary cymes. *W. edulis*, a native of Silhet and Chittagong, yields a milky juice, which concretes into an indifferent kind of elastic rubber or caoutchouc. The natives of the above districts eat the fruit and esteem it good. The fruit of another species, *W. Martabana*, so called from the province of which it is a native, is yellow and about the size of an orange.

WILLUGHBY, FRANCIS, was the only son of Sir Francis Willughby, Knight, and was born in 1635. His father, who was in easy circumstances, paid great attention to the education of his son, who was so diligent in his studies that it was feared he would injure his health. He early acquired great knowledge both of the classics and mathematics, and in the various branches of natural science. He was admitted at Trinity College, Cambridge, and took his degree of Bachelor of Arts in 1656, and of Master of Arts in 1659. It was here that he became a pupil of John Ray, and a lasting friendship was soon formed between the master and pupil. Willughby had a mind constituted very similarly to that of Ray, and both of them took great interest in the progress of natural science. Ray had at this time made great progress in the study of botany, and had already begun to reduce to harmony the confused facts which had been heaped together in that department of science, and this seems to have inspired Willughby to do the same for zoology. The Pandects of Gessner and Aldrovandus had been published, but the question that occurred to his mind was, How much of all this is true, and how much is false? To answer this question for the science of zoology as it then existed, he set to work. For this purpose he went to Oxford in 1660, in order that he might consult the works on natural history in the libraries there. Shortly after the return of Willughby from Oxford, Ray refused to sign the Act of Uniformity, and was obliged to resign his fellowship and leave Cambridge. The consequence was that the two friends made a tour on the Continent, visiting France, Spain, Italy, Germany, and the Low Countries, with the object of gaining all possible information on natural history: Ray examined plants, whilst Willughby attended to the animals. They returned laden with treasures, which Willughby immediately commenced working at, for the purpose of publishing a large work on the animal kingdom. Before doing this he contemplated a voyage to America, in order to add to his knowledge. But he died, in the midst of all his labours and in the prime of life, on the 3rd of July, 1672. He had published little, and thought his labours too imperfect to justify their publication. Ray however urged upon him, as he says in one of his works, for three reasons, that he should allow him to publish his works: first, the glory of God; secondly, the assistance of others in the same studies; and thirdly, the honour of their native land. Upon these grounds he permitted his works to be published, and Ray became their editor. He also left Ray one of his executors, and committed to him the charge of educating his two sons Francis and Thomas. Francis, the elder, who was then only four years old, died young; and Thomas subsequently became Lord Middleton. For this office, which Ray sacredly fulfilled, Willughby left him sixty pounds a year, which constituted the chief part of this great man's income throughout his life.

The first work edited by Ray after Willughby's death was his Ornithology, with the title 'Ornithologiæ Libri Tres: in quibus Aves omnes hactenus cognitæ, in methodum naturis suis convenientem redactæ, accurate describuntur. Descriptiones iconibus elegantissimis et vivarum avium simillimis æri incisis illustrantur. Totum opus recognovit, digessit, supplevit Johannes Raius,' London, 1676, folio. This work was translated into English by Ray, and the plates republished, in 1678. It contains a vast amount of original observation, and gives a very full and exact account of the habits of the birds described, as well as of their diseases, and the mode of keeping them. There are frequently also good accounts of dissections of various birds. Cuvier says that all subsequent writers have followed Willughby, and that his observations are wonderfully correct. The English work concludes with a treatise on Falconry. Although Ray seems to have taken great trouble with the plates, they are too inaccurate to be of use at present. But the letterpress is a perennial source of correct observation on the habits and structure of birds. In 1686 Ray edited a second work on the same plan, embracing the fishes. This was published at London, in folio, with the title 'Historiæ Piscium Libri Quatuor.' The descriptions in this work are good, and Cuvier states that it contained many observations on the Mediterranean fishes that could not be found elsewhere. In all his descriptions Willughby was very careful in distinguishing specific characters, and in this way he corrected many of the errors of preceding writers.

Willughby and Ray were early Fellows of the Royal Society of London, and Willughby contributed some papers to the 'Philosophical Transactions' before his death. Two of these were published in the 'Transactions' for 1671; one of them 'On a kind of Wasp called Ichneumons,' and another 'On the Hatching of a kind of Bee lodged in old willows.' Ray afterwards contributed many papers on insects, of which the substance had been prepared from Willughby's manuscripts.

Ray, in the preface to the 'Ornithologia,' has left behind him a beautiful memorial of the estimation in which he held his friend in the summary he there gives of his character. He seems to have added to habits of excessive industry and a rare philosophical genius, every virtue. It is no small praise to say he was worthy of his master and his friend. The influence of Willughby undoubtedly, under the direction of Ray, has been very great in every department of zoology, and had he lived to have laboured more, and to have developed the great principles of classification in zoology, which Ray did in botany, then might it have been said that the foundation of both sciences was laid at the same period in Great Britain. [RAY.]

(Derham's *Life of Ray*; Ray's *Preface* to Willughby's *Ornithology*.)

WILMOT, JOHN, EARL OF ROCHESTER, was born at Dichley (Oxfordshire), 10th of April, 1647, or, according to Burnet and Wood, in 1648. He was the son of Henry, earl of Rochester, a brave royalist in the civil wars and a faithful adherent of Charles II. in his exile. He was educated in the free-school at Burford, and at Wadham College, Oxford, where he showed remarkable talents. At school he acquired an exact knowledge of Latin, and became familiar with the best authors of the Augustan age, in whose writings he ever afterwards delighted. At college he was placed under the charge of Dr. Blandford, afterwards bishop of Oxford and of Worcester, but he abandoned himself to pleasure rather than to study, and, breaking off his course of reading at an early age, set off upon his travels in France and Italy. He returned to England in the eighteenth year of his age, and presented himself at the gay court of Charles II., where the graces of his person and the liveliness of his wit and fancy made him an acceptable companion. He also sought opportunities of distinction in war. In the winter of 1665 he went to sea with the earl of Sandwich, in the Revenge, commanded by Sir T. Tiddiman, and displayed great courage in the attack made on the Dutch fleet in the port of Bergen. In the following summer he again went to sea, under Sir Edward Spragge, and in the midst of an engagement volunteered to carry a despatch in an open boat, a service of great peril, which he executed with daring and judgment. These warlike deeds gave him a reputation for courage, which however he did not sustain at court. He was accused of sneaking away in street quarrels, and of evading duels which he had provoked. This imputation suggested the lines of Sir C. Scrope:—

'Thou canst hurt no man's fame with thy ill word;
Thy pen is full as harmless as thy sword.'

He is said to have entered upon a court life free from habits of intemperance, but his convivial disposition, his extreme youth, and the contagious example of a profligate court soon led him into such excesses that, as he assured Dr. Burnet, for five years together he was continually drunk. His fancy was more luxuriant when inflamed by wine, and his companions encouraged his excesses the better to enjoy his wit. In the midst of drunkenness and debauchery, extravagant frolics and buffoonery, he occasionally found time for poetry. Its character naturally took the cast of his life and habits: personal satires, or drinking and amatory songs, were the least ignoble fruits of his genius; licentious and obscene verse, the mere reflection of his life, was his ordinary recreation; and his liveliness and wit, and the grace and spirit of his versification, only cause us to regret the misapplication of his abilities.

The services of his father and his own favour at court obtained for him the offices of gentleman of the bedchamber and comptroller of Woodstock Park. But although his convivial talents rendered him agreeable to the king, his satires often gave offence. On one occasion, while drunk, he put into the king's hand a paper which he supposed to be a libel he had written upon some ladies, but which happened to be a satire upon King Charles himself. At another time he ventured so far as to scribble upon the door of the king's bedroom the well-known mock epitaph—

Here lies our sovereign lord the king,
Whose word no man relies on;
He never says a foolish thing,
Nor ever does a wise one.'

Among the various accomplishments of Rochester, that of mimicry was conspicuous. At one time he disguised himself as an Italian mountebank, and practised the art of medicine in Tower Street: at other times he dressed himself as a porter or a beggar, and in such characters diverted himself with low amours.

The incessant debauchery in which his youth was spent brought on painful diseases and a broken constitution. And although his habits and the depraved society in which he had lived, together with the love of displaying his wit on all occasions, had poisoned his mind with infidelity, he began to feel remorse, and to treat religion with respect. This change in his opinions was mainly caused by the society of Dr. Burnet, who had attended at the death-bed of one of Rochester's friends, and was otherwise slightly known to him, when he received an invitation to visit the earl, at that time recovering from a severe illness. Burnet listened to his infidel arguments, and answered them with earnest kindness. He explained the Scriptures in a tone of philosophy that suited the intellectual pride of Rochester, and at length convinced him of the truth of religion and of the necessity of repentance. Their interviews are touchingly described by Bishop Burnet himself, in his 'Life and Death of John, Earl of Rochester,' a book which, as Dr. Johnson truly says, 'the critic ought to read for its elegance, the philosopher for its arguments, and the saint for its piety.'

Early in the summer of 1680 he was seized with his last sickness, which he was convinced would be fatal. In the midst of the severest agonies of mind and body, he again sent for his friend Dr. Burnet, to whom he expressed his sincere repentance. He desired him 'to tell one for whom he was much concerned, that though there were nothing to come after this life, yet all the pleasures he had ever known in sin were not worth the torture he had felt in his mind.' His last days are affectingly described by the same admirable biographer, and were such as became a Christian. 'I do verily believe,' says Dr. Burnet, 'he was then so entirely changed, that if he had recovered he would have made good all his resolutions.' He felt deeply the mischief he had done by his example and by his perverted talents; and besought Dr. Burnet to publish, for the good of the world, a history of his sins, his sufferings, and repentance. He died on the 26th of July, 1680, in the thirty-fourth year of his age, and was buried beside his father in Spelsbury church, Oxfordshire. He left behind him a son, who died in the following year, and three daughters.

On his death-bed he had given strict charge that all his licentious and profane writings should be destroyed; but he was scarcely dead before a volume of poems bearing his name was published. Many of the poems are said not to have been written by him; and that the compositions as well as the frolics of others should have been attributed to so notorious a man, is not improbable. Amongst the best of the pieces known to be genuine may be mentioned the 'Satire against Man,' 'An Allusion to the 10th Satire of the First Book of Horace,' and 'Verses upon Nothing.'

(*Some Passages of the Life and Death of John, Earl of Rochester*, by Gilbert Burnet, D.D., late Lord Bishop of Sarum; Burnet's *Own Time*; Wood's *Athenæ Oxonienses*; Dr. Johnson's *Life of Rochester*, in *Lives of the Poets*.)

WILNA is an extensive government of West Russia, situated between 53° 35′ and 56° 24′ N. lat. and 21° 5′ and

26° 40′ E. long. All Samogitia (except the town of Polangin, with its territory on the Baltic) and almost the whole of Lithuania, of which Russia took possession on the third partition of Poland in 1795, are comprehended in the government of Wilna, which was constituted by Catherine II. It was composed of the antient palatinate of Wilna, of the greater part of that of Troki, and of the duchy of Samogitia; but in 1797 Paul I. added to it the government of Grodno, and gave to the whole the name of Lithuania, which remained in force till 1802, when Grodno was again separated, and the government of which we are treating received finally its antient name of Wilna. It is bounded on the north by Courland, on the north-east by Vitepsk, on the east by Minsk, on the south by Grodno, on the south-west by the kingdom of Poland, on the west by Prussia, and on the north-west by the Baltic. Its area is 24,400 square miles, and the population 1,315,800 inhabitants.

Face of the Country; Soil; Climate.—The country is an extensive and rather elevated plain, diversified by forests and hills, the highest of which however do not rise more than 300 feet above the surface of the sea, and the hollows are filled with marshes and bogs. Some districts are too sandy for vegetation, but on the whole the soil is not unfavourable to cultivation: in many parts there is a rich mould, in which all kinds of grain and useful plants flourish. Here and there are found blocks of granite, and fossil bones of elephants and other animals. The country appears to have been covered with one vast forest for thousands of years, and not to have had any human inhabitants till about 1000 years ago. The progress of cultivation has of course thinned the forests, but there are still woods of great extent into which no human foot has ever penetrated. There are many lakes and numerous rivers; most of the rivers are tributaries of the Niemen, which forms the south-western boundary of the province towards the kingdom of Poland. The Düna bounds the province for a short distance on the extreme north-east. The Wilia is the principal river; it rises in Minsk, is joined by the Narocz and the Swienta, and falls into the Niemen at Kauen. The Dange and the Beresina both rise in the province; the former passes into Prussia, and the latter into Minsk. The course of most of these rivers is slow, and the water is bad in consequence of the many small streams which flow into them from the marshes, which are chiefly in the east and south-east of the province, where likewise the lakes are the most numerous, the principal of which are the Narocz, to the east of Wilna, the Drisiraty, and the lake of Braslau. The climate is more temperate than that of the adjoining government to the north, but the winters, though short, are very cold; the spring is long and humid; the autumn and summer wet and foggy. There are no endemic diseases, unless we reckon as such the *plica Polonica*, which however is gradually disappearing.

Natural Productions.—Agriculture is the chief occupation of the inhabitants. Rye is the grain most generally cultivated, and considerable quantities are exported. Next to rye are barley and wheat, then oats, buck-wheat, peas and beans, and a little millet. It is not unusual to sow wheat and barley together in the spring. As soon as the barley is ripe, it is cut down, together with the young wheat; the latter shoots up again in the summer, and yields an abundant harvest. The soil, being good, even better than that of Courland, generally yields sixfold, and fresh land much more. As cultivation is gradually extending at the expense of the forests, and a better system introduced, the produce may be expected to increase even in a greater proportion than the population, and leave a larger surplus for exportation. Flax and hemp are likewise grown, and a considerable quantity exported. Hops are grown for the breweries, but the gardens produce scarcely any culinary vegetables or fruit.

The breeding of cattle is on the whole in a wretched condition. The peasants at least have only poor ill-fed beasts, horses as well as oxen, cows and sheep, and a few geese and common fowl. On the estates of the nobles however the cattle are in a better condition, and there is a good breed of small but spirited and hardy horses, called the Lithuanian, which are in great request for the Russian light cavalry. Bees are universally kept in great numbers, both in the towns and country, by the nobles as well as by the peasants. The abundance and remarkably fine quality of the honey are attributed to the great forests of lime-trees, of the flowers of which the bees are very fond. Though a great deal of honey is used for mead, or *lipez*, and for *malinek*, a beverage composed of honey and raspberry juice, large quantities are exported. The fishing is of little importance, though there is no want of fresh-water fish in the rivers and lakes, such as perch, pike, carp: but there is none for exportation. Sea-fish are obtained from Courland and Livonia.

There are vast forests of oak, fir, ash, beech, lime, willow, maple, and alder, and great abundance and variety of wild berries are found. These forests not only furnish large quantities of timber and fuel, but supply material for building every year about 3000 craft for the navigation of the Düna, Wilia, and Niemen, which never come back. Great quantities of charcoal are burned, and pitch, tar, potashes, and lamp-black are made. There is abundance of game, particularly deer (elks), and wild beasts, as well as wolves, bears, gluttons, foxes, martens, and squirrels, which are hunted for their furs. Hares, partridges, and game of different kinds are met with in the fields, and in a wooded valley near Letewik there are still some wild bulls (urus), which no one is allowed to kill without special permission from the government.

The government is not poor in minerals, but few of them are turned to account; there are bog-iron ore, saltpetre, marble, granite, sandstone, jasper, agates, and chalcedony.

Manufactures and Trade.—In a country where the natural productions afford ample employment to the population, manufactures can be but little advanced, and establishments on a great scale do not exist. The women in the country spin hemp, flax, and wool, weave linen and coarse cloth for their families, and knit stockings. The men work in the forests, and gain their livelihood partly as carriers, and by preparing potashes, pitch, tar, and lamp-black, and partly by assisting in the conveyance of goods on the Niemen, the Düna, and the Wilia. The articles exported are corn (rye), flour, groats, linseed, linseed-oil, hops, timber for houses and ship-building, planks, masts, spars, pipestaves, tanners' bark, tar, potashes, hides, wool, hair, horns, feathers, large quantities of honey and wax, tallow, butter, oxen, Lithuanian horses, and strong coarse linen. There are no great brandy-distilleries, but all the principal farmers have each his own still for himself and his family, and the Jews for sale. All goods exported go partly to Riga on the Düna, still more by land-carriage to Libau, and a considerable quantity by the Niemen to Prussia, which must pass through the custom-houses of Polangen, Jurburg, and Kowno. The inland trade is almost exclusively in the hands of the Jews, 'who,' says Hassel, 'are merchants, shopkeepers, brokers, publicans, and have even usurped several mechanical professions. These Jews, wherever they intrude themselves, are a scourge to the farmer, who is wholly dependent on them, and in general sells his crops to them while still standing.'

The population, as has been stated, is, according to Koppen, 1,315,800 inhabitants. The great majority are Lithuanians, whom Hassel and Schnitzler describe as a wretched race, groaning under the tyranny of their lords, not destitute of natural capacity, but ignorant, superstitious, indolent, and addicted to drunkenness. It may be remarked that the Lithuanians are a race entirely distinct from the Slavonian and Gothic, and that their language has a close affinity with the Sanscrit. The remainder of the population consist of—1, Poles, who form the nobility; 2, Little Russians, who are for the most part peasants, but not numerous; 3, Jews; 4, Tartars, who are few in number, but retain the manners, language, and religion of their fathers; 5, Gypsies, not numerous; 6, Germans, in some places as artisans, and here and there as colonists. The Lithuanians, Poles, and Gypsies belong to the Roman Catholic church, which has two bishops, who have 423 churches, several convents, and a numerous body of clergy under them. There are 10 Protestant churches under a consistory at Wilna. The Little Russians are mostly united Greeks, and the Tartars are Mohammedans. The Jews have many synagogues, and their own schools.

Public education was very backward till the government began to pay attention to it. In 1829 measures were taken to introduce regulations for the schools into the western provinces of the empire, but the revolution in 1829 had a most injurious effect. In 1832 the number of schools was reduced to 71, with 175 teachers and 1942 scholars:

whereas there were some years before 154 schools, with 388 teachers and 8711 scholars: great improvement however has since been made.

WILNA, the antient capital of Lithuania, now that of the government, is situated in 54° 43′ N. lat. and 25° 10′ E. long., at the conflux of the navigable river Wilia and the Wileyka, and is surrounded with picturesque hills. The streets, which are crooked and narrow, bear witness to its antiquity. On an eminence called the Castle Hill are ruins of an immense palace of the Jagellons. The town-hall does great credit to the talents of the Polish architect Gucewicz; the arsenal, the palace of the government, and some palaces of the nobility are handsome buildings. Among the churches the cathedral, dedicated to St. Stanislaus, is the most worthy of notice. It was built in 1367, on the spot where the sacred fire had formerly been burnt in honour of the Lithuanian god Perkonnas, 'the master of the thunder.' Besides the Roman Catholic convents, there are several Jewish synagogues, two Protestant churches, two Greek churches, and a mosque. There are in all forty churches.

The university of Wilna, founded as a college of Jesuits in 1578, and raised to the rank of a university, was not however permitted to teach medicine or jurisprudence. In 1773, when the order of the Jesuits was suppressed in Poland, its property was assigned to the schools, and the university was empowered to teach all the branches of human knowledge. Political events caused it to decline till 1803, when the emperor Alexander gave it new statutes and an increased revenue; it was in a very flourishing condition when, in consequence of the revolution in 1829-30, it was suppressed by a ukase of 1st May, 1832, and its library of 200,000 volumes was transferred to St. Petersburg. There remain only a medico-chirurgical academy, with the botanic garden, the observatory, and a theological seminary. There are no manufactures of importance, but a considerable trade. The population is 58,000 inhabitants, of whom nearly one half are said to be Jews.

Troki, the second capital, is situated on a lake 17 miles to the west of Wilna: it has 4000 inhabitants. Kowno is a considerable town, situated at the conflux of the Wilia and the Niemen, and surrounded on all sides by those rivers: it was here that the main body of Napoleon's army entered Russia on the 24th, 25th, and 26th of June, 1812. It is one of the most antient towns of Lithuania. There are several churches, and some houses built in the Gothic style. Kreidany, with 6000 inhabitants, is a very respectable town; all the houses however are of wood.

(Schnitzler, *La Russie, la Pologne, et la Finlande*; Hassel, *Handbuch* (*das Russische Reich*); Brockhaus, *Conversations Lexicon*; Krusenstern, *L'Instruction Publique en Russie*.)

WILSON, FLORENCE, is the name generally given to an author who is spoken of by his contemporaries only by his Latinised designation, Florentius Volusenus or Voluzenus. The vernacular name Wilson has been attributed to him solely because, being a Scotchman, no other common to Scotland approaches so near to that which he assumed. It has been supposed that he was called Wolsey, because he was patronised by the great cardinal, and in a vernacular letter which has been preserved he signs himself Voluzene. He is supposed to have been born near Elgin, in the county of Moray, about the beginning of the sixteenth century, and to have studied at the university (now King's College) of Aberdeen. He afterwards studied at the university of Paris, where he became tutor to a son of Cardinal Wolsey's brother. Losing this employment at the death of the cardinal in 1530, he was patronised by the cardinal of Lorraine, and by Du Bellay, bishop of Paris. In 1534 the bishop went on an embassy to Rome, but Wilson, who was to accompany him, was kept by sickness at Avignon. Understanding that Cardinal Sadoleto desired a Latin scholar to teach a grammar-school at Carpentras, the metropolis of his diocese, he proffered his services in that capacity. Sadoleto has left an interesting account of his interview with the wandering student, and of his surprise in finding one so well versed in polite learning coming from so distant and obscure a country as Scotland. Wilson received the appointment with an annual salary of seventy crowns, and entered on his duties in the year 1535. His earliest work, the publication of which is only known from its being entered in the 'Bibliotheca Thuana,' and mentioned by Gesner, was publi
Lyon in 1535. It is called 'Commentatio quædan
logica quæ eadem præcatio est, in Aphorismos di
In 1543 he published the work by which he is best
'De Animi Tranquillitate Dialogus.' The scene
in a garden near Lyon, and three interlocutors
debate on the subject of tranquillity of mind,
manner of the dialogues of Cicero. It was
lished at Lyon in 1637. A third edition was pri
Edinburgh in 1707, under the superintendence of
man, and a fourth at Edinburgh in 1751, edited by
pal Wishart. In 1546 Wilson formed the design o
ing to Scotland, but he only reached Vienne in Da
where he died, 'quam procul à patria,' as Bu
laments in some laudatory lines addressed to his
Dempster mentions among Wilson's works, 'Phil
Aristotelicæ Synopsis,' but, unsupported, he is ins
authority for such a work having existed.

(Mackenzie, *Lives of the Writers of the Scots*
iii. 29-34; Irving, *Lives of Scottish Writers*, i.
Chambers, *Biographical Dictionary of Eminent*
men.)

WILSON, JOHN, Doctor in Music, was born at
sham in Kent, in the year 1594. He was first a ge
of the Chapel-Royal to Charles I., and afterwards
in Ordinary to the same king. He was esteem
best lute-player in England, and 'being a cons
tendant on the king,' Sir John Hawkins says, '
quently played to him, when the king would usual
on his shoulder.' He was created doctor in m
Oxford in 1644, and in 1656 was elected professor
same faculty to that university, with the advan
having apartments in Baliol College, where, assi
the royalists, he excited 'such a love of music as
measure accounts for that flourishing state in whic
long subsisted there,' and of which Anthony Wood
his life of himself, given an interesting account.
the Restoration he entered into the service of Cha
succeeding the famous Henry Lawes, and died i
He composed much sacred music, and set many
Odes of Horace, as well as select passages from Au
Claudian, and Petronius Arbiter; though few of hi
are now to be met with, and of these the most p
are published in Playford's 'Musical Companion,'
interesting and excellent collection of vocal par
which is become very scarce.

WILSON, RICHARD, R.A. This great lan
painter was born of a respectable family at Pin
Montgomeryshire, in 1713. He was the third son o
children, six sons and one daughter. His father
clergyman, at the time of Richard's birth, in Montg
shire, but he was shortly afterwards collated to the
of Mold in Flintshire. Young Wilson showed ve
a taste for drawing, and gave such promise, that h
tion Sir George Wynne took him to London and
him with an obscure portrait-painter of the n
Thomas Wright, who lived in Covent Garden. W
master he made great progress, but nothing is kn
his earliest studies. He must however have
some rank as a portrait-painter, for in the year
painted a large picture of the prince of Wales
brother the duke of York, for their tutor Dr.
bishop of Norwich.

After practising some time with success as a
painter in London, he went, in 1749, to Italy to st
great works of the Italian masters. He had as y
little if anything in landscape-painting; but w
Venice he paid a visit to Zuccarelli the landscape-
who happened to be from home, and Wilson, to
time until he came, made a sketch in oils of t
from the painter's window. Zuccarelli thought so
of this sketch, that he recommended Wilson to
portrait and to take to landscape. Another occ
which happened to him in Rome induced him t
this advice. Vernet, the celebrated French lan
painter, visited him in his studio at Rome, and
much struck with a landscape of Wilson's which
there, that he offered to make an exchange with
one of his own landscapes for it, which was
assented to by Wilson.

From this time he devoted himself to landsca
soon acquired so great a reputation, that he ha
scholars even while in Rome, and Mengs offered t

portrait for a landscape. Wilson did not do as many
nters have done, that is, copy the works of celebrated
sters, but he went immediately to the source of all art,
confined his studies to nature. By this course he
ined that bold natural yet classical style for which he
listinguished, avoided the acquisition of adventitious
uties, and escaped the mannerism which generally
es from the too partial study of favourite masters.

e returned to London in 1755, after an absence of six
rs. In 1760 he exhibited, in the great room at Spring
dens, his celebrated picture of Niobe, which was pur-
sed by William, duke of Cumberland. This work esta-
hed his reputation in England as one of the first land-
e-painters of his time. In 1765 he exhibited in the
e place a View of Rome from the Villa Madama,
ch was purchased by the then Marquis of Tavistock.
was one of the first members of the Royal Academy,
ch was founded in 1768; and at the death of Hayman,
770, he was appointed librarian in his place: this
ointment brings a very small emolument with it, yet,
ll as it is, Wilson solicited the place; for although a
discriminating connoisseurs purchased some of his
pictures, he was neglected by the public, and was in
ate of indigence compared with the majority of his
w-members of the Academy. Many of the academi-
s had a personal dislike to him, among whom the
ident Reynolds was the foremost. The friends of Rey-
s attribute this to Wilson's unprepossessing appearance
to his uncouth manners, but these unfavourable cir-
stances do not account for the active and persevering
osity of the president. Wilson's uncouthness how-
was seemingly only external, if we are to credit the
wing account of him by Northcote—'that his mind
as refined and intelligent as his person and manners
coarse and repulsive; and that discernment and
liarity with him were necessary to discover the un-
shed jewel beneath its ferruginous coat.'

rrett and Smith of Chichester were much preferred
he public to Wilson, or at least by the picture-deal-
which effects the same result; for at that time,
g to the want of intercourse between artists and the
er classes, and to the want of proper facilities for the
ic exhibition of works of art, the sale of pictures was
ted with much more difficulty than it is at present.
following anecdote gives a deplorable picture, if true, of
on's prospects. He was in the habit of taking his works
d to the various brokers and selling his pictures for
ever they would give him. Upon one occasion, when
ook a painting to a picture-dealer in St. James's
h, he was led up to the attic by the dealer, who,
ing a door, pointed to a pile of landscapes against the
and said, 'Look ye, Dick, you know I wish to oblige
but see, there's all the stock I've paid you for these
years!' And it is a fact that some of these land-
es, for which Wilson received only a few pounds, have
since sold for nearly as many hundreds, thus verify-
he prophetic consolation of Peter Pindar to the poor
ter, in his 'Odes to the Academicians:'—

> 'Wilson's art
> Will hold its empire o'er my heart,
> By Britain left in poverty to pine.—
> But, honest Wilson, never mind:
> Immortal praises thou shalt find,
> And for a dinner have no cause to fear.—
> Thou start'st at my prophetic rhymes!
> Don't be impatient for those times;
> Wait till thou hast been dead a hundred year!'

e following instance will show how unduly Wilson
appreciated even by those who might be expected to
better:—He painted a picture of the Royal Gardens
ew, with a view of the pagoda, expressly for George
and after the king had kept it for a short time, it was
ned to him; the king however had probably little to
vith the transaction. Peter Pindar (Dr. Wolcott)
ht the rejected picture.

ilson was generally so unfortunate in the sale of his
s, that when one met with a ready sale and more
usual attention, he repeated it; and he painted some
cts as many as four and even five times, making only
slight alterations: he painted five pictures of
enas's Villa at Tivoli. The following are among his
ipal works:—Niobe; Phaeton; large view of Rome;
of Mæcenas at Tivoli; large view on the river Po in
; a companion to it, called Solitude; View on the
t of Baiæ; View on the Strada Nomentana; Hadrian's Villa; several views near Rome; Temple of Bacchus near Rome; View on the Tiber; View of the Bridge of Rimini; the Lake of Nemi; Cicero at his Villa; View of Ancona; Broken Bridge of Narni; Ruins on the coast of Baiæ; Temple of Venus at Baiæ; Island in the Gulf of Venice; Tomb of the Horatii and Curiatii; Apollo and the Seasons; Celadon and Amelia; Meleager and Atalante; Ceyx and Alcyone; Sion House from Kew Gardens; Tabley House, Cheshire; View on the river Dee; Wilton House; View from Wilton House; View on the Thames; View at Milbank; View of Rosamond's Pond, St. James's Park; View of Croome, Worcestershire; View of Moor Park, Herts; the Hermitage; View of Dover; Llangollen Bridge, with Castle Dinas Bran; View near Llangollen Bridge; View of Oakhampton Castle; Carnarvon Castle; Kilgarron Castle; Pembroke Town and Castle; Snowdon; Cader Idris; and the great bridge over the Taffe; besides a great many landscapes which have no particular designation. The figures in his landscapes are not all painted by himself; he occasionally availed himself of the assistance of Mortimer and Hayman. Many of Wilson's works have been engraved, but many yet remain to be engraved. The following engravers have executed plates after him:—Woollet, who has engraved nine; W. Sharpe, who executed the figures in the Niobe engraved by Samuel Smith; Pouncey; Ellis; W. Byrne; W. Elliott; J. Mason; P. C. Canot; E. and M. Rooker; J. Wood; J. Roberts; J. Gandon; J. Farringdon; W. Hodges; Middiman; Earlom; Cockburn; C. Turner; T. Morris; Reynolds, &c.

Wilson changed his residence very often. He first lived in the Piazza, Covent Garden; then in Charlotte Street, Fitzroy Square; in Great Queen Street; in Lincoln's Inn Fields; in Foley Place, and in other places; but his last residence in London was a mean house in Tottenham Street, Tottenham Court Road, of which he had the first and second floors, where he lived almost without furniture.

The last two or three years of his life however were spent in affluence, owing to some property which he inherited from a brother. He retired to the house of his relation Mrs. C. Jones, called Colomondie: it is near the village of Llanverris in Denbighshire, now called Loggerheads. He died at the last-named place in 1782, aged sixty-nine, and was buried in the churchyard of Mold. The village of Llanverris is now generally called Loggerheads, on account of the sign of the Loggerheads which Wilson painted for the public-house of the village.

There is a common report that Wilson composed his picture of Ceyx and Alcyone for a pot of beer set on the remains of a Stilton cheese; whereas the correct version of the story is, that it was partly composed *from* a pot of beer set on the remains of a Stilton cheese, which any one may perceive to be the correct version by looking at the composition. Wilson, like many other men of genius, has had many stories told of him which are not true, and are not worth contradiction.

In 1814 about seventy of Wilson's pictures were exhibited, with some other works, at the British Institution; and the following just remarks appeared as part of a critique on them in a number of the 'Sun' paper of that time:—'In many of these pictures Italy is realised, and at one glance we are enabled to enter into all the great and powerful feelings which are awakened by the recollection of what our earlier studies taught us respecting that land of heroes, that seat of stupendous empire which virtue raised and luxury withdrew, till it presented those melancholy scenes in the representation of which Wilson so pre-eminently excels.' 'They are fine compositions, mingling the loveliest appearances of nature, where nature is most beautiful, with dreary and dark desolation, and every touching image which decaying grandeur in the noblest works of art could suggest to a classical imagination.' 'From these sources emotion is engendered by the magic power of the painter, to which we can apply no other epithet but that of "sacred."'

Of Wilson's private character and habits the following extract, from the publication called 'Wine and Walnuts,' which contains several anecdotes respecting him, though short gives rather a graphic account:—'Richard Wilson and Willy Thomson, an organist, who kept a music-shop in Exeter 'Change, were great cronies. The cheerful music-seller was not much hurried, as Frank Hayman was wont to say of many ingenious wights in his day, whose talents were neglected, or who in short had little business

Hence his fire-side was a solace to the misanthropic painter, than whom no mortal of his transcendent talent had ever greater cause to complain. Perhaps it is injustice to his memory to write him down misanthrope; certainly he became a cynic—and who but must lament the cause? Wilson was one of those rare geniuses who appear formed to develop the almost hidden excellence of every science: his manners were austere and unbending to his superiors in rank; for he unfortunately lived when his lofty conceptions of art surpassed the comprehension of his compeers, which inducing indifference and neglect of his extraordinary talent, naturally begot an asperity in his proud mind. But he was urbane to every ingenious man, whether a professor of a liberal science or skilful mechanic; and neglected talent could always draw largely upon his sympathies. Thomson was a man exactly suited to his taste: he was humorous, good-tempered, and *recherché* in his own profession; and being, as is said before, not much hurried, Wilson, when under the influence of the spleen, would quit his easel, and march off to Exeter 'Change, when, under cover of Thomson's stall, he would sit and moralise on the evil dispensations of the Fates to men of mind.' Wilson frequently took in this way his cold punch and pipe with Thomson; and sometimes Garrick was one of the party.

(T. Wright, *Some Account of the Life of Richard Wilson, Esq., R.A., &c.*)

WILSO'NIA, a genus of plants belonging to the natural order Convolvulaceæ. This plant was discovered by Brown in New Holland, and named by him in honour of John Wilson of Kendal, who published 'A Synopsis of British Plants in Mr. Ray's Method,' in 1744. In this work many new stations of plants were indicated, and notes added upon the economical and medicinal uses of medical plants. Wilson was in an humble condition of life, and made great sacrifices for the purpose of enabling him to pursue his favourite study. He is said to have been so anxious to possess Morison's work on plants, that he was about to sell his only cow to purchase it, when a benevolent lady in his neighbourhood presented him with a copy.

WILTON, JOSEPH, R.A., a successful sculptor in his day, and the fashionable precursor of Nollekens in English bust-making. He was born in London in 1722; his father was a wealthy plasterer, and when his son was of a sufficient age, he sent him abroad to study sculpture. Wilton studied at the various towns in Brabant, at Paris, and at Rome, where in 1750 he was presented with the Jubilee gold medal by Benedict XIV. He spent eight years in Italy, chiefly occupied in copying antient statues. He returned to England in company with Cipriani, Chambers, the architect, and a clever modeller of the name of Capizzoldi, who assisted him in some of his works. When the Duke of Richmond opened a gallery for students in art, in Spring Gardens, he appointed Cipriani and Wilton the directors of it. Wilton was afterwards appointed coach-carver to the king, and he modelled the coronation coach of George III. Of his public works the principal are—the monument to General Wolfe in Westminster Abbey, of Admiral Holmes, of the Earl and Countess of Montrath, and of Stephen Hales. He made busts of Bacon, Cromwell, Newton, Swift, Wolfe, Chatham, and Chesterfield, besides many others. All his works were, like those of Roubiliac, admirably worked in the marble, but he showed little taste in his compositions; they were too crowded and too minute in accessories; and evince a total misconception of what constitutes a well-adapted design for sculpture. Wilton however made a large fortune and lived in great style. He kept almost an open board, and among others, Wilson, the landscape painter, and Baretti, the lexicographer, were often seen making their way to Wilton's at dinner-time. He had a very beautiful daughter, who was married to Sir Robert Chambers. In the Royal Academy there is a bust of Wilton by Roubiliac, the present of his daughter Lady Chambers. Wilton was one of the founders of the Royal Academy. He died in 1803, in his 81st year.

(Cunningham, *Lives of British Painters, Sculptors, and Architects.*)

WILTON. [WILTSHIRE.]

WILTSHIRE, an inland county of England, bounded on the north-west and north by Gloucestershire, on the north-east by Berkshire, on the south-east by Hampshire, on the south-west by Dorsetshire, and on the west by Somersetshire. The county is of very compact form, approximating to a quadrangle, having its angles respectively near Lechlade, Sapworth west of Malmesbury, Stour head west of Mere, and Cadnam on the verge of the New Forest. There are several small detached portions, surrounded by the adjacent counties of Gloucester and Berks. These detached portions consist of part of Wokingham parish, Hinton tything in Hurst parish, Didnam tything in Shinfield parish, and Swallowfield parish, which form three portions insulated in Berkshire; Kingswood parish, near Wootton-under-Edge, insulated in Gloucestershire; and Poulton parish, between Cirencester and Fairford, also insulated in Gloucestershire. Parts of Inglesham parish, belonging to Berkshire, and of Minety or Mynte parish, belonging to Gloucestershire, are insulated in Wiltshire. The county, including all its detached portions, is situated between 50° 55′ and 51° 45′ N. lat., and between 46′ and 2° 24′ W. long.; the main portion is between 50° 55′ and 51° 43′ N. lat., and between 1° 29′ and 2° 21′ W. long. The greatest dimension or length of the county, measured north and south, is from the border of Gloucestershire, between Cirencester and Fairford in Gloucestershire, to the border of Dorsetshire, near South Damerham, between Cranbourn in Dorsetshire and Fordingbridge in Hampshire, 54 miles; this dimension might be slightly increased by measuring north-north-west and south-south-east, from the neighbourhood of Cirencester to the border of Hampshire at Cadnam Bridge, between Southampton and Ringwood. The greatest breadth from east to west is from the junction of the three counties of Hampshire, Berkshire, and Wiltshire, at Inkpen Beacon, to the border of Somersetshire, at Midford Bridge, south of Bath, 37 miles. These dimensions are of course of the main part of the county, without the detached portions. The area, including the detached portions, is estimated at 1367 square miles; the aggregate areas of the several parishes are estimated at 869,620 acres, or 1359 square miles: the trifling discrepancy in these estimates is not accounted for. The population of the county at the several enumerations of the present century was as follows:—1801, 185,107; 1811, 193,828; increase 5 per cent.: 1821, 222,157; increase 15 per cent.: 1831, 240,156; increase 8 per cent.: 1841, 260,007; increase 8·2 per cent. In respect of area it is the fourteenth of the English counties, being 99 square miles smaller than Sussex, the county next above it, and 24 square miles larger than Shropshire, the county next below it. In amount of population, retaining the census of 1831 to facilitate comparison, it was the twentieth, being less populous than Durham, but more so than Derbyshire; and in density of population the thirtieth, being below Northamptonshire, but above Cambridgeshire. According to the census of 1841 it was surpassed in population by Derbyshire, and in density of population by Cambridgeshire, both which were below it in the enumeration of 1831. Salisbury, the county-town, is in 51° 4′ N. lat. and 1° 47′ W. long., 80 miles in a direct line west-south-west from the General Post-office, London or 85 miles by the mail route, partly by the South-western Railway, partly by coach-road.

Surface and Geology.—The geological formations of Wiltshire consist chiefly of the cretaceous and oolitic series, with the intermediate beds; in the south-eastern corner the chalk is covered with the tertiary formations of the chalk-basin of the Isle of Wight.

We shall first notice the chalk formation, which may be considered, from its extent, as the most striking geological feature of the county, forming the extensive downs which overspread the eastern, central, and southern parts. The chalk district of Hampshire and Wiltshire constitutes the centre of the chalk formation in England, from which proceed four great branches. The first great branch is the chalk range of the Chiltern hills, Dunstable and Royston downs, &c., extending through Berkshire, Buckinghamshire, Bedfordshire, Hertfordshire, Cambridgeshire, Essex (just the north-western corner), Suffolk, and Norfolk, across the Wash, reappearing in Lincolnshire and Yorkshire, and terminating in Flamborough Head; the second branch is the North Downs of Hampshire, Surrey, and Kent; the third the South Downs of Hampshire and Sussex; and the fourth the North and South Downs of Dorsetshire, enclosing between them the trough of Poole.

The Wiltshire portion of the great central chalk district is divided into two parts by the vale of Pewsey, where the green-sand occupies the bottom of the valley, and is skirted on each side by the chalk-hills. As this valley extends east and west, it will be convenient to describe the two portions into which it divides the chalk district as the northern and southern districts: Marlborough downs belong to the northern district; Salisbury Plain belongs to the southern.

The northern chalk district is bounded by a line entering the county from Berkshire at the village of Bishopston, and passes south-west by the villages of Little Hinton, Wanborough, Liddington, Badbury and Chisledon, and then along the hills above Broad Hinton and the Winterbournes to Avebury. From Avebury it runs west to Cherhill, then south-west to the neighbourhood of Eddington or Heddington, its westernmost point, from which the boundary returns in a tolerably direct line eastward by Bishop's-Cannings, All-Cannings, Stanton Fitzwarren, the Altons, Hewish, Oare, Wootton-Rivers, and the south side of Tottenham Park near Great Bedwin, to the border of Berkshire at Great Shalbourne. The boundary may be traced throughout by a tolerably steep escarpment overlooking the surrounding country. The included chalk district is divided into two parts by the depression or valley, running east and west, through which the Kennet passes from Avebury to Hungerford; and the northernmost of the two parts is again divided by a valley running north and south, and drained by a small feeder of the Kennet. This valley is occupied by the chalk, as well as the higher ground on each side. The principal eminences are on the boundary-line of the district, and are in several instances crowned by antient intrenchments or other earthworks. The following may be enumerated:—Charlbury Hill, above Little Hinton; Beacon Hill, crowned by an antient intrenchment called Liddington Castle, above Liddington; Barbury Hill, also crowned with an intrenchment; Hacken Hill, above the Winterbournes; Oldbury Castle, an intrenchment on the summit of the hill above Cherhill, having a white horse carved on the slope beneath; Beacon Down, above Eddington; Roundaway Hill, above Devizes, the scene of a severe action in the civil war of Charles I.; and Easton Hill, St. Ann's Hill, Clifford's Hill, Milk Hill, Walker Hill, Golden-ball Hill, Hewish Hill, Martinsell Hill, and Terrace Hill, all which are parts of the southern escarpment overlooking the vale of Pewsey. The northern chalk district forms an elevated platform, and is to a considerable extent uncultivated and uninclosed. In the part north of the valley of the Kennet, and on the west of the valley drained by the feeder of the Kennet, are Marlborough Downs; and on the east of the latter valley are Aldbourn Chace, Wanborough Plain, and Bishopston Down. South of the valley of the Kennet are the King's Play Down, Pound Down, Horton Down, Beckhampton Field, Savernake Forest, and Bedwin and Wilton commons. Some portions of plastic clay, covering the chalk, are observed to the west of Great Bedwin.

The southern chalk district is bounded by a line commencing on the north side of Inkpen Beacon, near the junction of the three counties of Hampshire, Berkshire, and Wiltshire, and running westward to the south of Ham, Shalbourne, Burbage, Easton, Milston, and Pewsey, and thence southward, making a bend convex to the west to Figheldean, or Fittleton, on the Avon. From thence it proceeds westward, forming however a bend prominently convex to the north, to West Lavington, and from thence farther westward, with a similar bend, by Earlstoke and Eddington to Westbury, its north-western extremity. From Westbury the boundary runs south-east, skirting the upper part of the valley of the Wily on the northern side, above Warminster to Heytesbury, and then turns and runs westward along the southern side of the same valley, by Longbridge-Deverill and Maiden-Bradley, to Long Knoll, a hill just within the border of Somersetshire, and which forms its western extremity. From Long Knoll the boundary runs southward or south-eastward, though in an irregular line, to Mere, and from thence, in a tolerably direct line eastward, on the north side of the vale of Wardour (watered by the Nadder), by West Knoyle and Chilmark, to the neighbourhood of Wilton, from whence it runs west-south-west along the south side of the vale of Wardour into Dorsetshire near Shaftesbury. By a reference to the map it will be seen that this boundary makes a circuit from Inkpen Beacon to Shaftesbury, its regularity being broken by three deep indentations in the upper part of the valleys of the Avon, Wily, and Nadder, where the subjacent formations have been denuded.

The south-eastern part of the county, inclosed by this boundary, is occupied by the chalk which extends eastward into Hampshire and southward into Dorsetshire, and forms an extensive hilly tract furrowed by the valleys of the Nadder, the Wily, the Avon, and the Bourn, and a valley watered by a stream which passes Broad-Chalk, Bishopston, and Humington, which valleys unite near Salisbury to form the valley of the Lower Avon. South and east of Salisbury the chalk is covered with the plastic clay formation belonging to the chalk-basin of the Isle of Wight, which is also observed in one or two other places in the district.

The principal hills in this southern chalk district, as in the northern, are on the boundary, which is for the most part indicated by a steep escarpment. The principal eminences are Inkpen Beacon, the highest point in the chalk formation in England, 1011 feet high, near the junction of Wiltshire, Hampshire, and Berkshire; Easton Hill and Pewsey Hill, both commanding the vale of Pewsey, and crowned with antient earthworks; Upavon Hill, Wivelsford Hill, and Rushton, Easterton, and Lavington downs, between Figheldean and West Lavington; Little Cheverill and Great Cheverill hills, Coulston Hill, Eddington Hill, and Bratton, Westbury, Upton, and Warminster downs, between West Lavington and Warminster; Battlesbury Camp, Middle Hill, Scratchbury Camp, and Cotley Hill, between Warminster and Heytesbury; Titherington, Littlecombe, Whiten, Bidcombe, and Cold Kitchen hills, between Heytesbury and Long Knoll; Mere, Keesley, Fonthill, Chilmark, Wily, and Barford downs, between Long Knoll and Wilton, on the north side of the vale of Wardour; and Chiselbury Camp, with a circular intrenchment, and White Sheet Hill, between Wilton and Shaftesbury, on the south side of the same vale; but the hills above the vale of Wardour are partly of green-sand. To these may be added the nills in the central part of the district; Mizmaze, Ashley, and Harnham hills, near Salisbury; Tower Hill and Gumbleton Hill, on the east side of the valley of the Bourn; Amesbury Down, Beacon Hill, Silk Hill, and Combe Hill, between the Avon and the Bourn; and Newton Hill, Heale Hill, and Boreland Hill, between the Avon and the Wily.

This chalk district, known as Salisbury Plain, forms an elevated platform, uncultivated and uninclosed, except in the valleys. Wide downs, covered by a scanty herbage, spread in every direction. The population is collected in the valleys, where, along the streams which water them, the villages stand very close. Along the valley of the Wily, between Warminster and Salisbury, a distance of about eighteen miles, are two towns and seventeen villages, not including hamlets; and on the Avon above Salisbury, within a distance of twenty-five miles, are eighteen villages and one town. The chalk is generally bare of wood, except to the south-east of Marlborough, where there is wood in Savernake Forest; in the south part, between the Wily and the Nadder, where are two tolerably extensive woods, Grovely Wood, near Wilton, and the Great Ridge Wood, near Mere; and along the Dorsetshire border, where the wooded tracts of Verditch Chace and Cranbourn Chace are, the former wholly, the latter partly, in this county.

The green-sand formation, comprehending the chalk marl with the green-sand, crops out from beneath the escarpment of the two chalk districts occupying the vale of Pewsey, which separates them, as well as the indentations in the boundary of the southern chalk district. Consequently the outer edge of the green-sand is rather more regular than that of the chalk. The green-sand rises gradually from the foot of the chalk escarpment towards its outer edge, which is in many parts traceable by a well-defined and steep escarpment. It may be traced on the north side of the northern chalk district, from the village of Chisledon, about five miles from the border of Berkshire, forming a long ridge by Wroughton, Cliffe-Pypard, Highway, and Compton-Basset and Cherhill, to Eddington, or Heddington, near Calne, where the ridge subsides, and the green-sand is for a short distance covered by Beacon-down Hill (otherwise Bagdon Hill), which forms the western extremity of the northern chalk district. Above the villages of Highway and Compton-Basset the green-sand ridge is known as Highway Hill and Compton

Hill. A considerable part of this ridge and of the valley between it and the chalk hills is uninclosed, if not uncultivated, and is very thinly peopled.

From Eddington the outer edge of the green-sand may be traced in an irregular line, marked by a clearly-defined escarpment, by Devizes and Pottern to Market Lavington; then westward, but not with so clearly marked an escarpment, by Westbury to the border of Somersetshire, between Warminster and Frome. It occupies nearly all the county west of the chalk between Warminster and Mere, the subjacent formations appearing only in one or two places to a very small extent. Between Mere and Wilton, and between Wilton and the Dorsetshire border, the green-sand is seen cropping out beneath the chalk, but occupies a very narrow strip of country skirting the chalk district. About Warminster and Stourhead Park, in the south-western part of the county, the green-sand hills nearly equal those of the chalk in height. Alfred's Tower, near Stourhead, is on a green-sand hill 800 feet high. Ticklepath Hill, near Shaftesbury, is formed of green-sand.

From beneath the outer edge of the green-sand formation the Weald clay, or Tetsworth clay, which usually separates the green-sand from the iron-sand, crops out. It occupies only a narrow tract, surrounding on every side the country occupied by the superior formations, and may be traced through the county without interruption, except perhaps once, on the south side of the vale of Wardour, at the old intrenchment of Castleditches, near Swallowcliff, where it is covered by the green-sand. The outer edge of this clay formation runs by Swindon, Calne, Sandy Lane, Seend (between Devizes and Westbury), and Dilton, into Somersetshire. In the vale of Wardour the clay occupies a very narrow strip skirting the green-sand.

The iron-sand does not appear in this county, except in a few places, especially near the foot of Beacon-down Hill (chalk), between Calne and Devizes, rising toward Bowood Park, and at Seend, west of Devizes, and is described as being a pudding-stone composed of rounded quartz united by a siliceous cement with a red calx of iron, containing ore formerly in much request for the furnace and the forge.

In the absence of the iron-sand, the Weald clay is found to rest along its northern and north-western borders on the Kimmeridge clay, which belongs to the uppermost division of the oolitic group. This Kimmeridge clay occupies a tract rarely exceeding two miles in breadth, but extending in length from the Berkshire border to Seend, west of Devizes, beyond which it is covered by the westward extension of the overlying formations. At Swindon, in the Kimmeridge clay district, beds of oolitic freestone, similar to the Portland beds, intervene between the Weald clay and Kimmeridge clay, and are extensively quarried. In the vale of Wardour beds similar to the Purbeck beds (the uppermost in this upper division of the oolites) are found, and slabs are raised for roofing. Beneath the Purbeck beds the Portland freestone crops out, and is extensively quarried at Fonthill, Tisbury, and Chicksgrove. From beneath these formations a clay, which is probably identical with the Kimmeridge clay, crops out, and occupies the western part of the vale of Wardour, extending beyond the boundary of Wiltshire into Dorsetshire. Much disturbance has been experienced by the denuded subcretaceous strata in the vale of Wardour. At Chicksgrove, on the bank of the Nadder, eight miles west of Wilton, they are horizontal; but at Chilmark, Fonthill, and Tisbury they are inclined 40°, dipping to the north and east. In the northern part of the county the upper oolites are confined to low ground: in the vale of Pewsey they acquire some elevation, as in Lady Down near Tisbury.

The formations already noticed occupy the whole of the county south and east of a line drawn westward from the Berkshire border, 3 miles south of Highworth, parallel to and a little to the north of the Wilts and Berks Canal, by Stratton to the neighbourhood of Wootton-Basset; and from thence south by west, across the canal by Calne and Bromham to Seend; and from thence south-west to the Somersetshire border at Corsley near Frome, the whole line making a circuit convex to the north-west. Beyond this boundary the strata of the middle oolites, comprehending the coral-rag and calcareous grit, and the Oxford clay, crop out, occupying all the northern border of the county and extending westward to a line drawn south by west from Cirencester in Gloucestershire, by Kemble, Hankerton, Malmesbury, Stanton-St.-Quentin, Chippenham, Melksham, Semington, Trowbridge, and North Bradley, to Frome in Somersetshire; beyond which line the upper beds of the lowermost division of the oolites appear.

The tract occupied by the middle oolites has a breadth of 8 miles along the northern part of the county, where it extends into Gloucestershire: between Wootton-Basset and Cirencester it is 11 or 12 miles broad; and then diminishes towards the south and south-west, so that near Westbury and Frome it is probably not more than one or two miles broad. The lower or outer edge of the coral-rag and calcareous grit may be traced by a range of low hills of this formation, extending to the north of Highworth, Swindon, and Wootton-Basset, and then southward by Lyneham, Bremhall, Bowood, and Bromham. Near Seend, west of Devizes, there is a depression in these hills, through which the Kennet and Avon Canal passes; but the hills re-appear at Steeple-Ashton, beyond which the coral-rag is covered by the westward extension of the chalk and green-sand. The average height of the coral-rag hills seems to be about 400 feet above the level of the sea. The Oxford or clunch clay occupies the lower ground at their foot, including the valley of the Thames, and that of the Avon above Malmesbury. The limestone (Kelloway rock) which is occasionally found in connection with the Oxford clay, and which is used only for mending the roads, has been observed in some parts of the county. There are some gentle eminences of Oxford clay between Cricklade and Malmesbury, and again about Melksham, Semington, and Trowbridge. Mineral-waters occur in this formation: those of Melksham, and of Holt, three miles south-west of Melksham, are impregnated with purgative salts; those of Seend near Devizes contain iron and carbonic acid.

The formations belonging to the lower oolites in this county are the corn-brash, the forest marble, then a bed of clay in some places 80 feet thick, and then the great oolite. The corn-brash is much quarried near Malmesbury for building; and at Atford, between Melksham and Bath, is a quarry of forest marble. Farley Down and King's Down, near Bath, Drift Down, near Marshfield, and the other hills which occupy the border of the county west of Malmesbury, Chippenham, Melksham, and Bradford, and which are a part of the Cotswold range, appear to be chiefly composed of the great oolite; but their eastern slope is partly occupied by the beds of corn-brash and Forest marble.

Hydrography and Communications.—This county is comprehended in the three basins of the Thames, the Severn, and the Christchurch or Salisbury Avon; that part of the south-western border about Stourhead and Mere which is drained by the Dorsetshire Stour being included in the basin of the Avon, with which the Stour unites in Christchurch haven. The northern chalk district and the northern part of the county, as far as a line drawn from the neighbourhood of Swindon to near Tetbury in Gloucestershire, are included in the basin of the Thames; the southern chalk district, with the green-sand district which begirds it, the vale of Pewsey east of Devizes and Market Lavington, and the vale of Wardour, belong to the basin of the Salisbury or Christchurch Avon; and the western side of the county, nearly as far south as Warminster, belongs to the basin of the Severn.

Some of the streams which join the Thames in the upper part of its course rise in this county. One, which has been considered by some persons, but with very little reason, as the true Thames, rises just on the border of the county where the Roman road Akeman or Acman Street crosses the Thames and Severn Canal by 'Thames-head' bridge, and flows south-east near Kemble, Somerford-Keynes, and Ashton-Keynes, a mile above which it is joined by the Flagham brook from Oaksey, and a mile below which it is joined by the Swill brook from Crudwell and Hankerton; two miles below the junction of the Swill brook, it joins the Churn or true Thames [THAMES] from Cirencester, about a mile above Cricklade bridge. This pseudo-Thames has a course of about nine miles before joining the true Thames. From Cricklade bridge, where the true Thames first touches the county, it flows four miles by Castle Eaton to the border of the county; then between three and four miles farther along the border separating Wiltshire from Gloucestershire; and quits the county altogether a little above Lechlade. Between Cricklade and the border of the county it receives the Key or Ray, and just above Lechlade the Cole, both which rise in the green-sand hills or in the northern escarpment of the northern chalk district, and join the Thames on its right bank. The Key (otherwise the Ray) rises in the green-sand hills near Wroughton, close to which village, within two miles of its source, it turns two mills; it runs northward, passing to the west of Swindon and close to the little village of Water Eaton near Cricklade, and has a course of about 10 miles; it receives several brooks by the way. The Cole has three principal sources: one between Swindon and Chisledon, in the green-sand; one near Chisledon, also in the green-sand; and one in the chalk escarpment near Bishopstone and Little Hinton, close to the Berkshire border. It flows northward, chiefly on the border of the county, which it separates from Berkshire: its whole course, from the Chisledon source to the Thames, is about 13 miles: it receives a number of brooks. Its junction with the Thames is just beyond the border of the county.

The most important feeder of the Thames in this county is the Kennet, which rises in the green-sand district near its outer edge, in Cleavancy fields between Cliffe-Pypard and Yatesbury. It flows south and south-east by Yatesbury and Avebury, to Silbury Hill on the Bath road, near which it turns eastward by East Kennet, West Overton, Fyfield, Manton, Marlborough, Mildenhall, Ramsbury, and Chilton-Foliat, just below which it touches the border of he county, which it separates from Berkshire for about a mile or a mile and a half, and then, at Hungerford, quits t altogether. Its course between Avebury and Hungerord is through a valley or depression in the northern chalk district. That part of the course of the Kennet which beongs to Wiltshire is about 20 miles long; its course hrough Berkshire to its junction with the Thames at Reading is from 26 to 28 miles: making its whole length from 6 to 48 miles. Some small tributaries join the Kennet in Wiltshire: the Bourn flows southward through a depresion in the chalk by Ogbourn-St.-Andrew and Ogbourn-St.-George, into the Kennet on the left bank below Marlorough; another, from Aldbourn, flows south-east and oins it also on the left bank near Ramsbury; a third, rising ear Burbage and flowing north-east past Great Bedwin nd Little Bedwin, joins the Kennet on the right bank ear Hungerford; this last is partly incorporated with the Kennet and Avon Canal.

The Salisbury Avon, sometimes called the Upper Avon, ses in the southern slope of the northern chalk district, in he neighbourhood of Devizes, and flows east-south-east long the vale of Pewsey by Beachingstoke, Marden, Wivelsford, Charlton, and Rushall, near which village it joined by another stream which rises near Burbage, and ows first west-south-west, then south, along the vale of Pewsey, by Easton, Milston, Pewsey, Manningford-Abbots, Manningford-Bruce, and Newington. From the junction he united stream flows southward by Upavon, Chisenbury, Enford, Haxton, Nether Avon, Figheldean, Durrington, Milston, Bulford, Amesbury, Wilsford, Great Durnford, Woodford, and Stratford-under-the-Castle (*i.e.* the castle of Old Sarum) to Salisbury, at which it is joined on the right y the Wily (united with the Nadder): it is joined a little ower down, on the left bank, by the Bourne, and still lower, n the right, by a stream which rises near Alvedeston, and ows eastward through Ebbesborne-Wake, Fifield, Broadhalk, Stoke-Farthing, Flamston, Bishopston, Toney-Stratrd, Combe-Bisset, Humington, Odstock, and Nunton. elow the junction of these streams the Avon flows southard by Standfinch House to Downton, a little below hich it quits the county: its length from the neighbourood of Devizes to the border of the county is 41 miles: its rther course into the English Channel at Christchurch is bout 25 miles; making 66 miles in all.

The Wily or Willey rises in the downs north of Mere, in he south-west part of the county, and flows first east, then orth by Kingston-Deverill, Monkton-Deverill, Brixton-Deverill, Hill-Deverill, and Longbridge-Deverill to Warinster, near which it bends to the east-south-east, and ows past Bishopstrow, Norton-Bavant, Heytesbury, Knook, Upton-Lovel, Boyton, Sherrington, Codford-St.-Peter, Codrd-St.-Mary, Stockton, Fisherton-de-la-Mere, Wily, teeple-Langford, and Little Langford, to Stapleford. Here is joined on the left by a stream, 6 miles long, which rises ear Orcheston-St.-Mary and Orcheston-St.-George, and asses Shrewton, Maddington, Rollestone, Winterbourntoke, and Berwick-St.-James. From the junction of this stream the Wily flows south-east by Wishford, South-Newton, Ditchampton, Fugglestone, Quidhampton, Netherhampton, Bemerton, and West-Harnham, to Fisherton Anger, a suburb of Salisbury, where it joins the Avon. It whole course is about 27 miles. Near Quidhampton it i joined on the right by the Nadder, which rises close to th Dorsetshire border near Shaftesbury, and flows first east then north-east by Donhead-St.-Andrew, and Donhead-St. Mary, to Tisbury; where it bends eastward and flows nea Sutton-Mandeville, Fovant, Compton-Chamberlain, Barford-St.-Martin, North-Burcombe, and Wilton, into th Wily: its whole length is about 18 miles.

The Bourn rises just within the northern boundary of th southern chalk district, and flows southward by Collingbourn-Kingston, Collingbourn-Ducis, North Tidworth South Tidworth, Shipton (these two villages are in a corner of Hampshire which the Bourn here crosses), Cholderton, Newton-Toney, Allington, East-Boscombe, Idmiston Porton, Winterbourn-Gunner, Winterbourn-Dantsey, Winterbourn-Earls, Winterbourn-Ford, and Laverstock, nea Salisbury, below which it joins the Avon: its whole length is about 23 miles.

A very small part of the county about Mere, in the south-western corner, is drained by the upper waters of the Dorsetshire Stour, which rises at Stourhead in this county. The Stour and the Salisbury Avon unite just above their outfall into the English Channel at Christchurch.

That part of the county which belongs to the basin of the Severn is drained by the Bristol Avon, the source of which is in the Cotswold Hills, at Horton near Chipping-Sodbury in Gloucestershire. From this source the stream flows in a circuitous course, 15 miles east, by Little Badminton through Badminton Park, on leaving which it enters Wiltshire, by Luckington, Great Sherston, Easton-Grey, and Bremilham or Cowage, to Malmesbury, where it is joined by a stream, 8 miles long, from Tetbury and Brokenborough. From Malmesbury the Avon flows in a winding channel 1 miles southward by Little Somerford, Great Somerford Dauntsey, Seagry, Sutton-Benger, Christian-Malford, Kellaways, and Tytherton-Lucas, to Chippenham, which i only 10 miles by the road from Malmesbury; and from thence 20 miles in a winding channel south-west by Laycock, Melksham, Whaddon, Staverton, Bradford, and Limpley-Stoke, to the border of this county and Somersetshire, between Bradford and Bath. Besides the feeder which joins it at Malmesbury, the Avon receives on the left bank a stream from Wootton-Basset, and the river Marden, a stream from near Devizes, and the rivers Were and Frome. The stream from Wootton-Basset rises on the slope of the green-sand hills near Cliffe-Pypard, and flows past Wootton-Basset and Brinkworth, into the Avon at Dauntsey. The Marden rises in the green-sand hills (Compton Hill) above Compton-Basset, and flows by Calne, just below which it receives a stream (larger than the Marden itself, above the junction) from the green-sand hills between Highway and Cliffe-Pypard, and which stream passes Hillmarton and Bremhill. The Marden is about 9 miles long; if measured from the head of the Hillmarton branch it would be longer. The stream from the neighbourhood of Devizes rises east of that town, and passes near Stert, Pottern, and Semington: it is 13 miles long, and joins the Avon at Whaddon: it receives several feeders, two of them more immediately from the neighbourhood of Devizes. The Were is formed by the junction of several streams which rise on the escarpment of the chalk downs about Westbury. The remotest spring is near Upton-Scudamore, between Westbury and Warminster, and passes Dilton, Westbury-Leigh near Westbury, North Bradley, and Trowbridge: the length of the Were is about 9 miles. The Frome belongs chiefly to Somersetshire, but some part of its course (abou Road, Tellisford, Farleigh, and Freshford, all in Somersetshire) is on the border of this county.

Of these numerous rivers only few are navigable, and tha only for a short distance in this county. This is the consequence of its central position and comparative elevation, from which it results that the principal streams have only thei sources or the upper part of their courses in it. The navigation of the Thames, the Kennet, and the Bristol Avon does not commence until after those rivers have quitted the county. The Salisbury Avon was made navigable from that city to its mouth, under an act of 17 Charles II. but the works were destroyed by a flood soon after thei completion, and remained in ruins until 1771. Some re pairs were then made, but they were inefficient; and the navigation is now given up except just at the mouth of the river; and even there the bar at Christchurch is an obstacle insurmountable except at spring-tides.

The want of river-navigation in Wiltshire is partially supplied by canals, of which three lines are connected with this county.

The northernmost line is that of the Thames and Severn Canal, which, in its course from the Thames at Lechlade in Gloucestershire, to the Stroudwater Canal at Stroud in the same county, connecting the rivers Thames and the Severn, crosses the northern part of this county near Castle Eaton and Cricklade. This canal was commenced under an act 23 George III. (A.D. 1783); and its formation led to the abandonment of the navigation of the Thames in this county or upon the border between Cricklade and Lechlade. The canal is not however so much used as was expected, partly owing to the inefficient navigation of the upper part of the Thames with which it is connected, and partly to the competition of other lines of canal navigation.

The second line is that of the Kennet and Avon Canal, which also connects the Thames with the Severn, by means of their respective tributaries the Kennet and the Bristol Avon. This canal is 57 miles long: it commences at the head of the navigation of the river Kennet at Newbury in Berkshire, and terminates in the river Avon at Bath: its rise from Newbury to the summit-level is 210 feet, effected by thirty-one locks; its fall from that level to Bath is 404½ feet, effected by forty-eight locks. A considerable part (about 41 miles) of its course is in Wiltshire, which county it enters near Hungerford, 9 miles from Newbury. It then passes south-westward by Froxfield, Little Bedwin, and Great Bedwin, to Crofton, 16½ miles from Newbury and 7½ from Hungerford, near which the summit-level begins. The summit-level extends two miles and a half to the hamlet of Brimslade near Wootton-Rivers, passing through the intervening hill near Burbage by a deep cutting nearly two miles long, with a tunnel near the middle of the cutting, 510 yards long. From Brimslade to Wootton-Rivers there is a fall of 33 feet by four locks: and then the canal passes on a level 15 miles through the vale of Pewsey by Wilcot, Alton-Barnes, Stanton-Fitzwarren, All-Cannings, and Bishop's-Cannings, to Devizes. From Devizes to Foxhanger, distant only two miles and a half, there is a descent of 239 feet by twenty-nine locks. From Foxhanger by Seend to Semington, four miles and a half, is a fall of 56 feet by seven locks. From Semington, where the Wilts and Berks Canal joins it, it runs 5 miles on a level by Staverton and near Trowbridge to Bradford, where it descends, by one lock, 10 feet, into the valley of the Avon. Its course to Sidney Gardens, Bath, is 9 miles, by Freshford, Limpley-Stoke, Claverton, Bathford, Bath-hampton, and Bathwick, comprehending all that remains of its course in this county (which it quits 4 miles from Bradford at the Dundas Aqueduct by which it is carried over the Avon), and is on a level. From Sidney Gardens, Bath, it descends into the river Avon, 66½ feet, by seven locks, in the distance of one mile. Between Devizes and Bath, where the inequality of the ground is great, the canal is carried through the higher grounds by cuttings, over the lower grounds by embankments, and across the branches of the Avon by aqueducts which are distinguished for excellent construction and workmanship. Between Bradford and Sidney Gardens, Bath, the canal is much used in summer for travelling, the beauty of the valley of the Avon, along which it runs, being a great attraction.

The Dorset and Somerset Canal was intended to join the Kennet and Avon Canal at Widbrook near Bradford: two acts were obtained for it, 36 and 43 George III. (A.D. 1796 and 1803), but the works were not executed. It was to enter Wiltshire near the village of Road (which is in Somersetshire, close on the border of Wiltshire), and to pass near Trowbridge.

The third line of canal-navigation is that of the Wilts and Berks Canal: it lies between the two lines already noticed (the Thames and Severn Canal, and the Kennet and Avon Canal), and connects the Thames near Abingdon, with the Kennet and Avon Canal at Semington, between Devizes and Bradford. Its whole length is 52 miles, with a rise of 168 feet from the Thames at Abingdon to the summit-level, and a fall of 201 feet from the summit-level to the Kennet and Avon Canal. After passing through the Vale of White Horse, in Berkshire, by Wantage (to which town there is a short branch), East Challow, West Challow, Uffington, Longcott (where there is another short branch), and Shrivenham, it enters Wiltshire, 21½ miles from its commencement at Abingdon, and runs west-south-west along the valley at the foot of the green-sand hills, by Stratton-St.-Margaret's, Swindon, and Wootton-Basset, to the village of Clack, where it turns south-south-west, and runs by Foxham, Tytherton-Lucas, Bremhill, Laycock, and Melksham, to Semington. The summit-level is in this county, commencing at Long Leaze near Stratton-St.-Margaret's, and terminating near Wootton-Basset. From this summit-level, at Lower Eastcott near Swindon, is a branch 8½ miles long, passing the town of Cricklade to the Thames and Severn Canal at Latton in Gloucestershire, near Cricklade. This branch, which is nearly all in Wiltshire, was formed as a separate canal under an act 53 George III. (A.D. 1813), and was called the North Wilts Canal; but has by a subsequent act (1 and 2 Geo. IV., A.D. 1821) been incorporated with the Wilts and Berks Canal. It falls from the Wilts and Berks Canal to the Thames and Severn Canal, nearly 59 feet, and passes through a short tunnel near Cricklade. There are two other branches of the Wilts and Berks Canal in Wiltshire: one of three and a half miles to Calne, with a rise of 21 feet; and one of nearly two miles to Chippenham, with a fall of 17 feet.

The principal coach roads are the present mail-road from London to Salisbury and Exeter, and the two former mail-roads to Bath and Bristol. The Salisbury and Exeter mail-road enters the county about two miles and a half beyond the hamlet of Middle Wallop, or nine miles beyond Andover, and runs across Salisbury Plain by Winterslow Hut and St. Thomas's bridge (over the Bourn) to Salisbury; and from thence by Fisherton-Anger, Wilton, North Burcombe, Barford-St.-Martin, Compton-Chamberlain, Fovant, Brookhill, and Ludwell to Shaftesbury, just before entering which it quits the county. One of the Bath and Bristol ex-mail-roads enters the county at Hungerford; and runs across Savernake Forest to Marlborough, and thence across the downs by Fyfield and West Overton, Beckhampton, Avebury, Cherhill, Blackland, Calne, Chippenham, Corsham, to Box, a mile and a half beyond which it quits the county. The other ex-mail-road branches from the one just described at Beckhampton, and passes through Devizes, Melksham, and Atford to Bathford in Somersetshire (just across the Wiltshire border), beyond which it unites with that through Calne and Chippenham. A third road to Bristol branches from the first of the two ex-mail-roads at Chippenham, and runs through Marshfield in Gloucestershire. It does not pass through Bath.

There are several roads from London to Exeter, besides the mail-road. One of these branching from the mail-road at Salisbury passes through Combe-Bisset, and enters Dorsetshire near Woodyates Inn. It passes through Blandford, Dorchester, and Honiton. Another road branching from the mail-road at Andover enters the county at Park House, and runs across Salisbury Plain through Amesbury, Winterbourn-Stoke, Deptford, Wily, Cricklade, and Mere, beyond which it enters Somersetshire. A road branching from this road beyond Amesbury passes by Stonehenge, Rolleston, Muddington, Chiltern-All-Saints, Chiltern-St.-Mary, Newham, Heytesbury, and Maiden Bradley, beyond which it quits the county.

The road from London to the Old Passage on the Severn, opposite the mouth of the Wye, branches from the Bath road at Chippenham, and runs by Yatton-Keynell, Castle-Combe, and Nettleton into Gloucestershire. Another road to the Old Passage enters the county at Coleshill in Berkshire, beyond Faringdon, and runs by Highworth, Water-Eaton, Cricklade, Charlton, Malmesbury, Easton-Grey, Great Sherstone, and Luckington into Gloucestershire, uniting with the former road at Acton-Turville in Gloucestershire. A road branches from this road at Cricklade and runs to Cirencester and Gloucester.

There are several roads from Salisbury, the county-town: one runs south by west to Cranbourn, Wimbourn-Minster, and Poole in Dorsetshire, branching from the road to Exeter (through Blandford, Dorchester, and Honiton) a little beyond Combe-Bisset; one southward by Downton to Fordingbridge, Lyndhurst, and Christchurch in the New Forest in Hampshire: two south-east to Southampton; one through Bramshaw, the other through Romsey: two eastward to Winchester; one by Romsey, and one (branching from the London and Exeter mail-road) through Stock-bridge: and two north-west to Bath and Bristol; one through Heytesbury, Warminster, Westbury, and Bradford; the other branching from this at Warminster, and rejoining it at Bath.

The Great Western Railway has a considerable part of its course in this county, which it crosses in a direction nearly parallel to that of the Wilts and Berks Canal. It enters Wiltshire between the Shrivenham and Swindon stations, the latter of which is 77 miles from the London terminus. There are stations at Swindon, Wootton-Basset, Chippenham (93 miles), Corsham, and Box. There are two inclined planes; one at Wootton-Basset, one mile and thirty chains long, and one at Box, two miles and forty chains long: the planes are quite straight in their direction, and have an inclination of about 53 feet in a mile. On the Box plane occurs the Box tunnel, nearly a mile and three-quarters long. The Cheltenham and Great Western Union Railway branches from the Great Western at Swindon station, and runs, or is to run, to Gloucester and Cheltenham. It is open as far as Cirencester, including all the part which belongs to this county. There are stations at Purton, Minety, and Cirencester.

Agriculture.—In an agricultural point of view the county of Wilts may be divided into two districts, the first r southern district comprehending all the Wiltshire Downs, with their intersecting valleys, and separated from he northern by an irregular line running round the foot of he chalk-hills from their entrance into the north-east part f Berkshire to their south-west termination at Maiden Bradley. We shall therefore consider these districts separately.

South Wiltshire Agriculture.—South or more properly outh-East Wiltshire contains, in round numbers, about 00,000 acres of land. The Downs are an elevated tableland intersected by valleys, which give the surface a broken ppearance. These valleys contain rivers and small treams. The soil being generally more fertile there, and he climate milder, cultivation was originally confined to hem; and there most of the villages are situated: the igher and more exposed situations remain as natural pastures for sheep and cattle.

The air on the Downs is keen, and healthy to robust constitutions. The valleys, although more sheltered from the weeping winds from the Atlantic, partake of this keen ir, which is drawn along their course in currents.

The soil on the Downs varies little, being thin, and uniformly resting on the chalk. It produces excellent short erbage, very well suited for sheep pasture; and where it as been broken up, it is only by great skill and very careful cultivation that it is made to repay the cost. It is comparatively a small proportion which has been converted into arable land, and chiefly on the borders of the valleys; he cultivation but extends upwards in consequence of the emand for corn offering temptations to the proprietors nd farmers to increase the quantity of land devoted to its rowth, and the extent of pasture affording the means of lding sheep on the arable land, and thus increasing its rtility. As we descend from the Downs into the valleys, e soil generally becomes less mixed with flints and of a ore loamy nature, in consequence of the waters washing own portions of the upper soil, of which the finer particles e deposited on the sides of the hills, and form what is lled white land. The level part of the valleys nearest e rivulets consists of flints washed down lower, and mixed ith fine earth. In some places there is a kind of peat, the rmation of which is evidently owing to the stagnation of e waters in pools which have not had sufficient outlet; ut these spots are not numerous.

Some remarkable veins of sand intersect this district; ne of these, of a fertile nature, enters the county at Mere n the borders of Dorsetshire, and takes a north and north-east direction round the outer edge of the Downs, keeping early close to their foot, by way of Maiden Bradley, Warminster, Westbury, and Lavington, towards Devizes, where meets with a much wider and still more fertile vein oming down the Pewsey vale from Burbage. Another ein also enters the county from Dorsetshire, being a continuation of the sand-hills on which Shaftesbury stands, and asses through Donhead, Ansty, Swallowcliff, Fovant, &c., nder the foot of the Downs, till it is stopped by the high round in Burcombfield. This vein is also met at or near ovant by another branch, or rather a ridge of sand-hills, oming from West Knoyle by Stop-Beacon and Ridge. These are the principal soils in this division; and although there are some spots of a more clayey nature, they are not extensive. (See the *Report to the Board of Agriculture*, by Thomas Davis.)

The system of cultivation was originally such as the situation of the more fertile soils and their connection with the extensive pastures on the Downs naturally suggested. Wool was, no doubt, the principal produce; and no more corn was grown than the necessity of the inhabitants required. The estates or manors extended in narrow strips along the valleys, and had certain rights of common and wood attached to them. These were let whole, or more commonly subdivided, and the arable land lay in common fields, in divisions and patches, which precluded any system of cultivation which was not adopted by general consent. This is the history of all common fields. Folding sheep on the land was the great resource; and the numerous streams suggested artificial irrigation, by which hay was increased for winter-feed and early grass for the lambing season. In no part of England, as we shall see hereafter, was the system of water-meadows introduced so early or carried to such perfection. In fact it became one of the chief features of the agriculture. A farm consisted of certain buildings and homesteads, with meadows, irrigated if possible, or kept in heart by folding; with some fields to raise corn for the family, and a run on the Downs for a certain number of sheep, which were the chief source of rent and profit. Since the common fields have mostly been enclosed and divided among the proprietors, more land has been cultivated and better systems adopted; but this has been done slowly, the old methods retaining a certain sanctity in the eyes of the farmers, who are not easily brought to depart from what they have seen their fathers do before them. A great and gradual improvement however has taken place, and new methods are daily introduced, and will in the end render this part of the county far more important in an agricultural point of view than it is now.

The buildings on a farm were formerly very extensive, and occasioned a great expense to the proprietors in continual repairs. Since the introduction of the practice of stacking corn out of doors, which is so much better and more economical than laying it up in barns, and especially the introduction of threshing-machines, the buildings are now much contracted, and a less burden to the proprietor, while the rents are improved and better paid. Sheep are still a principal object of the Wiltshire farmer; but his attention is not confined to them, and he makes them subservient to a greater production of corn.

By the old system the sheep ran on the commons or Downs during summer and autumn, and also on the summer fallows till they were ploughed up for wheat: as soon as the corn was reaped, the flocks had the stubbles and the Downs to run on, till winter forced the owners to give them hay, when the farmer found his own fold and hay, the common shepherd still feeding and folding the whole: but latterly each farmer had his own shepherd and folded on his own land. When the ewes are near yeaning, the owner takes them home to the enclosed meadows, and by the time all the lambs are dropped the water-meadows are ready to receive them. As there is seldom sufficient food in winter for the whole flock, a portion is necessarily sold off in autumn to supply other counties, where they have more winter forage, but no commons or downs for summer pasture. Since the introduction of turnips a great change has taken place in the system; many of the wethers and barren ewes are fatted at home, and the only portion sold off are the lambs and teggs, which have been bred for this purpose, without diminishing the breeding flock.

Farms were formerly much smaller than they are at present, but it has been found that the expense of men and horses on a small farm is much greater in proportion than on a larger. It is most advantageous to the farmer when he has the largest flock which one shepherd can manage. If he has more sheep, he must have two such flocks. As much arable land as will fully occupy six horses is as little as can be profitably farmed: more than this requires great activity in the farmer, or the help of a trust-worthy foreman to each department—a thing not always to be met with. The management of the arable land was [illegible], as the condition of common fields necessarily imposed—two crops and a fallow, varied occasionally by [illegible] grass-seeds, which could only be done by a [illegible] sent to waive the right of common pasture after hay-making. Since the enclosures the system is improved; turnips are raised in considerable quantities, their use for winter-feed having been soon found out. Clover, sainfoin, and other artificial grasses come into the rotation, and the only fault in the different systems is that which is yet too often met with, of two white straw crops following one another; the only palliation of this is the abundant folding of sheep on the land, which keeps it in heart and prevents its exhaustion.

The Wiltshire ploughs are mostly without wheels or with only one wheel: the former are used on rough heavy soils, and the latter on stubbles and clover leys. In the flinty soils a plough with two wheels is generally used, as being steadier; the furrows being necessarily shallow, the swing-plough would be too easily thrown out of the ground. The heavy white lands require three horses at least to a plough, but the light chalky lands can be easily ploughed with two; and, with good ploughmen, lighter ploughs might be used, such as the improved Berkshire and Suffolk ploughs. The carts and waggons are too heavy. A light single-horse cart is far preferable, and will no doubt be generally adopted when its economy in horse-labour is appreciated. The light thin soils on the Downs, when cultivated, require much skill to make them productive. Formerly they were much worked and pulverized in summer, by which the texture was too much loosened, and weeds were greatly increased. The wheat looked well in spring; but the earth was blown away from the roots in high winds and dry weather, and abundant crops of poppies took the place of the thin and withered corn. Lately the farmers have adopted a better plan; they try to give firmness to the soil by pressure and folding, before sowing, and the crops are much improved.

The common practice of *raftering* the land, as it is called, that is, ploughing a furrow and laying the furrow-slice on the solid land, and then opening another furrow 18 inches from the first, so as to produce another similar ridge, leaving the surface in alternate open furrows and double ridges, has the effect of killing the grass and exposing half the roots to the air, the other half not being stirred. When this is done across the stitches, at right angles, or diagonally, which is better, one harrowing down and ploughing prepare the land for wheat sowing; and the crops justify the practice, but it is faulty in that it soon fills the land with weeds. One good ploughing and pressing with iron cylinders after a clean layer is a far better preparation. A heavy drag or a nine-share plough is very commonly used as a substitute for ploughing. It stirs and cleans the land at the same time, raising the root-weeds to the surface, to be gathered and burned.

In the sandy soils the seed is generally deposited by the drilling-machine; but where flints abound this implement is not so applicable, and the broad-cast sowing is continued.

The most common rotation now adopted on the heavy white lands, where turnips will not grow, is that of fallow, wheat, beans, oats, clover; or, which is better, fallow, wheat or barley, clover mown, ditto fed, wheat, beans, or oats. The second year of the clover it is broken up early in summer and well pulverized, and the sheep are folded on it at night: the wheat is generally good after it. Half the barley or wheat stubble is now generally sown with peas, beans, or vetches, and the other half with clover; the land is kept clean by weeding and hoeing the crops, and the clover is more certain from not recurring so often.

On the sands the Norfolk rotation of turnips, barley, clover, wheat, is commonly adopted, with the variation of a fallow between the clover and wheat, when the land is close folded and thus consolidated. Some good farmers have peas or tares fed off early on half the barley land, to prevent the too frequent recurrence of clover. In the Pewsey vale the sandy loam is so nearly allied to clay as to be cropped like heavy land, and the crops here are more certain and abundant. The Down land is cropped in various manners, turnips and barley or oats being the principal crops; on the deeper red soils wheat is introduced every fourth or fifth year. Rape and rye-grass are sometimes sown together after wheat, to be fed off in spring, and the grass is continued a year or two more to recruit the land. The flocks of sheep which are kept everywhere give the principal supply of manure by the fold; as fewer horned cattle are kept in the yards. When the ewes and lambs feed in the water-meadows, the folding is found to be far more effective than at any other time. This is probably from the abundance of urine produced by the fresh succulent grass.

Potatoes are raised in considerable quantities on the rich sands, which are peculiarly adapted to this crop; and it has been a common observation, that a bad year for wheat is generally a good one for potatoes, which increases the value of this excellent root.

We have alluded to the water-meadows, which in this part of the county are extremely well managed. There are two kinds of water-meadows, those irrigated by catch-work and those which are flooded. [IRRIGATION.] The flooded meadows are those which lie along the course of the rivers or rivulets, and are flat and level naturally or rendered so by art. The water is let on by sluices and channels from the upper part of the stream, and kept in by banks, if necessary, and let off again into the lower part of the stream, or on lower meadows, by similar sluices and channels. This method requires a greater supply of water and more expensive works. The expense is often from 10*l.* to 20*l.* per acre; but the return is so ample, that this is a capital extremely well laid out. It is computed that there are above 20,000 acres of excellent water-meadows in this district.

As soon as the after-grass is eaten bare in autumn, the water is let on; all the grips and channels which may have been damaged by the treading of the cattle being first carefully dug out and repaired. The best time for this operation is soon after Michaelmas, when the rains bring down fine earth from the hills around. The water generally covers the meadows for a fortnight or three weeks, to 'give them a good soaking at first.' This makes the surface close and increases the roots of the grasses. It is then let off till the surface is quite dry again. If any scum appears on the water during the flooding, it is immediately let off, or it would do harm. When the growth of the grass seems to flag, the water is let on again for a few days only. During hard frost it is useful to have all the meadows covered with water, which prevents the frost touching the roots: as spring advances the floodings must be much shorter, till the grass attains the proper size and bulk. Where there is not sufficient water to flood a meadow, or if it lies on a declivity, the catch-work is the only method applicable, and the letting on and off of the water is regulated on the same principle. The great value of early and abundant grass for ewes and lambs makes these meadows of the greatest consequence to the sheep-farmer. When they are fed off close, by the end of April or later, the water is let on for a day or two and then let off. In six weeks after a very heavy crop of hay may be made; another short flooding produces abundant after-feed. This however is generally fed off by horses and cows, as it is thought to rot sheep at that time; but some water-meadows on the Avon never cause rot at any time.

The best water-meadows are on a loose bed of broken flints, with scarcely any earth; which would lead one to think that water alone is sufficient to feed plants: but this water is impregnated with mineral and organic matter in extremely minute division, and to these it probably owes its extreme fertility. There are two small water-meadows at Orchiston, six miles from Amesbury, which are usually called the 'long grass meadows.' They contain together only 2½ acres; but the crop of hay is sometimes so enormous, that the *tithe* of it was once sold for five guineas. It is found, on examination of the grasses, that the *Agrostis Stolonifera* is by far the most abundant, in fact almost excluding all other grasses. This is the *Fiorin grass*, once so strongly recommended by Dr. Richardson as to obtain universal notice amongst agriculturists; but, like other plants overrated by those who desire to introduce them, its celebrity had a short run. As the rivulet which supplies the water to these meadows is subject to great variations in different seasons, and sometimes is low in winter, it happens then that very little hay can be cut in summer: but this is not often the case.

As the cows in this district are not such objects of attention as the sheep, the breeds are very various, and few of them of superior quality. The chief dairies are on the borders of Dorsetshire, whence comes the butter used in the towns, North Wiltshire producing little butter, except whey-butter—its chief produce being cheese.

The Wiltshire sheep are a variety of the Southdown, but not in general so pure. The original breed was horned, but this has been almost entirely superseded by the polled breed, which produces a finer wool, if not so large a carcass. Of late the size has been an object to the breeder, since fine wool has much diminished in value. An attempt was formerly made to introduce the Merino breed, and crosses between it and the Southdown; but it did not answer: the sheep were too delicate for the climate and feed, and the superior quality of their wool did not make up for the inferiority of the carcasses. There is probably at this moment not a remnant of Merino blood in any flock in Wiltshire.

The great object in keeping a flock of sheep formerly was to fold them, and for this purpose they must be strong and active; but now the early fatting is the principal object, and a different breed answers this purpose best. The Southdown breed was introduced into Wiltshire in 1789, by Mr. Mighell of Kennett, and since that time has almost entirely superseded the old Wiltshire breed. Crosses with other breeds, such as the Leicester and Cotteswold, are now very common; and since the carcass has become the chief object, these half-breds, as they are called, are thought by some to be most profitable. Their wool is not so fine, but longer, and the fleeces heavier.

The pigs are much the same as in other counties; the Chinese and Neapolitan breeds having by their crosses improved the original breeds and altered all their qualities, they are reduced in size and bone, and fatten both earlier and in less time: all these things have opened the eyes of the most prejudiced. It is remarkable that, while the advantage of a smaller size has been so readily recognised in the pig, many breeders still aim at great size in the horse and ox. Experience will perhaps convince them, in the end, that they are wrong, and that, generally speaking, a small animal of perfect symmetry is more profitable than a large one.

North Wiltshire Agriculture.—The north-western district of Wiltshire differs greatly from the southern district. The subsoil in this part of the county, instead of being chalk, consists chiefly of flat broken stone, called provincially corn-grate. It is the same as that of the Cotteswold Hills in Gloucestershire. These stones serve for building when they are of sufficient thickness, and the thinner layers to cover houses, instead of slate. The top soil is a reddish calcareous loam mixed with irregular flat stones, and commonly called stone-brash. In some places a stratum of clay is interposed between the rock and the top soil, which may easily be known by the oaks which thrive there, whilst on other parts the elm thrives best. Where the top soil is thin, it is poorer, and is chiefly cultivated as arable land; where it is deep and rich, there are some of the finest pastures in England, such as those about Chippenham and thence southward to Melksham and Trowbridge, where the largest oxen may be fatted.

There is a very fertile vein of gravel, or rather of small shelly-sand with pebbles, covered with a good depth of rich mould, which runs in a broken line from Melksham through Chippenham to Cricklade, but extends wider from Tytherton through Christian Malford and Dantzey to Somerford. All this vein is very rich land, especially near Dantzey. The porous subsoil keeps the soil dry and warm better than any artificial draining could do. A less fertile vein of sand runs from Redburn by Seagry, Draycott, and Sutton Benger to Langley Burnell by Chippenham, and another begins at the opposite corresponding hill at Charlcot, and runs through Bremhill to Branham. The greatest part of the residue of the soil of this district lies on a hard close rock of a rough irregular kind of bastard limestone, fit only for mending the roads with: the soil above this rock is mostly retentive of moisture, and consequently cold. Bradon Forest consists of a poor iron-clay fit only for wood, and notoriously ungrateful to the cultivator.

This district is essentially a dairy country, and probably so from time immemorial. The buildings are well suited to this purpose, and placed conveniently with respect to the surrounding fields. The cheese-lofts are often on a very extensive scale; and all the buildings are kept in a neat and substantial order. Leases are common for 14 or 21 years, and the tenant is prevented from selling hay or straw, which secures his keeping sufficient stock for manure. The implements are similar to those used in the south-eastern district. The common fields have been mostly enclosed by act of parliament, to the great advantage of the husbandry. Some of the best land has been laid down in grass, and a better system of cropping has been generally introduced, and a cleaner tillage.

The most common rotation in the beginning of this century was that of wheat, oats, turnips, barley, clover mown, then fed, and summer fallowed for wheat. This was not a bad course, but improvements have been introduced according as the soil was heavier or lighter. Folding sheep on wet cold clays is never profitable, and feeding oxen on oil-cakes and hay has only been introduced of late years, and is by no means generally adopted as a system. Barley does not come to such perfection in the heavier soils, which are better adapted to beans and vetches as a preparation for wheat, instead of a too frequent recurrence of clover. The turnips after wheat and oats, with only the sheep-fold to recruit the land, are never so good as with good yard-muck; and the feeding of sheep on the turnips does not sufficiently enrich it when the crop is light. Most of the cold clays require draining, an improvement of which the effects are so striking, that it must soon become very general on such soils.

The grass land forms the greater portion of North Wiltshire, and the cheese made there is justly celebrated. It is mostly bought up by factors for the supply of London and other large towns. The dairy is managed in the best manner, and so much depends on this, that with care nearly as good cheese may be made from inferior pastures as from the best. There is an opinion that poor land gives the best cheese, and this notion prevails in Cheshire: but there are many reasons for thinking that this opinion has no foundation. The land may be poor for corn, and yet produce very sweet herbage, as in the case of the Downs; but a rich milk equally well managed will produce a richer cheese. No one will assert that the Stilton cheeses made in Leicestershire, on the richest pastures, or that the Gruyère or Parmesan cheeses, are not of superior quality to any cheese made on poor land.

Formerly the cows were fed with hay in winter in the pastures: but so much damage was done to the land by the treading of heavy animals in wet weather, that many dairymen now keep their cows in the stalls from November to April, as they do in Holland. They find the advantage of this practice both to the cows and the pastures; and this also gives them manure for the arable land, as well as the grass land, which is more improved by manuring with a rich compost than by the irregular droppings of the dung from the cows in the pastures. The manuring of grass land is generally done immediately after hay-making. This improved system, and that of feeding and mowing the grass land alternately, have done much good to the pastures, and kept them freer from docks, thistles, and other weeds.

Much of the heavy wet soils has been improved by under-draining, but a great deal remains to be done. The stone in the substratum is well adapted to fill drains with, and if these are only made sufficiently near to each other, the nature of the soil will soon be altered for the better, where it is too wet and cold.

Considering the extent and perfection of the water-meadows in the southern district, it is surprising that there are so few in the northern. This must be ascribed to the difference in the systems pursued on sheep-farms and dairy-farms. There is not the same necessity for a rich food early in spring; and upland hay is plentiful and preferred by many to lowland meadow hay: yet the advantage of water-meadows for cows, as well as sheep, should have drawn more attention to their formation.

The breed of milch-cows is an object of greater attention in this district than in the southern. The long-horned breed was formerly in high repute, as the old cows fatted well and produced good prices from their weight. Each cow of the large breed will give from 3 to 4½ cwt. of cheese in a season, if she calves in proper time. But if more cows of a smaller breed can be fed on the same land, and thus every acre produce more cheese, whatever each cow may give, the smaller cow is evidently the most profitable: besides, smaller animals require less food, and will thrive where the larger would fall off. It will probably be found, in the end, that good breeds of small cows pay best: such are the Ayrshire cows and the small Suffolk polled breed. The North Devon are sometimes excellent milkers, and they certainly are the handsomest breed. A great many cows are fatted in the dairies, when they are dry or have missed calving.

There are very few market-gardens or orchards in this district, and no cider is made. Vegetables are only raised for sale near the towns; every farm having as much garden as the family requires, and no more. The woods have diminished greatly all over the county, which was once very well wooded; and the fuel being dear from the distance from coal-mines, the decay of the woods begins to be felt. If plantations were judiciously made, there is no doubt but they would ultimately pay well. Much of the land is peculiarly suited to the growth of timber and underwood.

The sheep in this district are much the same as in the southern portion of the county, and although there are not so extensive sheep-pastures, there is usually a flock attached to every arable farm, and folding is one of the chief modes of manuring the fields. Cattle fatted in yards would probably produce manure of a better quality for turnips, and would be more economically fatted than sheep, for which there is not always sufficient feed at all times of the year for want of water-meadows.

Many porkers are fatted in the dairies on the whey, after it has been skimmed and whey-butter made, and the breed of pigs has been much improved of late by judicious crossing with small-boned breeds, which fatten earlier and in less time. There is nothing peculiar in the breed of horses; those used on the farms are mostly imported young from other counties.

There are many excellent markets in Wiltshire; the principal corn-markets are Warminster, Devizes, and Salisbury. Swindon and Salisbury are excellent cattle-markets. Marlborough is a great market for cheese, although most of it is contracted for by factors, who take the whole produce to London, Bath, and Bristol.

The principal fairs in Wiltshire are;—Amesbury, May 17, June 21, Dec. 21; Barwick Hill, Nov. 6; Bedwin, July 26; Bradford, Trinity Monday; Britford, Aug. 12; Calne, May 6, Sept. 29; Chippenham, May 17, June 22, Oct. 29, Dec. 17; Corsley Heath, Whit-Tuesday; Cricklade, second Thursday in April, Sept. 21; Devizes, Feb. 13, April 20, Holy Thursday, July 5, Oct. 2, 20; Dilton Marsh, Easter Monday, Sept. 24; Downton, April 23, Oct. 2; East Lavington, Aug. 10; Great Bedwin, April 23, July 26; Heytesbury, May 14, Sept. 25; Highworth, Aug. 13, Oct. 11, 29; Hindon, Monday before Whit-Sunday, Oct. 29; Kingsdown, Wednesday before St. Matthew's day; Ludgershall, July 25; Maiden Bradley, May 6, Oct. 2; Malmesbury, March 28, April 28, June 6; Marlborough, July 10, Aug. 22, Nov. 23; Melksham, July 27; Mere, May 17, Oct. 10; Norlease, April 23; Purton, Tuesday before May 6, Friday after Sept. 19; Ramsbury, May 14, Oct. 11; Salisbury, Tuesday after Jan. 6, Whit Monday and Tuesday, Tuesday after Weyhill fair; Swindon, Monday before April 5, second Monday after May 12, Sept. 11, second Monday in Dec.; Tanhill, Aug. 6; Trowbridge, Aug. 5; Warminster, April, Aug. 11, 22, Oct. 26; Westbury, first Friday in Lent, Easter Monday, Whit-Monday; Whitchurch, Nov. 17; Wilton, May 4, Sept. 12; Wootton-Basset, May 4, Nov. 13, Dec. 19; Yarborough Castle, Oct. 4.

Divisions, Towns, &c.—The county is divided into twenty-eight hundreds, which, with their respective positions in the county, areas, and population in 1831, are as follows:—

Hundred.	Position in the County.	Area in Acres.	Population in 1831.
Alderbury . . .	S.E.	31,760	4,469
Amesbury . . .	E.	42,620	6,611
Bradford . . .	W.	18,760	11,604
Branch and Dole .	Central	38,440	8,560
Calne . . .	Central	21,540	6,663
Cawden and Cadworth	S.	25,100	4,532
Chalk . . .	S.	26,610	3,143
Chippenham . .	N.W.	65,160	20,460
Damerham, North part	N.W.	27,600	6,092
Damerham, South part	S.W.		
Downton . . .	S. and S.W.	23,590	6,815
Dunworth, or Danworth	S.W.	26,650	6,747
Elstub and Everley .	E. and Central	40,590	5,722
Frustfield . . .	S.E.	8,200	1,480
Heytesbury .	S.W. and Central	32,370	5,866
Highworth, Cricklade, and Staple .	N.	51,520	12,235
Kingsbridge .	N.E. and Central	40,430	9,863
Kinwardstone . .	E.	55,590	11,699
Malmesbury . .	N.	57,030	12,532
Melksham .	W. and Central	18,870	18,871
Mere . . .	S.W.	17,290	4,212
Potterne and Cannings	Central	27,360	13,601
Ramsbury . .	N.E.	16,350	3,336
Selkley . .	E. and Central	47,270	9,981
Swanborough . .	Central	47,310	9,732
Underditch .	S.E. and Central	6,660	11,289
Warminster . .	W.	25,170	10,728
Westbury . .	W.	11,340	7,324
Whorwelsdown .	W.	18,440	5,989
		869,620	240,156

The city of Salisbury is included in Underditch hundred, the borough of Devizes in Potterne and Cannings hundred, and the borough of Marlborough in Selkley hundred.

Wiltshire contains the county-town and city of New Sarum, or Salisbury; the parliamentary boroughs of Calne, Chippenham, Cricklade, Devizes, Malmesbury, Marlborough, Westbury, and Wilton; the disfranchised boroughs of Great Bedwin, Downton, Heytesbury, Hindon, Ludgershall, Old Sarum, and Wootton-Basset; and the market-towns of Amesbury, Great Bradford, Corsham, Highworth, East or Market Lavington, Melksham, Mere, Swindon, Trowbridge, and Warminster. Some of these places are described in separate articles. [AMESBURY; BRADFORD (GREAT); CALNE; CHIPPENHAM; CRICKLADE; DEVIZES; SALISBURY; SARUM.] Of the rest we subjoin an account.

Malmesbury is in the hundred of Malmesbury, 100 miles from the General Post-Office, London, by the Great Western Railway to Shrivenham station, and thence by coach through Highworth. According to an anonymous history of Malmesbury priory, compiled in the middle of the fourteenth century, and quoted by Leland in his 'Collectanea,' there was a town here with a castle, reputed to have been built by Dunwallo Malmutius, one of the British kings said to have reigned before the Roman invasion. The town was altogether destroyed by foreign invaders, but the castle remained, and near its walls a Scottish monk, called Maildulph or Maildelph, who had been so worried in his own country by plunderers and robbers as to be induced to flee into England, established himself as a hermit, and afterwards became the founder of a monastic community, which rose to the rank of a Benedictine abbey. The chronicler gives to the castle the British name of Bladon and the Saxon name of Ingelburn. He affirms that the neighbouring village of Brokenborough had been antiently called Cairdurburgh, and had been the residence of kings both pagan and Christian, but without distinguishing whether British or Saxon. This partly fabulous narrative may perhaps indicate that there were at Malmesbury at a very antient period a castle and a town. Maildelph founded his monastery in the seventh century, and from him the modern name Malmesbury, a corruption of Maildelphsbury, appears to have originated. It is probable that the abbey suffered from the Danish invasions of the ninth and tenth centuries, when the town was twice burnt; but it recovered, and being enriched by lands and rendered venerable by relics, became one of the most important monasteries in the west of England. The abbot was mitred in the reign of Edward III. The yearly revenues of the abbey at the dissolution were 803*l*. 17*s*. 7*d*.

The borough appears to have had a charter as early as the reign of Athelstan, when the inhabitants are said to have contributed greatly to a victory over the Danes. In the reign of Stephen a castle was built here, and the town was walled by Roger, bishop of Sarum, who was however obliged to surrender the castle to the king. In the civil war of Stephen and Maud, the town and castle were taken (A.D. 1152) by Prince Henry, son of Maud, afterwards Henry II. In the civil war of Charles I. the royalists had a garrison here, which was driven out by Sir William Waller, at the head of a parliamentarian army, March, 1643. The royalists recovered the place, but it was again taken by the parliamentarians under Colonel Massey, or Massie, who stormed it, A.D. 1645. The cloth-trade flourished in the middle ages, according to the testimony of Leland, who says that 3000 'clothes' (pieces of cloth) were made yearly. The abbey buildings were converted into a cloth-factory by one Stumpe, a clothier, to whom the king had granted them.

The town stands on an eminence in the point of land formed by the junction of the Avon and the stream (Leland calls it the Newton-water) from Tetbury and Brokenborough, and consists of some streets irregularly laid out, but paved and lighted. The town does not extend much beyond the limits of the municipal and old parliamentary borough, which comprehends the abbey parish or district, and parts of the parishes of St. Paul and St. Mary Westport; the chief part of these parishes is without the borough limits, but the population returns do not discriminate between the in-parts and out-parts. The statistics of the three parishes, in 1831, were as follows:—

		Houses.			Families employed in				
	Area in Acres.	In-hab.	Uninhab.	Build.	Agriculture.	Trade, &c.	All others.	Total. Fam.	Persons.
Abbey parish or district.	40	22	..	1	5	14	5	24	124
Malmesbury (or St. Paul's) parish.	5990	454	28	3	239	180	57	476	2169
t. Mary Westport parish.	1510	253	25	5	141	93	31	265	1286
Total.	7540	729	53	9	385	287	93	765	3579

Of the population 2834 persons were comprehended in e old borough. By the Boundary Act several adjacent arishes were added to the borough for parliamentary pur- oses, enlarging the population to 6185. There are two hurches—the Abbey church and St. Mary's, and the re- ains of a third—old St. Paul's. The Abbey church was, the dissolution, purchased by the inhabitants of St. aul's parish, and made parochial. It is well described Leland as 'a right magnificent thing.' It was originally cross-church; the central tower had fallen before Le- nd's time, and now but a small part of the church re- ains, that is to say, part of the nave and aisles, the and southern porch, and a wall belonging to the south ansept. The upper part of the western tower, which was anding in Leland's time, has since fallen, and the part of e nave immediately adjacent to it is dilapidated, so that e part now used stands in the midst of ruins. The ar- itecture of what remains of the west front and the ad- cent part of the nave, as well as of the south porch, hich is beautifully enriched, is Norman; the rest of the ave appears to be chiefly of decorated English cha- cter. The interior is a mixture of the Norman and the nglish or pointed style. In the interior, near the altar, a screen, apparently composed of architectural frag- ents, inclosing a space in which stands an altar-tomb, ith an effigy in royal robes, said to represent King Athel- an, who was buried in the church of Malmesbury Abbey; e tomb is however of much later date than that prince, d is now far from the place of his interment, which was the choir, under the high altar. There were formerly ree churches in the churchyard of the Abbey: namely, e Abbey church just noticed; the old parish church of Paul, of which the lofty tower is still standing and is ed as a belfry, while the eastern end, now quite detached om the tower, is occupied as a dwelling-house; and a tle church, which Leland describes as 'a very old pece work,' used in his time as a cloth-factory, and now alto- ther destroyed. The church of St. Mary Westport is a ean-looking building, erected nearly two centuries ago the site of the old church, which was destroyed by Sir illiam Waller. There is near the Abbey church a house, e lower part of which was probably part of the abbot's sidence; the upper part is more modern. There is an tient cross in the market-place, which Leland records having been built within the memory of man; and west the Abbey is a building called Chapel-house, supposed have been originally the chapel of a nunnery which adition fixes on the spot. Leland has preserved notices traditions of two other nunneries in or near the town. he White Lion Inn is thought to have incorporated in it me remains of an hospitium or house of entertainment longing to the abbey; and the corporation alms-house, ar one of the bridges over the Avon, is supposed to comprehend some remains of an establishment of the Knights Hospitallers. There are some fragments of the town walls.

There are several dissenting places of worship, and four bridges—two over the Avon and two over the Newton-water.

Malmesbury has little trade or manufactures: the clothing trade gives employment to a few persons, and tanning, brewing, and lace-making are carried on. The market is on Saturday, and there are several large cattle-markets or fairs for horses, cattle, and sheep.

The borough has returned members to Parliament with little interruption since the time of Edward I. By the Reform Act it was reduced from returning two members to return only one; and by the Boundary Act the limits and population of the borough were much enlarged. It is not noticed in the Municipal Corporations Reform Act.

The living of St. Paul's is a vicarage, united with the perpetual curacies of Redborne and Corston chapels, which are in the parish, of the joint clear yearly value of 265*l*., in the rural deanery of Malmesbury, in the archdeaconry of Bristol, in the diocese of Gloucester and Bristol. The living of St. Mary Westport is a vicarage, united with the adjacent parochial chapelries of Brokenborough and Charlton, jointly of the clear yearly value of 310*l*., in the same ecclesiastical divisions as St. Paul's.

The parish of St. Paul and the abbey district comprehended, in 1833, eight day-schools of all kinds, with 205 scholars, namely, 138 boys and 67 girls; giving rather less than one in eleven of the population under daily instruction. One of these day-schools was an endowed school, with 15 boys; two were national schools, with 60 boys and 45 girls. The national schools were attended on Sundays by 70 boys and 45 girls; and there were five other Sunday-schools, with 405 scholars: giving 520 scholars, or above two in nine of the population, under instruction on Sunday. There was no return made from the parish of St. Mary Westport.

Three writers of eminence in their respective ages were connected with Malmesbury:—St. Aldhelm, a Saxon writer of note in the seventh and eighth centuries, was for a time abbot of Malmesbury, where he was interred; William of Malmesbury, one of the best English historians of the middle ages, was a monk of the abbey; and Thomas Hobbes, sometimes designated the Philosopher of Malmesbury, was a native of the parish of St. Mary Westport.

Marlborough is in Selkley hundred, 75½ miles from the General Post-office, London, by the Great Western Railway to Reading, and from thence by the Bath road through Newbury and Hungerford. Some antiquaries have proposed to fix the Roman station Cunetio, of Antoninus, at Folly Farm, close to Marlborough; and the evidence in favour of this opinion is strong. There was a castle at Marlborough in the time of Richard I., which was seized during his imprisonment by his brother John; but on Richard's return it was reduced under the king's power. A parliament or assembly was held here in the time of Henry III., the laws enacted in which were called the Statutes of Malbridge, one of the older forms of the name, which in Domesday is written Marlberge. The site of the castle is covered by a large house, which was a seat of the dukes of Somerset, and was afterwards used as the Castle Inn. Within the last year this building has been fitted up as a Clergy School, and has been opened with good prospect of success. The mound of the antient keep is in the garden. The municipal and old parliamentary borough comprehends the two parishes of St. Mary the Virgin and St. Peter and St. Paul, the statistics of which in 1831 were as follows:—

		Houses				Families employed in				
	Area in Acres.	In-hab.	Uninhab.	Build.	Total.	Agriculture.	Trade, &c.	Others.	Total.	Persons.
St. Mary the Virgin.	..	300	12	7	319	27	232	118	377	1849
St. Peter and St. Paul.	..	244	5	2	251	9	180	137	326	1577
Total	170	544	17	9	570	36	412	255	703	3426

The parish of Preshute or Manton was added by the Boundary Act for parliamentary purposes, and enlarged the population to 4186 persons.

The town of Marlborough consists chiefly of one wide street running from east to west, and lined with houses, irregularly built, and many of them old. Most of the houses are of brick. The streets are roughly paved on each side with large boulders or pebbles from the downs adjacent. The market-house for cheese, butter, and corn, is at the east end of the street: it is an antient building, having in its upper story a council-chamber, assembly-rooms, and court-house. The shambles or butcher's-market are near it. The churches are both in the main street; St. Mary's is at its eastern end, near the market-house; it is an old church with a freestone tower at the west end, with a Norman doorway enriched with zigzag ornaments: the church of St. Peter and St. Paul is near the western end of the street, adjacent to the Castle Inn, and has a lofty square tower with battlements and pinnacles. There are, on the south side of the street, some remains, now converted into a private house, of an antient priory for the regular Canons of St. Augustine. There are several Dissenting places of worship in the town.

The trade of Marlborough is not great; it is chiefly in coal, corn, and malt. Before the opening of the Great Western Railway, it was a great thoroughfare, and one of the chief posting towns between London and Bath and Bristol. There is a small market on Wednesday, and a more important one on Saturday; and several yearly fairs. Marlborough is a borough by prescription; the corporation, under the Municipal Corporations Reform Act, has four aldermen and twelve councillors, but no commission of the peace. It sends two members to parliament: its boundaries were enlarged by the Boundary Act. The living of St. Mary's is a vicarage of the clear yearly value of 100*l*., with a glebe-house: that of St. Peter and St. Paul is a rectory of the clear yearly value of 130*l*.: both are in the rural deanery of Marlborough, in the archdeaconry of Wilts, and the diocese of Salisbury. There were in the borough, in 1833, twelve day-schools of all kinds, with 531 scholars, namely, about 205 boys and 236 girls, and 90 children of sex not distinguished in the return; giving between one in six and one in seven of the population under daily instruction. One of the day-schools was a small but well-endowed grammar-school; and one, a national-school, with 67 boys and 95 girls, was also a Sunday-school. There were besides, two Sunday-schools with 117 boys and 154 girls; giving in all 433 children, or one in eight of the population, under instruction on Sunday.

Henry of Marlborough, an historical writer of the fourteenth and fifteenth centuries; Obadiah Sedgewick and Christopher Fowler, eminent puritan divines of the seventeenth century; John Hughes, the poet and dramatist; Harte, the historian of Gustavus Adolphus; and the well known Dr. Sacheverell, were all natives of Marlborough.

Westbury is in the hundred of Westbury, 102 miles from the General Post-Office, London, by the South-Western Railway to Basinsgtoke, and from thence by Andover, Ludgershall, Rushall, and Market Lavington. It is a place of considerable antiquity, and a number of Roman coins have been dug up in the neighbourhood. Some antiquarians have proposed to fix here the site of the Antonine station Verlucio, but the opinion is not general. Little is known of the antient condition or history of Westbury: it was incorporated by Edward I. by charter, and sent members to parliament in the time of Henry VI. The statistics of the parish in 1831 were as follows:—

		Houses				Families employed in				
	Area in Acres.	In-hab.	Unin-hab.	Build.	Total.	Agri-culture.	Trade, &c.	Others.	Total.	Popu-lation.
Westbury borough ..		474	60	7	541	103	341	214	658	2495
Bratton chapelry ..		284	10	.	294	201	49	50	300	1237
Dilton do. ..		454	38	2	494	130	246	83	459	2172
Leigh township ..		309	37	3	349	110	155	49	314	1420
Total	11,310	1521	145	12	1678	544	791	396	1731	7324

The old borough comprehends only a part of the town: it was augmented by the Boundary Act by the addition of the other parts of the parish. The town consists of one long crooked street and of some smaller streets, irregularly laid out. Westbury Leigh forms another street, separated by an interval of open road from the principal street of Westbury. The church is a large antient building, with a central tower and a fine west window, and several monuments. A handsome town-hall was erected, A.D. 1815, by Sir M. M. Lopez, the then patron of the borough. The clothing manufacture is carried on in the parish, though not to the same extent as formerly; it gave employment in the whole parish, in 1831, to 200 men, besides women and children. The market is on Friday, and there are two considerable yearly fairs for cattle, horses, pigs, sheep, and cheese.

The borough was formerly very close: the corporation is not noticed in the Municipal Corporations Reform Act. The living of Westbury is a vicarage united with the chapelries of Dilton and Bratton, of the joint clear yearly value of 238*l*., with a glebe-house, in the rural deanery of Wylie, in the archdeaconry and diocese of Salisbury, but in the peculiar jurisdiction of the precentor of Salisbury cathedral. The parish of Westbury contained in 1833 seventeen daily-schools of all kinds, with 578 scholars, namely, 363 boys and 215 girls, giving about one in thirteen of the population under daily instruction. One of the schools was an infant-school with 117 children, namely, 53 boys and 64 girls; another was an endowed Lancasterian school, with 176 boys; both these were partly supported by subscription; the rest were private schools. There were also twelve Sunday-schools, with 1564 scholars, namely, 753 boys and 811 girls, giving between one in four and one in five of the population under instruction on Sunday.

Bryan Edwards, the historian of the West Indies, was a native of Westbury.

Wilton is in the hundred of Branch and Dole, 3 miles west-north-west of Salisbury, and 88 from the General Post-Office, London, by the South-Western Railway to Basingstoke, and thence through Andover and Salisbury. Wilton is a place of great antiquity, and its former importance is indicated by the circumstance of its having given name to the county, which is called in the Saxon Chronicle Wiltunscire. The town itself appears to have obtained its name from the river Wily (Wily-town, Wilton), near which it stands. It was the scene of one of Alfred's earliest battles with the Danes (A.D. 871), and some have supposed it to be the Ellendune of the Saxon Chronicle and other antient authorities, where Egbert conquered (A.D. 823) the Mercian King Beornwulf, and established the permanent supremacy of the West Saxon dynasty. Wilton was the occasional residence of the West Saxon kings; and an abbey for nuns, which was either originally or soon became of the Benedictine order, existed here at an early period, of which Alfred and his successors Edward the Elder, Athelstan, Edmund, Edred, and Edgar, were great benefactors. Wilton was plundered and burnt by the Danish King Sweyn in the reign of Ethelred II. (A.D. 1003), but appears to have so far recovered as to be a place of importance at the time of the Conquest. It received a charter from Henry I. In the civil war of Stephen, the king was about to fortify the monastery in order to check the garrison which Maud the empress had at Old Sarum, when he was attacked and driven away by Robert, earl of Gloucester, the empress's chief supporter. The yearly revenue of the abbey at the dissolution was 652*l*. 11*s*. 5½*d*. gross, or 601*l*. 1*s*. [illegible] clear. Wilton was for a time (A.D. 909-1045, or later) the seat of a bishopric formed by the dismemberment of the diocese of Sherborne, and afterwards reunited with it, [illegible] before the removal of the see to Sarum. [SARUM.] The statistics of the borough and parish of Wilton in 1831 were as follows:—

		Houses				Families chiefly engaged in				
	Area in Acres.	In-hab.	Unin-hab.	Build.	Total.	Agri-culture.	Trade, &c.	Others	Total.	Popu-lation.
Wilton, borough and parish.	1730	383	21	1	405	161	214	120	435	[illegible]

The borough has been enlarged for parliamentary purposes by the addition of the parishes of Fugglestone, Stratford-under-the-Castle, Great Durnford, Woodford, South Newton, Wishford, Barford, Burcombe, Netherhampton, West Harnham, and Britford; and parts of the parishes of Fisherton-Anger, Bishopston, Toney-Stratford, Combe-Bisset, and Humington: this enlarged borough comprehends an extensive rural district, and has a population of 8315. The town stands on the tongue of land formed by the junction of the Nadder and the Wily, of which the former flows on the south side and the latter on the north-east side. The village of Fugglestone and the hamlets of Ditchampton and Bulbridge, in Wilton parish, are so near to the town that they may be regarded as suburbs. Wilton consists chiefly of one long street, on the road from Salisbury to Hindon and Mere. The church, formerly the abbey church, consists of the nave and western tower, which are antient, side aisles of the Elizabethan or early Stuart period, and a chancel of modern date. There are monuments of the Herbert family. Opposite the e 'the county cross.' The town-hall is an antient ric building; and there are places of worship for tists and Methodists. Near the town is Wilton the seat of the earl of Pembroke, a mansion of ous architecture but imposing appearance, stand- nsible park and gardens. The house contains a ection of paintings and antiquities, and a valuable It is supposed to occupy the site of the antient

n was formerly famed for its carpet manufacture: nch of industry, though declined, gave employment parish, in 1831, to forty men. The market is not ularly. There are two yearly fairs; one of them is e greatest sheep-fairs in England.

iving of Wilton is a rectory, united with the rectory ridge, the vicarage of Ditchampton, and the per- uracy of Netherhampton, of the joint clear yearly f 450*l.*, with a glebe-house, in the rural deanery of , in the archdeaconry and diocese of Salisbury.

parish contained, in 1833, eight day-schools of all ith 112 scholars, namely, 69 boys and 43 girls; nly about one in eighteen of the population under struction. One of the schools was an endowed r educating, clothing, and apprenticing 20 poor There were two Sunday-schools, one of them a school, having together 256 scholars, namely, 116 140 girls; giving one in eight of the population truction on Sunday.

Bedwin is in the hundred of Kinwardstone, 72 m the General Post-office, London, by the Great Railway to Reading, and thence by Newbury, rd, and Cross Ford. Great Bedwin was a place n the Anglo-Saxon period, and has in its neigh- an earthwork called Chisbury Castle, said to have ned or strengthened by Cissa, a Saxon chieftain parts, though some think that Cissa's fortification Castle Hill,' south of the town, on which exten- ndations of walls have been discovered. A fierce tween Wulfhere, king of Mercia, and Escuin, or ing of Wessex, was fought near Bedwin, A.D. 685. ugh, which is co-extensive with the parish, sent to parliament in the time of Edward I., but was sed by the Reform Act. The parish of Great as an area of 10,420 acres, and contained, in 1831, s inhabited and 1 uninhabited, with a population milies or 2191 persons: three-fifths of the popu- re agricultural. The town consists principally of ts, crossing each other at right angles. The built of flint in the form of a cross, with nave, and transept: the nave is apparently of Norman re, the chancel of Early English character. The ntains numerous monuments, some of them very among them is one of Sir John Seymour, father Seymour, queen of Henry VIII. There is an market-house, but the market is discontinued. two yearly fairs. The borough is not noticed Municipal Reform Act. The living of Great a vicarage, of the clear yearly value of 212*l.*, the rural deanery of Marlborough, in the nry of Wilts, in the diocese of Salisbury, but in iar jurisdiction of the dean of Salisbury. The d, in 1833, thirteen day-schools of all kinds (one ndowed), with 145 scholars, giving about one in the population under instruction in the week; Sunday-schools, with 120 children; giving only ghteen of the population under instruction on

n is in the hundred of Downton, 6 miles south- of Salisbury, and 91 from the General Post- ndon, by the South-Western Railway to Basing- thence by Andover and Salisbury. The place e importance in the middle ages, and had a which extensive earthworks remain; but no his- nes or traditions of interest are connected with . Downton sent members to parliament, but interruptions, from the time of Edward I. until Act, by which it was disfranchised. The parish a of 11,420 acres, and contained, in 1831, 715 amely, 693 inhabited, 14 uninhabited, and 8 with a population of 783 families or 3519 persons, agricultural. The town consists of a long street, stretching across the Avon, over the three arms of which there are three bridges; and of one or two other streets. It is neither paved nor lighted. The church is a large cross church, with nave and side aisles, chancel, and transept, with a tower at the intersection of the nave and transept: it contains a number of monuments. There is an antient stone cross, called 'the borough cross,' at which the parliamentary elections were formerly held. The borough is not noticed in the Municipal Corporations Reform Act. The market has been discontinued for many years.

The living of Downton with Nunton is a vicarage, united with the perpetual curacy of Redlynch, of the joint clear yearly value of 571*l.*, with a glebe-house, in the rural deanery of Wilton, in the archdeaconry and diocese of Salisbury. There were in the parish, in 1833, thirty-eight day-schools of all kinds, with 621 scholars, namely, 243 boys and 378 girls; giving above one in six of the population under daily instruction. Of these schools, two were national schools, with 48 boys and 47 girls; and were supported partly by endowment, partly by subscription. There were at the same time nine Sunday-schools, four of them national schools, with 589 scholars, namely, 253 boys and 336 girls; giving about one in six of the population under instruction on Sundays.

Heytesbury is in the hundred of Heytesbury, 96 miles from the General Post-Office, London, by the South-Western Railway to Basingstoke, and from thence by Amesbury; and 17 miles from Salisbury on the road to Warminster. Heytesbury had for its Saxon name Hegtredesbiryg, softened in Domesday into Haseberie. No historical interest attaches to it. It sent members to parliament from the time of Henry VI., and was disfranchised by the Reform Act. The parish has an area of 3380 acres, and contained, in 1831, 280 houses, namely, 268 inhabited, 11 uninhabited, and 1 building; with a population of 280 families or 1412 persons, from one-fourth to one-third agricultural. The town is in a pleasant valley on the north bank of the Wily, and consists of some streets irregularly laid out, and neither paved nor lighted. The manufacture of woollen cloth employed about 35 men in 1831. There is no market, and but one small yearly fair for cattle and sheep. The church is a large cross church, with a square tower at the intersection of the nave and transept. It was antiently collegiate. There is an hospital or almshouse, founded and endowed in the fifteenth century by Walter Lord Hungerford. The living of Heytesbury is a perpetual curacy, united with the perpetual curacy of Knook, of the joint clear yearly value of 131*l.*, in the rural deanery of Wylie, in the archdeaconry and diocese of Salisbury. There were in the parish, in 1833, six day-schools, with 132 scholars; giving about one in ten or eleven of the population under daily instruction; and four Sunday-schools, with 202 scholars; giving one in seven of the population under instruction on Sundays. All the Sunday-schools and five of the day-schools were supported by contributions.

Hindon is in the hundred of Downton, 97¼ miles from the General Post-Office, London, by the South Western Railway to Basingstoke, and thence by Andover and Amesbury; and 15¼ from Salisbury, on the road to Ilchester and Chard. This borough sent members to parliament from the time of Henry VI. until the Reform Act, by which it was disfranchised. The parish has an area of 270 acres, and contained, in 1831, 187 houses; namely, 184 inhabited, and 3 uninhabited, with a population of 184 families, 921 persons. The town consists of one principal street and three shorter ones, two of them crossing the main street at right angles. The church or chapel (for East Knoyle is the mother church) is in the main street, and is a plain building. There is a market on Thursday, but it is much declined from its former importance; and there are two yearly fairs for horses, cattle, sheep, and poultry. The borough is not noticed in the Municipal Corporations Reform Act. The living is a donative, of the clear yearly value of 73*l.*, in the rural deanery of Chalke, in the archdeaconry and diocese of Salisbury. There were in the parish, in 1833, five day-schools, with from 172 to 176 scholars; namely, 71 boys, 65 girls, and from 36 to 40 children of sex not stated in the returns, giving nearly one in five of the population under daily instruction. Two of these schools, with 71 boys and 65 girls, were supported by Lord Calthorpe; and were also Sunday schools, attended on Sundays by 71 boys and 83 girls, giving 154 children, or one in six of the population under instruction on Sundays.

Ludgershall is in the hundred of Amesbury, 74 miles from the General Post-Office, London, by the South-Western Railway to Basingstoke, and from thence by Andover. The town is called Litlegarsele in Domesday. It had a castle erected soon after the Norman Conquest, of which there are some remains. It sent members, though not uninterruptedly, from the time of Edward I. to the passing of the Reform Act, when it was disfranchised. The borough is not noticed in the Municipal Corporations Reform Act. The statistics of the borough and parish, in 1831, were as follows :—

Area in acres.	Houses			
	Inhabited.	Uninhabited.	Building.	Total.
1660	116	4	0	120

Families				
chiefly employed in Agriculture.	Trade, &c.	Others.	Total.	Persons.
59	33	26	118	535

The town is in a pleasant situation: the streets are neither paved nor lighted. The church is of irregular form, with nave, chancel, and two transepts of very unequal dimensions. The nave and chancel are separated by a pointed arch, the archway being occupied by a wooden screen; and there is a low square western tower of irregular shape, built of flint and brick. The market has long been given up, but a mutilated stone cross distinguishes what was formerly the market-place. There is a considerable yearly fair. The living is a rectory of the clear yearly value of 274*l*., in the rural deanery of Amesbury, in the archdeaconry and diocese of Salisbury. There were in the parish, in 1833, three day-schools, supported by subscription, with 46 scholars, viz. 26 boys and 20 girls, giving from one in eleven to one in twelve of the population under daily instruction. There were no Sunday-schools.

Wootton-Basset is in Kingsbridge hundred, 87 miles from the General Post-Office, London, by the Great Western Railway, which passes near the town. It is called in Domesday, Wodetone; and was held by Milo Crispin, but afterwards passed to the Bassets of Wycombe, from whom it obtained its distinguishing epithet. The town sent two members to parliament from the time of Henry VI. to the passing of the Reform Act, when it was disfranchised. It is on an elevated site, and consists chiefly of one street along the road from Cricklade to Calne, lined with houses, built chiefly of brick and thatched. The statistics of the borough and parish, in 1831, were as follows :—

Area in acres.	Houses			
	Inhabited.	Uninhabited.	Building.	Total.
4830	400	28	0	428

Families				
engaged in Agriculture.	Trade, &c.	Others.	Total.	Persons.
243	75	86	404	1896

The church is an antient structure in the centre of the town. The market is on Tuesday, and there are six yearly fairs. The corporation is not noticed in the Municipal Corporations Reform Act. The living of Wootton Basset is a vicarage of the clear yearly value of 461*l*., with a glebe-house, in the rural deanery of Avebury, in the archdeaconry of Wilts, in the diocese of Salisbury. There were in the parish, in 1833, nine day-schools, with 197 scholars, namely, 38 boys and 38 girls, and 121 children of sex not stated, giving from one in nine to one in ten of the population under daily instruction; and three Sunday-schools, with 214 scholars, namely, 100 boys and 54 girls, and 60 children of sex not stated in the return, giving about one in nine of the population under instruction on Sunday.

Highworth is in the hundred of Highworth, Cricklade, and Staple, 79 miles from the General Post-Office, London, by the Great Western Railway to Shrivenham, which is distant from Highworth four miles. The parish has an area of 9810 acres; it is divided into seven chapelries or tythings, and contained, in 1831, a population of 3127. Highworth tything had at that time 130 houses, namely, 123 inhabited, 6 uninhabited, and 1 building, with a population of 124 families, or 632 persons, about one-sixth agricultural. The town is on a hill, on the road between Lechlade and Swindon: it is neither paved nor lighted. The houses are mostly built of stone, of which there are quarries in the neighbourhood. The church is in the middle of the town; it is an antient building, having a chapel on the south side, hung round with pieces of antient armour. The market is on Wednesday, and there are two yearly fairs, namely, a cattle fair and a statute fair for hiring servants. The town was formerly incorporated, but lost its privilege of sending members to parliament through disuse, and the corporation has ceased to exist. The living is a vicarage united with the chapelries of Broad Blunsdon, South Marston, and Sevenhampton, all in the parish, of the joint clear yearly value of 468*l*., with a glebe-house, in the rural deanery of Cricklade, in the archdeaconry of Bristol, in the diocese of Gloucester and Bristol. There were in the whole parish, in 1833, one infant school with 50 children, and four other day-schools, with 159 scholars, namely, 117 boys and 42 girls, giving about one in fifteen of the population under daily instruction; and three Sunday-schools, with 417 scholars, namely, 223 boys and 194 girls, giving above one in eight of the population under instruction on Sunday. One of the day-schools was partly supported by endowment and subscription.

East or Market Lavington is in the hundred of Swanborough, about 113 miles from the General Post-Office, London, by the Great Western Railway to Chippenham, and from thence by Devizes. The parish, including the tything of Easterton, has an area of 5840 acres, and had, in 1831, 330 houses, namely, 319 inhabited, 7 uninhabited, and 4 building, with a population of 356 families, or 1525 persons, about two-thirds agricultural. The town is in the valley between the green sand and chalk hills on the north-west side of Salisbury Plain; the two principal streets cross each other at right angles; and the hamlet of Easterton nearly adjoins the town on the north-east. The church is in the town, and is of Gothic architecture of the later or perpendicular period. The market, if continued, is on Wednesday, and there is one yearly fair. The living is a vicarage, of the clear yearly value of 300*l*., with a glebe-house, in the rural deanery of Pottern, in the archdeaconry of Wilts, in the diocese of Salisbury. There were in the whole parish, in 1833, five day-schools with 87 children, namely, 26 boys and 46 girls, and 15 children of sex not stated, giving about one in seventeen of the population under instruction in the week; and two Sunday-schools, with 262 scholars, namely 121 boys and 141 girls, giving one in six of the population under instruction on Sunday. Bishop Tanner, author of the 'Notitia Monastica,' was a native of Market Lavington.

Melksham is in the hundred of Melksham, about 104 miles from the General Post-Office, London, by the Great Western Railway to Chippenham, and from thence through Laycock. At the time of the Domesday survey the manor belonged to the crown, and the town appears to have been a place of some consequence; but it afterwards declined, and continued in obscurity until it was revived by the introduction of the cloth manufacture; but that branch of industry has of late years somewhat declined. Some years since mineral waters were discovered in the neighbourhood of the town; and hot and cold baths have been established, and houses built for visitors to 'the Spa.' The parish has an area of 8020 acres, without including the chapelry of Seend, which is a dependency of it: it had, in 1831, 995 houses; namely, 942 inhabited, 48 uninhabited, and 5 building, with a population of 973 families or 4722 persons, about two-sevenths agricultural. The town consists principally of one long winding irregular street, chiefly along the road from Bath to Devizes, but partly on the road to Westbury: the principal part of the town is divided by the river Avon, over which is a balustraded stone bridge of four arches, from a suburb called 'the city,' a designation which has led to the conjecture that it was the site of a Roman station; but there is no reason from history or tradition to think it was. The houses, which are of stone, are of neat appearance; and the main street is paved and lighted with gas. The church, which lies back from the street, on the west side of the town, is a cross church, with some Norman portions, and a handsome tower rising from the intersection of the nave and transept, and two chantry chapels on the south side. There are places of worship for Baptists, Independents, Wesleyans, and Quakers. The principal manufacture is that of broad-cloth and kerseymere, which employed in the parish, in 1831, about 170 men. The market is held once a fortnight; for cattle, pigs, &c. on Monday; and there is one yearly fair

There are petty sessions once a fortnight, and a court for the recovery of small debts is held once in three weeks. The living is a vicarage, united with the chapelries of Seend, Earl-Stoke, and Shaw, of the joint clear yearly value of 916*l*., with a glebe-house, in the rural deanery of Pottern, in the archdeaconry of Wilts, in the diocese of Salisbury. There were in the parish, without including the chapelry of Seend, in 1833, five day-schools of all kinds, with 320 scholars; namely, 180 boys, 90 girls, and 50 children of sex not stated in the return; and four Sunday-schools, with 675 scholars, of sex not stated in the return; giving one in fifteen of the population under instruction daily, and one in seven under instruction in the week. One of the day-schools was an infant-school, with 50 children; and two others were Lancasterian schools, with 130 boys and 90 girls; all three partly supported by subscription, and the Lancasterian schools having also a small endowment.

Mere is in the hundred of Mere, 104 miles from the General Post-Office, London, by the South-Western Railway to Basingstoke, and from thence by Andover, Amesbury, and Hindon; or 22 miles west of Salisbury through Barford and Hindon. The manor of Mere belonged in the reign of Henry III. to the king's brother, Richard, earl of Cornwall and king of the Romans, who built a castle here, the site of which may still be distinguished on the north-west side of the town. The parish has an area of 7400 acres, divided into three tythings, the town tything, Woodlands and Chaddenwicke (or Chaddenwych) tything, and Zeals tything: the town tything contained, in 1831, 304 houses; namely, 300 inhabited and 4 uninhabited; with a population of 300 families or 1482 persons, rather more than one-third agricultural. The population of the whole parish, in 1831, was 2708. The town consists chiefly of one street of indifferent houses, irregularly built along the road from London and Salisbury to Wincaunton and Exeter. The church, which is on the south side of the town, is a handsome Gothic building, chiefly of perpendicular character, having a western tower, with battlements and pinnacles. The northern porch appears from its architecture to be more antient than the body of the church. There is a market-cross, or market-house, in the centre of the town. The manufacture of woollen cloth and kerseymere is carried on in the parish, but to a very small extent, and that chiefly in the tything of Zeals: it employed, in 1831, 27 men in that tything, 7 in the town tything, and 4 in the tything of Woodlands and Chaddenwicke. The manufacture of dowlas and bed-ticking was carried on some years since. The market is on Thursday, and there are two large yearly fairs. The living is a vicarage, of the clear yearly value of 200*l*., with a glebe-house, in the rural deanery of Wylie, in the archdeaconry and diocese of Salisbury. The parish contained, in 1833, nine day-schools of all kinds, with 201 scholars; namely, 130 boys and 71 girls; and one Sunday-school, with 300 scholars; namely, 100 boys and 200 girls; giving between one in thirteen and one in fourteen of the population under daily instruction, and one in nine under instruction on Sunday. One of the day-schools, with 20 boys, had a small endowment.

Swindon is in the hundred of Kingsbridge, 81 miles from the General Post-Office, London, by the Great Western Railway, which passes near the town. Swindon is pleasantly situated on a hill commanding an extensive prospect, and consists of several streets irregularly laid out. The area of the parish is 3510 acres: it comprehended, in 1831, 332 houses; namely, 325 inhabited, 4 uninhabited, and 3 building; with a population of 360 families or 1742 persons, about one-eighth or one-ninth agricultural. There are several good houses in and round the town, inhabited by families in independent circumstances. The parish church is on the south-east side of the town, and is of mean external appearance, but neatly fitted up within. There are some Dissenting places of worship. The market is on Monday for corn and other commodities, and for cattle every alternate Monday: there are five yearly fairs. There is a mill, with an overshot wheel of unusually large dimensions, and near the town are quarries of freestone of the same formation as the Portland stone, which employ a considerable number of men: the stone is used for troughs, tomb-stones, mile-stones, &c. The living is a vicarage, of the clear yearly value of 302*l*., with a glebe-house, in the rural deanery of Cricklade, in the archdeaconry of Bristol, in the diocese of Gloucester and Bristol. There were in the parish, in 1833, seven day-schools of all kinds, with 185 scholars; namely, 92 boys and 93 girls; and three Sunday-schools, with 194 scholars; namely, 84 boys and 110 girls; giving between one in nine and one in ten of the population under daily instruction, and about one in nine under instruction on Sundays. One of the day-schools, with 40 boys and 10 girls, was supported by an endowment.

Trowbridge is in the hundred of Melksham, 120½ miles from the General Post-Office, London, by the Great Western Railway to Bath, and from thence by Bradford. Trowbridge had a castle or some fortification in the reign of Stephen, which was garrisoned by the supporters of the Empress Maud, and taken by the king's forces. John of Gaunt either repaired this castle or built a new one; but it was in ruins in Leland's time: he tells us that of seven great towers there was only a part of two. The castle stood on the south side of the town, near the river Were. There are no remains now, and its site is built over. The parish has an area of 1960 acres, and contained, in 1831, 2289 houses, namely, 2105 inhabited, 181 uninhabited, and 3 building; with a population of 2175 families, or 10,863 persons, a very small part agricultural. The town is on a rocky hill on the north-east bank of the Were, a tributary of the Avon: it was, and probably is still, the largest town in the county, with the exception of Salisbury. It consists of several streets, irregularly laid out, paved, and lighted with gas. The houses are chiefly of stone; and generally old and of mean appearance. The parish church is in the centre of the town, and is dedicated to St. James: it is a spacious edifice, with a nave, chancel, two aisles with chapels attached to their eastern extremities, a north and a south porch, and a large western tower and spire. The ceiling of the nave is flat, and is ornamented with rich carving, and some of the windows have fragments of stained glass. The font, which is octagonal, is also richly carved. There are two district churches or chapels-of-ease in the parish, namely, Trinity church or chapel in the town, and Staverton chapel, in the hamlet of Staverton, about two miles north of the town. There are several places of worship for General and Particular Baptists, Methodists, and Independents. The principal branch of industry at Trowbridge is the manufacture of broad-cloth and kerseymere, especially the latter: the two branches in 1831 gave employment to 1094 men, besides women and children. Trowbridge is the largest clothing town in the county and one of the largest in the west of England. The clothing trade is of considerable antiquity here. Leland says of Trowbridge, 'the towne standeth on a rocky hill; and is very welle buildid of stone, and florisheth by drapery.' He mentions some of the great clothiers of the place, and records their benefactions to the town. The market is on Saturday; some of our authorities give the place three markets weekly, on Tuesday, Thursday, and Saturday; there is a yearly fair. Petty sessions are held monthly, and there is a court of requests for the recovery of small debts, which holds its sittings every three weeks. The living is a rectory united with the chapelries of Trinity and Staverton chapels, of the joint clear yearly value of 600*l*., with a glebe-house, in the rural deanery of Pottern, in the archdeaconry of Wilts, in the diocese of Salisbury. It was held for several years by the poet Crabbe, who was much respected in the town by persons of all denominations, and whose decease was the occasion of very general regret. There were in the parish, in 1833, fourteen day-schools of all kinds, with 978 scholars, namely, 449 boys, 315 girls, and 214 children of sex not stated in the return; and ten Sunday-schools, with 2144 scholars, namely, 1060 boys and 1084 girls; giving one in eleven of the population under daily instruction, and one in five under instruction on Sundays. Of the day-schools, one, with 198 children, was an infant-school, partly supported by subscription; another, with 90 boys, was a national school partly supported by endowment; two others, with 280 boys and 187 girls, were Lancasterian schools, partly supported by subscription. George Keate, a poet and miscellaneous writer of the last century, best known by his account of the Pelew Islands, was a native of Trowbridge.

Warminster is in the hundred of Warminster, 100 miles from the General Post-Office, London, by the South Western Railway to Basingstoke, and from thence by Andover, Amesbury, and Heytesbury. Camden proposed to fix here the Verlucio of Antoninus, but other antiquaries reject this opinion. The parish has an area of 5450 acres, and comprehended, in 1831, 1308 houses, namely, 1236 inhabited, 57 uninhabited, and 15 building; with a population of 1275 families, or 6115 persons, more than one-third agricultural. The town is in a very healthy situation, close to the western border of Salisbury Plain, in the valley of the Wily, to the north of the river itself: it consists of several streets, the principal one extending along the road from Salisbury to Frome. The principal street is well paved; and the general appearance of the town is neat and respectable. The parish church stands on the north side of the town, on the Bath Road, and is dedicated to St. Denis: it is a spacious and handsome church, built of stone; the tower is of the time of Edward III., the rest of the church was rebuilt early in the last century. A new church, called Christ Church, has been built within the last few years; and there is a chapel in the centre of the town, dedicated to St. Lawrence, founded as early as the time of Edward I., and now used as a chapel-of-ease. There are places of worship for Baptists, Independents, Wesleyan Methodists, and Presbyterian-Unitarians. There is a handsome town-hall erected by the marquis of Bath, with a handsome suit of rooms for assemblies, public meetings, &c. The market is held on Saturday, and there are three yearly fairs. The market is a considerable corn-market, though it has been injured by the rivalry of Devizes, which has the advantage of canal navigation. The October fair is called, by way of eminence, 'the great fair,' and is a considerable sheep, cattle, and cheese fair. The woollen manufacture which was formerly carried on is now almost extinct, and the silk manufacture, which was introduced some time since, scarcely, if at all, exists. Only seven men were employed in manufactures in the parish in 1831. The living is a vicarage of the clear yearly value of 324*l*., with a glebe-house, in the rural deanery of Wylie, in the archdeaconry and diocese of Salisbury. The vicar presents to the perpetual curacy of Christ Church, which is of the clear yearly value of 150*l*. There were in the parish, in 1831, thirty-seven day-schools of every kind, with 911 scholars, namely, 494 boys and 417 girls: and nine Sunday-schools, including the national school, which was a day-school also, with 1061 scholars, namely, 555 boys and 506 girls; giving above one in seven of the population under daily instruction, and above one in six under instruction on Sundays. Of the day-schools, twenty-three schools, with 359 scholars, were dame-schools or other schools for small children; one was a national school with 140 boys and 60 girls, and 40 girls additional on Sundays: one was a Lancasterian school with 80 girls; and one was an endowed grammar-school with 48 boys.

Some of the villages are entitled to notice. Aldbourne (colloquially pronounced Auburn) is in the hundred of Selkley, about six miles north-east of Marlborough. It is beautifully situated in a valley, and was antiently a place of importance. In modern times it has twice suffered severely from fire. In 1760 a conflagration destroyed more than seventy houses; and in 1817 twenty were consumed. The earl of Essex was beaten here by the royalists in the great civil war A.D. 1643. Aldbourne Chace, an extensive waste, with a large rabbit-warren on the north and north-west of the village, was formerly well wooded and stocked with deer. The area of the parish is 8060 acres; the population, in 1831, was 1418, from one-third to one-half agricultural. Aldbourne had formerly a market and fairs, but they have been discontinued: a small manufacture of fustians was carried on a few years since, but if it still exists it is much reduced. Steeple-Ashton is in Whorwelsdown hundred, about three miles east of Trowbridge; it was formerly a market town, and in Leland's time was the seat of a considerable clothing manufacture. It has a lofty and elegant church, with nave, chancel, side aisles, north and south porches, two small chapels, and a large western tower. Both church and tower are surmounted by battlements and pinnacles. The tower has a fine western window, and was antiently surmounted by a stone spire, or, as Leland calls it, a 'spired steeple,' which gave to the village its distinguishing epithet of Steeple-Ashton. The spire was destroyed in two thunder-storms in July and October, 1670. A tessellated pavement, differing from the usual style and materials of Roman pavements, was dug up at Steeple-Ashton. The area of the parish is 7450 acres: it is divided into five chapelries or tythings. The population of the tything of Steeple-Ashton, in 1831, was 848; of the whole parish, 1854. Box is in the hundred of Chippenham, about five miles east of Bath, in a beautiful valley watered by a small feeder of the Avon, sometimes called the Box brook. There are considerable quarries near Box, of the freestone usually called Bath stone, and there are two mineral springs. The area of the parish is 4130 acres: the population, in 1831, was 1550, of whom 60 men were employed in stone quarries or on the roads. The Great Western railway passes near Box, and the longest tunnel on the line is near this place. North Bradley is in the hundred of Whorwelsdown, two miles south of Trowbridge. The parish has an area of 3020 acres, including the tything of Southwick; the population of Southwick, in 1831, was 1452; that of the rest of the parish, including the village of North Bradley, 1025; together, 2477, about one-fourth agricultural. The manufacture of broad cloth and kerseymere is actively carried on in the village; it gave employment in 1831 to 91 men. Bratton is just at the foot of the north-west escarpment of the southern or Salisbury Plain chalk district in Westbury hundred. It is a hamlet of Westbury, from which it is distant two or three miles east-north-east. Bratton camp is an antient entrenchment of irregular form, nearly a mile in circuit, and enclosing an area of twenty-three acres, on the edge of the chalk downs between the village and the town of Westbury. On the escarpment below it is the figure of a white horse, which Gough supposed to be a memorial of Alfred's victory at Eddington, but which is positively asserted by others to be of modern date. Bromham or Bremham is in the hundred of Potterne and Cannings, four miles north-west from Devizes. It is near the supposed site of the Roman station Verlucio, and some Roman antiquities, consisting of a bath and portions of a tesselated pavement, were found here about eighty years since. The church is large and antient; it has a chapel richly carved, and containing some antient banners and armour, and several monuments of the Baynton family. Collinson, author of the history of Somersetshire, was a native of Bromham. The area of the parish is 3300 acres; the population, in 1831, was 1556, two-fifths agricultural; 62 men were employed in the woollen cloth manufacture. Bishop's-Cannings is in the hundred of Potterne and Cannings, about three miles north-east from Devizes: the area of the parish is 10,290 acres, and it extends to the old boundary of the borough of Devizes; some part of the chapelry of St. James in Bishop's-Cannings' parish is included in the new boundary of the borough. The population of the parish, in 1831, was 3350. The village of Bishop's Cannings is in the valley beneath the southern escarpment of the northern chalk district, to the left of the road between Marlborough and Devizes: it has a fine cross church, with nave and side aisles, transept, south porch, a chantry on the east side of the south transept, another chantry chapel, and a lady chapel, now used as the chancel. Some portions of the church are of Norman character, other parts are Early English, and the battlements and some windows in the nave are of a later period: the tower and spire rise from the intersection of the nave and transept, and are of Early English character. Corsham, formerly a market-town, is in the hundred of Chippenham, about four miles west-south-west of Chippenham. The parish has an area of 6710 acres; the population, in 1831, was 2952, nearly one-half agricultural. The village is in a healthy situation, and consists of a long street, with the houses built of stone, with a market-house in the centre, built A.D. 1784, by Mr. Methuen, with the vain expectation of reviving the market. The church is a large antient building, lying back from the church, close to Corsham Park, the seat of Lord Methuen: it consists of a nave, chancel, a chapel on the north side, and three aisles, with a tower and spire. There is an almshouse at the south end of the village for six poor women, with an adjoining lodge for 'the master;' and there are meeting-houses for Independents and Baptists. The manor of Corsham was antiently a royal demesne; and subsequently belonged to the earls of Cornwall. Richard, earl of Cornwall, brother of Henry III., granted to the tenants of the manor some peculiar privileges, which they still retain, especially that of appointing a bailiff, who is sheriff and coroner, with exclusive jurisdiction within the manor. Corsham House is a building of the age of Elizabeth, of very incongruous architecture: it contains a very fine collection of paintings, formed by Sir Paul Methuen, an eminent diplomatist, early in the last century. Sir Richard Blackmore, the poet, was a native of Corsham. Long-

Deverhill or Deverill is in the southern division of
rham hundred. It is called Longbridge Deverhill to
guish it from four other villages to which the name of
hill is common, all lying within about three miles
of Longbridge Deverhill, and one of them, Hill De-
l, immediately adjacent to it. Longbridge Deverill
has an area of 4230 acres; the population, in 1831,
307, more than a third agricultural: the clothing
acture employed above fifty men. Dilton is a
of Westbury, of which parish it is a chapelry. The
is about a mile from Westbury: the population of
apelry, in 1831, was 2172, of whom 200 men were
yed in manufacture chiefly or wholly of woollen
and kerseymere. Hilperton is little more than a
orth-east of Trowbridge; it shares in the cloth and
mere manufacture of that town, which gave employ-
to 85 men in Hilperton parish in 1831. The area of
rish is 980 acres; the population, in 1831, was 1067.
wood is in a portion of Chippenham hundred in-
l in Gloucestershire, about a mile south by west of
on-under-Edge. There was formerly a Cistertian
here, founded A.D. 1139: it was almost forsaken
fterwards by the removal of the monks to Haselden,
fterwards to Tetbury, Kingswood becoming a cell
nly a monk or two to say mass; but about A.D. 1170
bot and monks returned to a place called Merewood,
gswood parish, where the village now is, near the
their former seat. The revenues of the abbey at
ssolution were estimated at 254*l*. 11*s*. 2*d*. gross, or
1*s*. 2*d*. clear, according to Speed and Dugdale. The
ent of a MS. Valor, quoted by Tanner, differs a little
his account. Part of the conventual buildings, con-
of the gate-house of the abbey and a range of build-
each side, lately occupied as separate dwellings,
w in ruins, are still standing. The area of Kings-
parish is 2320 acres; the population, in 1831, was
of whom 123 men were employed in the woollen
manufacture. East Knoyle, in Downton hundred,
two miles south-west of Hindon (area of parish
cres; population, in 1831, 1028, chiefly agricultural)
e birthplace of Sir Christopher Wren, whose father
ctor of the parish. Ramsbury is in Ramsbury hun-
½ miles north-west from Hungerford. It was made
at of the bishopric erected in the ninth or tenth
by the dismemberment of Wiltshire from the
of Sherborne; the see was removed after an in-
to Wilton, but at what period is doubtful; and was
ards reunited to Sherborne, the cathedral being
at Old Sarum, from which it was removed to
ury. The area of the whole parish, which is divided
ree tythings, is 9960 acres; the population, in 1831,
90, of which the town tything contained 1538. The
is spacious, and consists of a nave and two aisles,
cel, and a massive western tower. Ramsbury manor
use belong to Sir Francis Burdett. Sherston Magna,
at Sherston, is in Chippenham hundred, about six
west of Malmesbury. The area of the parish is 4140
the population, in 1831, was 1361, principally agri-
l. Sherston is thought by some to be the Sceor-
of the Saxon Chronicle, the scene of an indecisive
(A.D. 1016) between Edmund II. (Ironside) and
, who engaged during the battle in personal con-
The village is partly within the site of an antient
pment, part of which is obliterated. There is a
adition of a conflict between the Saxons and Danes,
ch the Saxons were commanded by a warrior called
bone,' of whom a gigantic figure is seen on the sign
nn. Rattlebone is thought to be a popular traditional
f Edmund II. The church at Sherston is a very
cross church, comprehending a nave, two aisles,
t, and large south porch. It is of various dates,
Norman, partly later. Southwick (population, in
452) is a tything of North Bradley in Whorwels-
undred, two miles south-south-west of Trowbridge.
loth manufacture employed, in 1831, 113 men.
y and Limpley-stoke are chapelries in the parish
ndred of Bradford; Winsley about a mile, and
y-stoke about two miles west of that town. The
tion of the two chapelries, in 1831, was 2847; the
manufacture gave employment to 245 men.

sions for Ecclesiastical and Legal Purposes.—The
was formerly included in the diocese of Salisbury,
s divided into the two archdeaconries of Salisbury and Wilts. The archdeaconry of Salisbury comprehended the five rural deaneries of—(1) Amesbury, (2) Chalke or Chalk, (3) Pottern, (4) Wilton, (5) Wylie or Wylye; beside the deanery of Salisbury, which consists of the three parishes of that city: the archdeaconry of Wilts comprehended the four rural deaneries of—(1) Avebury, (2) Cricklade, (3) Malmesbury, (4) Marlborough. By the late alterations, in pursuance of the recommendation of the Church Commissioners, the rural deaneries of Cricklade and Malmesbury have been transferred to the archdeaconry of Bristol, in the diocese of Bristol and Gloucester; and the rural deanery of Pottern has been transferred from the archdeaconry of Salisbury to that of Wilts. The total number of ecclesiastical charges in the county is, as near as we can ascertain, 336; but as some of these are permanently united, the number of benefices is only 273. The ecclesiastical charges and benefices are arranged as follows:—

I. DIOCESE OF SALISBURY.

1. *Archdeaconry of Salisbury.*

Rural Deanery.	Rect.	Vicar.	Perp. Curac.	Chapelries.	Donatives.	Total Charges.	Benefices.
Amesbury .	13	7	5	4	1	30	24
Chalke .	22	8	3	5	2	40	33
Salisbury .	..	1	2	.	.	3	3
Wilton .	4	3	2	5	.	14	7
Wylie .	22	13	5	4	.	44	39
2. *Archdeaconry of Wilts.*							
Avebury .	12	14	3	6	.	35	26
Marlborough	13	15	2	3	1	34	32
Pottern .	15	17	5	12	.	49	36
II. DIOCESE OF GLOUCESTER AND BRISTOL.							
Archdeaconry of Bristol.							
Cricklade .	9	15	.	5	.	29	24
Malmesbury	33	18	1	6	.	58	49
Total of the county	143	111	28	50	4	336	273

Wiltshire is in the western circuit: the spring assizes are held at Salisbury, the summer assizes at Devizes. The judges proceed to those places from Winchester; and go from them to Dorchester. The Epiphany and Easter quarter sessions for the county are held at Salisbury; the midsummer sessions at Warminster, and the Michaelmas sessions at Devizes.

At the commencement of the year 1836 there were four prisons belonging to the county: one, a county gaol, at Fisherton Anger, a suburb of Salisbury; two at Devizes, the old bridewell and the new house of correction; and one, a bridewell, at Marlborough. But since that time the old bridewell at Devizes has been given up. The county gaol at Fisherton Anger contains 112 sleeping cells and 5 dark cells; with 10 day-yards, all gravelled and partially paved. Each prisoner eats and sleeps in a separate cell, and only four or five are allowed to be in the yard together. The prison is not made so useful as it might be; as many as 50 cells have been empty at one time, and that while the prisons at Devizes and Marlborough were full to overflowing. The majority of the inmates are prisoners for trial. The prison is neat and clean and well arranged: it is so built that every sound is heard, even a whisper has been said to have been heard at night. The labour is very light. The house of correction at Devizes contains 235 sleeping cells, 38 of which are for women; an addition of 40 cells has been lately made. There are ten wards or divisions for men, and a separate building for women. Day-rooms for the men are almost disused; the women have a day-room, a laundry, and an infirmary; there is also a school-room. Most of the prisoners sleep in separate cells. The silent system is enforced on all. Prisoners for trial are placed in a yard during the day, two or four together; but convicted prisoners are allowed to be in the yard only one at a time. The prison is neat and orderly; the general management good, and the keeper and matron humane. For those condemned to hard labour there is a tread-mill capable of employing 60 prisoners, and a crank mill for 32. The county bridewell at Marlborough was built in [illegible]. It is too small; it contains four wards, four yards, and four day-rooms, with above [illegible] cells. There are no means of warming the cells in winter. The untried have a yard to themselves, in which they communicate with each other without restraint; but the convicted are kept, as far as possible, in separate cells. There is no regular labour for the men: the women sometimes wash and mend clothes. The arrangements of the prison are in several respects defective; but it is kept neat and clean, and the keeper appears to perform his office, amid many difficulties, in a methodical and careful manner. (*Inspectors of Prisons' Second*, *Fourth*, and *Seventh Reports*.)

Before the Reform Act thirty-four members of parliament were returned from Wiltshire; namely, two for the county, two for the city of Salisbury, and two each for the boroughs of Great Bedwin, Calne, Chippenham, Cricklade, Devizes, Downton, Heytesbury, Hindon, Ludgershall, Malmesbury, Marlborough, Old Sarum, Westbury, Wilton, and Wootton-Basset. By the Reform Act, Great Bedwin, Downton, Heytesbury, Hindon, Ludgershall, Old Sarum, and Wootton-Basset were altogether disfranchised; and Calne, Malmesbury, Westbury, and Wilton reduced to one member each. The county was formed into two divisions, each returning two members; so that the number of members is now eighteen, returned as follows:—

	Members.	Constituency. 1835-36.	Constituency. 1839-40.
Wiltshire, northern division	2	5059	5259
Ditto, southern do.	2	3059	2913
Calne	1	178	179
Chippenham	2	228	265
Cricklade	2	1761	1646
Devizes	2	343	375
Malmesbury	1	238	280
Marlborough	2	263	291
Salisbury	2	721	698
Westbury	1	211	291
Wilton	1	228	205
	18		

The northern division of the county comprehends the hundreds of Bradford, Calne, Chippenham, Damerham (North), Highworth Cricklade and Staple, Kingsbridge, Malmesbury, Melksham, Pottern and Cannings, Ramsbury, Selkley, Swanborough, and Whorwelsdown. The court of election is held at Devizes; and the polling places are Devizes, Melksham, Malmesbury, and Swindon.

The southern division comprehends the hundreds of Alderbury, Amesbury, Branch and Dole, Cawden and Cadworth, Chalk, Damerham (South), Downton, Dunworth, Elstub and Everley, Frustfield, Heytesbury, Kinwardstone, Mere, Underditch, Warminster, and Westbury. The court of election is held at Salisbury; and the polling places are Salisbury, East Everley, Hindon, and Warminster.

The detached portions of the county were by the Boundary Act added to the counties in which they are respectively insulated.

In consequence of the bribery proved to exist in the borough of Cricklade, the elective franchise of that borough was extended (A.D. 1782) to the freeholders of the hundreds of Highworth Cricklade and Staple, Kingsbridge, and Malmesbury. With the exception of Cricklade, all the boroughs in the county were enlarged by the Boundary Act, some of them very considerably, by the addition of a number of rural parishes. This was especially the case with Malmesbury and Wilton. By the Municipal Reform Act, the extended parliamentary boundaries of Devizes and Salisbury were adopted for municipal purposes.

History and Antiquities.—Wiltshire is probably the richest, of all the English counties, in memorials of the earliest historic period, and indeed of the ante-historic period of our country. This pre-eminence it owes to the wide extent of its chalk downs, unbroken by enclosures, and untouched by the plough, on which the earthen or rude stone memorials of the remotest ages have remained uninjured, except by the mouldering touch of time, or by rare and occasional interventions of the caprice and violence of man; exempt in a great degree from the more systematic and complete destruction which the extension of building or cultivation has caused.

It is difficult to determine exactly to which of the antient British nations the various parts of the county belonged. A large portion, there can be no doubt, belonged to that nation or those nations who are mentioned by Ptolemy under the generic name of Belgae (Βέλγαι). Ptolemy assigns to them the cities of Ischalis (Ἴσχαλις) and Aquae Calidae (Ὕδατα Θερμά), now Ilchester and Bath in Somersetshire, on the one hand, and Venta (Οὐέντα Winchester in Hampshire, on the other. We may fore assign to the Belgae that part of the county whi between these places. Possibly some parts of the western border, about Mere and Hindon, may hav longed to the Durotriges (Δουρότριγες, Ptolemy), who pied Dorsetshire: and some parts on the north-east the county probably belonged to the Atrebates, or At (Ἀτρεβάτιοι, Ptolemy), whose chief town was C (Καληούα, Ptolemy), now Silchester, on the border of shire and Hampshire. It is not unlikely that the part of the valley of the Thames may have belonged Dobuni (Δοβοῦνοι, Ptolemy), whose chief town was D novium, or Corinium (Κορίνιον, Ptolemy), now Ciren

By Richard of Cirencester the towns of Ischali Aquae Calidae, or, as he terms the latter, Therm Aquae Solis (probably an error for Sulis), are as to the Hedui; in which case it is not unlikely th western part of the county of Wilts may hav longed to that people. But it is to be observe Richard appears to be at issue in this matter wit lemy, who, as we have seen, assigns them to the B The Celtic origin of the Hedui (supposing them to the same race as the Gallic nation so called) m difficult to suppose that they are included by Ptole der the name Belgae. Yet a passage in Richard in that the name of Belgae was given to a people of race:—'For all the Belgae are Allobroges, and d their origin from the Celtae and Belgae.' In the ver Richard's book published in 1809, Allobroges is inte to mean 'foreigners.' We suspect some error in t of the original. It is however possible that the n Belgae may have been given by Ptolemy to a gre federation of which the predominant tribes were gic race; and that the Hedui, so powerful in Gau in Britain subordinate members of this so-called confederation. Richard assigns to the Segontiaci sition near the river Cunetium (or Kennet) and called Vindonum, which he elsewhere enumerates the tributary and less important cities (civitates diariae minorisque momenti); and his map app place the Segontiaci partly in Wiltshire.

It is likely that the county was included in the s Vespasian's operations in the reign of Claudius, w subdued 'two very powerful nations' (of whom Ric Cirencester states, probably enough, the Belgae of P to have been one), conquered the Isle of Wight, an in reducing the southern part of Britain into the fo province. (Suetonius, *Vespasianus*, c. 4.) In the division of Britain, Wiltshire was included in the p of Britannia Prima.

After the departure of the Romans, Wiltshire was th of contest between the Britons and the Saxons. Th of the asserted massacre of the British nobles by He placed on Salisbury Plain; but both the event its its locality are doubtful. The great victory which founder of the kingdom of Wessex, obtained (A. over the British king Natan-leod or Nazaleod, b the conquerors to the south-eastern border. Cha the Cerdice's-ford of the Saxon Chronicle, on the Sa Avon, above Fordingbridge, in Hampshire, but c the Wiltshire border, was the limit of the territory ' leaga' (a name which seems to be preserved by Abbey, in Hampshire), to which Natan-leod gave Cerdic does not appear to have entered or subdue shire then. The Saxon Chronicle is silent about h many years; and when he is next noticed (A.D. 51 on occasion of a victory gained by him and his son at Cerdicesford or Chardford above mentioned. then it may be doubted if much of Wiltshire was su for many years afterwards (A.D. 552) we find Cynric, Cerdic, in successful conflict with the Britons at Se rig or Old Sarum. The West Saxons, of whose ki Hampshire formed the nucleus, appear to have sou extend their power northward, to and even beyo Thames, rather than westward. However, before A.D. 577, they must have overrun Wiltshire, as them in that year, under their king Ceawlin, fightin the Britons in the north of Somersetshire and in G tershire, to reach which they must have crossed Wi Whether they suffered any repulse, or the Brito taliated their invasion, is not clear; but in A.D according to the Saxon Chronicle, 'there was a slaughter of the Britons' at Wodnesbeorge, or Wanborough, near Swindon. According to other antient writers, Ceolric, nephew of Ceawlin, was in this battle supported by the Britons against his uncle, whom he conquered and deposed. In A.D. 652, Cenwalh, king of the West Saxons, 'fought at Bradan-forda by Afene,' obviously Bradford-on-the-Avon, but who were his competitors is not stated in the Saxon Chronicle: it is probable that they were either the Western Britons or the Mercians (by whom, under their king Penda, he had been a few years before expelled from his kingdom), or these two powers in conjunction. In A.D 715, Ine or Ina, king of Wessex, and Ceolred, king of Mercia, fought at Wodnesbeorhe or Wanborough, near Swindon, but the result is not stated. In A.D. 823, the battle which gave to Wessex the permanent superiority among the Anglo-Saxon states was fought at or on Ellendune, which has been commonly identified with Wilton, but, as we think, without reason. Allington-on-the-Bourne, near Amesbury, and Ellingdon or Ellington Wroughton, now called simply Wroughton, near Swindon, have been suggested. We think either supposition preferable to that which identifies Ellendune with Wilton.

The first notice of Wiltshire by that name in the Saxon Chronicle occurs A.D. 870, just before the accession of Alfred, when it is recorded that the bishop of Wiltshire, Ethered, was translated to the metropolitan see of Canterbury. It is obvious that the name, which is written Wiltun-scire, was taken from the town of Wiltun or Wilton. A division probably coincident with the county is noticed at an earlier period, namely, A.D. 800, when the Mercian Æthelmund, alderman of the Hwiccas, or people of Worcester and the adjacent parts, having crossed the Thames at Cynemaeresford or Kempsford, between Cricklade and Lechlade, to invade Wessex, was defeated by the Wilsaetas or men of Wilts. The name under a somewhat altered form (Wylsaete) is found again in the Saxon Chronicle after the accession of Alfred, denoting the men of Wiltshire.

Alfred's first battle with the Danes, after his accession, was fought at Wilton early in 871, before he had been on the throne a month. His ardour led him to engage the enemy with too small a force, and he was defeated. Just at the beginning of A.D. 878, Cyppanhamme or Chippenham was surprised by the Danes, and Alfred was driven from his kingdom. When he emerged from his retirement amid the marshes of Athelney, he met the men of Someretshire and Wiltshire at Ecgbyrhtes-stane or Egbert's-tone (probably Brixton-Deverhill, near Warminster), on he east side of Seal-wuda or Sel-wood; from whence he marched to Iglea (Iley or Highley, near Melksham), and rom thence to Æthandune, generally supposed to be Eddington, near Westbury, under the escarpment of the outhern (or Salisbury Plain) chalk district, where he gave he Danes so complete a defeat as to compel them to surrener their camp and submit to him. He thus recovered his ingdom with little difficulty. The Danish army, which ppears to have retired by agreement to Chippenham, arched after some months (A.D. 879) to Cyren-ceastre or irencester, and next year (A.D. 880) into East Anglia, here they settled.

When the East Anglian Danes revolted against Edward he Elder (A.D. 905), they forded the Thames at Crickde, and overran and plundered the country as far as radon, between Cricklade and Malmesbury, but retired efore the king could gather his army to attack them.

In the year 978 a council of the chief nobles on ecclesitical affairs was held at Calne, which became mournfully lebrated from a fearful disaster which distinguished it. he floor of the room where the council was assembled ave way: some were killed, others dreadfully bruised: ut the holy archbishop Dunstan stood alone upon a am.' From some circumstances 'the holy archbishop' s been suspected of being the author of the disaster in ich he was so singularly preserved. In 1003 Wiltshire s ravaged by the Danes, who plundered and burned Wiln, and occupied Old Sarum: the men of Wiltshire and mpshire assembled to meet them, but the treachery or wardice of their commander, Alderman Elfric, enabled enemy to withdraw without loss. In A.D. 1006, the nes were again in Wiltshire and defeated the Anglo-xons at Cynetan or Kennet. In A.D. 1010 and 1015, y were in Wiltshire again: in the latter year an Anglo-con army assembled at Cosham, now Corsham, where their king, Ethelred II., lay sick; but the treachery of Alderman Eadric or Edric led to its dispersion without coming to an engagement with the invaders. In 1015, a little before the Danish invasion, the widow of Sigferth, a Saxon thane, whom Edric had treacherously put to death, was confined at Mealdelme's-byrig or Malmesbury, from whence she was carried off by Edmund Ironside, the king's son, who married her. In A.D. 1016, Edric deserted his countrymen, joined the Danes under Canute, and passed the Thames at Cricklade to march into Mercia. In A.D. 1016, soon after midsummer, a severe but indecisive battle was fought between Edmund Ironside, now king of the Anglo-Saxons, and Canute, the Danish king, at Sceorstane, now Great Sherston, about 6 miles west of Malmesbury. This is the latest historical event of any importance connected with the county before the Norman Conquest.

The Roman road from Calleva (Silchester) to Isca Silurum (Caerleon), probably entered the county at or near Hungerford, but there do not appear to be any traces of it east of Marlborough. It is still to be traced from Fyfield, two miles west of Marlborough, with little interruption, for 22 miles across the downs by West Kennet, Silbury Hill, a little to the south of Calstone-Willington, and from thence by Heddington Wick, through Spy Park, almost to the border of the county near Bathford. This road, but in the opposite direction to that in which we have traced it, is followed in the fourteenth Iter of Antoninus, and two of the stations of the Iter, Verlucio and Cunetio, are identified, the former with Sandy Lane, just to the east of Spy Park, and the latter with Mildenhall and Folly Farm, both near Marlborough, on the Kennet, or with Rudge Farm, near Froxfield, midway between Marlborough and Hungerford. Camden proposed to place Verlucio at Warminster, and Gibson at Westbury, Stukely at Heddington, and Horsley at Laycock: but Sandy Lane better suits the distances of the Iter. The remains of baths, tesselated pavements, medals, pottery, glass, &c., have been dug up in Spy Park and in Bowood Park, near the supposed site of Verlucio, and a bend in the road, otherwise unaccountable, renders it probable that there was a station here. This road is included in the twelfth Iter of Richard of Cirencester.

A Roman road from Calleva (Silchester) and Venta Belgarum (Winchester), to Isca Dumniorum (Exeter), coincident with the fifteenth Iter of Antoninus, and included in the sixteenth Iter of Richard, enters the county across the Hampshire border, about two miles east of the village of West Winterslow, passes by the hamlet of Middle Winterslow (near which its remains are called the Devil's Causeway), across Winterbourn-Down, crossing the river Bourn at the village of Winterbourn-Ford, and from thence to Old Sarum, which may be identified with the Sorbiodunum of Antoninus [SARUM]; from which place the road runs south-west by Stratford-Dean, Bemerton, Toney-Stratford, and Vernditch Lodge, and across Vernditch Chace, into Dorsetshire, where it is in one part known as Achling Ditch, or Atchling Street.

The Roman Fosse Road touches the boundary of the county on the north side, about 2 miles from Cirencester, the Durocornovium of Antoninus and the Κορίνιον of Ptolemy: it runs south-west about 23 miles upon or within the boundary of the county, coinciding throughout with existing roads, and showing its Roman origin by the directness of its course. In the Ordnance Map it is called, between Cirencester and Bath, (but we know not on what authority,) Akeman Street, and is included in the tenth Iter of Richard of Cirencester. There are traces of a Roman settlement at Easton-Grey on the Fosse, where a profusion of medals has been found.

Another Roman road, called in the Ordnance Survey (after Higden) Ermine Way, enters the county on the north side, and runs south-east, coinciding with the modern road from Cirencester to Cricklade, near which it crosses the Thames, just however avoiding the town. From near Cricklade it runs still south-east by or near Water-Eaton, Broad Blunsdon, Stratton-St.-Margaret's, Wanborough, and Baydon, into Berkshire, uniting at Spinae or Speen with the Roman road from Londinium to Aquae Sulis, or Bath. It is comprehended in the thirteenth Iter of Antoninus, and is coincident throughout its Wiltshire course with modern roads or lanes.

A road branching from that just described, at Wanborough-Nyth and Covenham farms, between Stratton and Wanborough, runs southward by Chiseldon and Ogbourn-St.-George to the station at Folly Farm, near Marlborough, coinciding with modern roads or lanes. From Marlborough it may still be traced running south-westward by a long straight avenue across Savernake Forest and the grounds of Savernake House and Tottenham Park, by Crofton, Wilton, Marton, and through Conholt Park into Hampshire, at Hampshire Gate, and so to Venta Belgarum or Winchester. Just before quitting Wiltshire it makes a sudden bend, very unusual in Roman roads, to avoid a declivity.

The Roman road, known in later times as the Port Way, from Calleva (Silchester) to Sorbiodunum (Old Sarum), enters the county at Hampshire Gap, near Newton-Toney, and runs by Porton and Winterbourn Gunner.

Another road, coming apparently from Spinae (Speen near Newbury), is traceable just on the border of the county near Tidcombe, 4 or 5 miles north-north-east of Ludgershall, running in the direction of Sorbiodunum.

There are some traces of a Roman road from Folly Farm by Marlborough, running due south in the direction of Sorbiodunum or Old Sarum. Possibly the road from Spinae just noticed united with this.

Another road is supposed to have run in a north-west direction from Sorbiodunum toward Aquae Sulis, now Bath: but this is not certain.

A road from Sorbiodunum leading westward may be traced across Salisbury Plain, through Groveley Wood, by Dinton-Beeches, through Stockton Wood and the Great Ridge Wood, towards Monkton Deverhill, and Kingston Deverhill, and thence by Maiden Bradley into Somersetshire. It is apparently part of the road which runs through Somersetshire along the Mendip Hills towards the Bristol Channel.

Of the station Cunetio traces are found both at Mildenhall on the north side of the Kennet, and Folly Farm on the south side: and Sir R. C. Hoare distinguishes the two positions by the names of Upper Cunetio (Folly Farm) and Lower Cunetio (Mildenhall). The hill on which Folly Farm stands is covered with a variety of banks and earthworks, probably belonging to the period before the Roman dominion, and within these more antient works are traces of the Roman settlement. A portion of the rampart, which was quadrangular with rounded angles, may be seen; and funeral remains, coarse tessellated pavements, medals, and other relics have been dug up. The most remarkable of these relics were a small bronze figure of a female dressing her hair, and a bronze spoon. At Mildenhall are some traces of the rampart. It is not improbable that the town of Cunetio occupied both banks of the river, and that the two forts were for its defence, one on the north, the other on the south side.

At Wanborough-Nyth and Covenham farms, where the road to Cunetio branches off from that between Durocornovium (Cirencester) and Spinae (Speen), are traces of a Roman settlement; abundance of fine red glazed and thin black pottery, as well as some of coarse manufacture, has been found; and inequalities in the surface of the ground, from which many large stones have been dug up, are indications of antient buildings. Sir R. C. Hoare, without any other authority, that we are aware of, than the modern name Nyth, has named this station Nidum.

The Roman settlement at Easton-Grey on the Fosse appears, from the traces of buildings, to have been of some extent; Sir R. C. Hoare identifies it, on slender grounds, with the Mutu-Antonis of Ravennas: there are no traces of any vallum, but numerous medals and a coarsely sculptured bas-relief have been found.

At Stockton Wood Corner, 10½ miles from Sorbiodunum (Old Sarum), on the road which leads into Somersetshire by Kingston Deverhill, are some indications of a Roman settlement, pottery and medals having been dug up. At Bishopstrow, between Warminster and Heytesbury, on the line of the supposed road from Sorbiodunum (Old Sarum) to Aquae Sulis (Bath), the remains of a Roman settlement have been found; an earthen vallum incloses an irregular quadrangular area of 50 acres, still called the Bury: large fragments of Roman pottery have been dug up in every part of the inclosure. At Pitmead, close to Bishopstrow; at Rudge, near Froxfield; at Bromham, near the site of the station Verlucio; and at Littlecote, near Ramsbury, tessellated pavements have been discovered, but the principal of them were destroyed soon after they were found. At Rudge a brass cup and some medals were found in a well; the cup was inscribed with the names of several of the stations on the Roman wall in Northumberland. An engraving of it is given in Horsley's 'Britannia Romana,' and in Hoare's 'Antient Wiltshire.' Many other Roman remains, but not of great importance, have been found; some of them, such as stuccoed and painted walls, and hypocausts were found within the inclosures of what are supposed to be British settlements.

Of the antiquities, not Roman, the most striking are those of Stonehenge and Avebury or Abury. [STONEHENGE; AVEBURY.] There are some traces of a British road, or track-way, known as the Ridge-way, running across Salisbury Plain, from Heytesbury, by John a'Gore's Cross, Redhorn turnpike (on the road from Salisbury to Devizes), by the village of Charlton-on-the-Avon and the hamlets of Broad Street and Honey Street, across Walker's Hill, by the village of East Kennet, over Hackpen Hill (east of Abury), near Barbury and Leddington Castles, and over Shelbarrow Hill into Berkshire; throughout which county it may still be traced.

Wansdyke, or Wansditch, is a vast earthen rampart, with a ditch on the north side, which extends, though not uninterruptedly, through the county. The first undeniable trace of Wansdyke, westward, is at Maes Knoll Camp, about five miles south-south-east of Bristol. It may be traced at intervals in Somersetshire, by Stantonbury Camp, to the neighbourhood of Bath, where a small part of it may be seen near the Warminster road, and a more considerable part extending across Claverton Down to Bath Hampton Camp. From thence its direction is doubtful: it is supposed to have coincided, for many miles, with the line of the Roman road from Aquae Sulis to Cunetio. At Morgan's Hill, three or four miles east of the Roman station Verlucio, it again appears, diverging from the course of the Roman road, and running across the chalk downs of the northern chalk district, not far from its southern escarpment, which overhangs the vale of Pewsey. In this part it is very perfect, and is accompanied on each side by smaller ditches, by barrows, and other antiquities. Near and beyond Marlborough its course is discernible only at intervals. It may, however, be traced by Cheesbury or Chisbury Camp, between Marlborough and Great Bedwin, where it suddenly bends to the south-south-east; it afterwards turns more to the east, and enters Berkshire. Its length, in Wiltshire, from its divergence from the Roman road to the Berkshire border, is about 19 miles, including gaps. The origin of Wansdyke is unknown. The old popular tradition, which was evidently connected with its name, was, that it was made by the devil on a Wednesday. Aubrey supposed it to have been the antient boundary of the kingdoms of Wessex and Mercia, and considers its name to have been Woden's-dyke. Stukely supposes it to have been made by the Belgae, to secure their territories from the Celtae. Sir R. C. Hoare seems to have regarded it as a Belgic work, repaired or reconstructed by the Saxons.

There are numerous other banks and ditches to be traced on the downs; some probably for defence, like Wansdyke, with one rampart and a ditch: others are supposed to have been roads, and consist of a broad level way between two banks. Old-ditch may be traced on the downs, north of Warminster and Heytesbury, running eastward by Chittern, or Chiltern-All-Saints, and Tilshead, till it terminates in another ditch running at right angles to it; its length is about 11 miles, including gaps or intervals; the transverse ditch, in which it terminates, can be traced for above two miles. Grimsditch, consisting of a bank and ditch, and Bokerly-ditch, also consisting of a bank and ditch, separating at its south-eastern end into two branches, are on the downs south of Salisbury, on the border of Dorsetshire. Bokerly-ditch forms, for a short distance, the boundary of the two counties. The length of Grimsditch is about six miles; of Bokerly-ditch, including both branches, about six miles, including gaps or intervals. Both have a very winding course.

The camps and other earth-works are very numerous: they are fully described in Sir R. C. Hoare's 'Antient Wiltshire,' which has been our chief authority for the antiquities of the county.

In the reign of Henry II., A. D. 1164, a national council was held at Clarendon, two miles south-east of Salisbury, where the kings had a residence and a forest: at this council the constitutions of Clarendon were passed, restricting the power of the clergy. In the reign of ry III., A. D. 1267, the statutes for the suppression of ults, known as 'the statutes of Malbridge,' were ted in an assembly, or council, held at Marlborough. he War of the Roses, the men of Wiltshire generally raced the Lancasterian side; but no great event in war occurred in the county. In the civil war of rles I., Marlborough, which was garrisoned by the iamentarians, was taken, with the governor and officers, 1000 prisoners, and four pieces of cannon, by the lists under Wilmot, A. D. 1642. In 1643 a body of list infantry was besieged in Devizes by Sir William ler, but the siege was raised, and Waller defeated h July) on Roundaway Hill, by Wilmot. Other actions ess importance were fought at Malmesbury and Ludhall; and Wardour castle and Warminster town were eged and taken. During the Commonwealth, Wilt- was the scene of the unsuccessful attempt of the lists under Sir Joseph Wagstaffe. [SALISBURY.]

rdnance Map of England; Greenough's *Geological of England*; Conybeare and Phillips' *Outlines of the logy of England and Wales*; *Beauties of England Wales*; Britton's *Beauties of Wiltshire*; Priestley's *ory of Canals* and *Navigable Rivers*; Sir R. C. Hoare's *ient Wiltshire and Modern Wiltshire*; Ptolemæus, *graphy*; Antonini *Itinerarium*; Ricardus Cirinensis; *on Chronicle*; *Parliamentary Papers*.)

STATISTICS.

opulation and Occupations.—As an agricultural county, tshire was the tenth in rank in 1831, standing between olk and Oxfordshire. The proportion of the agricul- population was 48·5 per cent. in 1831, at which od there were 3387 occupiers of land employing urers, 1239 occupiers not employing labourers, and number of agricultural labourers was 24,708. The ainder of the male population, aged 20 and upwards, distributed as follows:—3497 employed in manuures; 13,089 in retail trades and handicrafts; 1792 talists, bankers, and members of the professions; non-agricultural labourers; 1557 domestic servants; r males aged 20 and upwards, 4338; and there were female servants. The following details refer to 1831, Return of Occupations in 1841 not being yet pubd:—'The manufacture of fine broadcloth and of kerseymere employs more than 1000 men at Trowbridge, 600 at Bradford, 200 in the parish of Westbury, 170 at Melksham, 170 at Kingswood, 170 at North Bradley with Southwick, 85 at Hilperton, 65 at Chippenham, 62 at Bromham, 52 at Longbridge, 35 at Heytesbury, 35 at Calne, 35 in the parish of Mere, and a few in various other places; so that the total number throughout the county exceeds 3000. At Wilton about 40 men are employed in making carpets, and a few at Burcomb. A small manufactory of horsehair exists at Britford.'

On the supposition that the registered baptisms, marriages, and deaths, bore the same proportion to the actual population as in 1801, the population of Wilts, in the undermentioned years, would be as follows:—95,861 in 1570; 119,672 in 1600; 146,799 in 1630; 128,869 in 1670; 152,372 in 1700; and 168,937 in 1750. The population actually enumerated at the following decennial periods was as under:—

	Males.	Females.	Total.	Increase per Cent.
1801	87,380	97,727	185,107	
1811	91,560	102,268	193,828	5
1821	108,213	113,944	222,157	15
1831	117,622	122,534	240,156	8
1841	128,240	130,493	258,733	7·7

From 1801 to 1841 the population increased 73,626, or 49·7 per cent. In the three years ending June, 1841, the proportion of marriages to the population was 1 in 156; births, 1 in 34; deaths, 1 in 50; the proportion for England being respectively 127, 31, and 45. In the same three years, the proportion per cent. of persons married under 21 years of age, was 16·8 for women, and 8·2 for men; and in England and Wales 13·78 for women, and 4·69 for men (Fourth Report of Registrar-General). It appears from the Census Returns of 1841, that 228,395 persons, or 88·3 per cent. of the population, were born in the county; 27,570 persons, or 19·7 per cent., in other counties of England and Wales; 284 persons, or 0·1 per cent., in Scotland; 605 persons, or 0·6 per cent. in Ireland; 7 persons were born in the colonies; 159 were foreigners and British subjects born in foreign countries; and the place of birth of 1713 persons was not ascertained. According to this Census the number of persons to a square mile is 189. The population, &c. of each hundred and borough in 1841 is shown in the following table:—

	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
HUNDRED, &c.	English Statute Acres.	In-habited.	Un-inhabited.	Building.	Males.	Females.	Total of Persons.	Under 20 years.		20 Years and upwards.		In this County.	Else-where.
								Males.	Females	Males.	Females.		
rbury . .(Hundred)	31,760	973	33	2	2,538	2,441	4,979	1,240	1,158	1,298	1,283	4,449	530
sbury . . ,,	42,620	1,416	53	6	3,614	3,528	7,142	1,731	1,614	1,883	1,914	5,688	1,454
lford . . ,,	18,760	2,503	265	10	5,868	6,235	12,103	2,844	2,886	3,024	3,349	10,923	1,180
ch and Dole. ,,	38,440	1,800	90	46	4,250	4,491	8,741	1,966	1,934	2,334	2,557	7,845	896
e . . ,,	21,540	1,355	33	2	3,422	3,574	6,996	1,726	1,658	1,696	1,916	6,452	544
den and Cadworth ,,	25,100	958	21	3	2,307	2,511	4,818	1,090	1,167	1,217	1,344	4,428	390
k . . ,,	26,610	649	20	2	1,654	1,661	3,315	803	790	851	871	2,973	342
penham . ,,	65,160	4,427	153	14	12,590	11,658	24,248	5,565	5,305	7,025	6,353	19,880	4,368
erham, N. & S. ,,	27,600	1,291	33	3	3,232	3,150	6,382	1,511	1,450	1,721	1,700	5,603	779
nton . . ,,	23,590	1,401	59	6	3,294	3,451	6,745	1,605	1,586	1,689	1,865	6,151	594
worth . . ,,	26,650	1,354	37	5	3,449	3,584	7,033	1,731	1,695	1,718	1,889	6,336	697
b and Everley ,,	40,590	1,273	49	4	3,309	3,287	6,596	1,584	1,544	1,725	1,743	5,913	683
tfield . . ,,	8,200	310	12	1	756	776	1,532	372	359	384	417	1,335	197
sbury. . ,,	32,370	1,152	37	8	2,867	2,867	5,734	1,473	1,308	1,394	1,559	5,359	375
worth, Cricklade, d Staple . ,,	51,520	2,889	51	34	7,815	7,346	15,161	3,577	3,493	4,238	3,853	12,345	2,816
sbridge . . ,,	40,430	2,087	40	6	6,795	5,513	12,308	2,764	2,546	4,031	2,967	10,149	2,159
ardstone . ,,	54,030	2,319	24	4	5,843	6,016	11,859	2,889	2,873	2,954	3,143	10,790	1,069
esbury . ,,	57,030	2,717	96	9	7,039	6,879	13,918	3,344	8,307	3,695	3,572	12,210	1,708
sham . . ,,	18,870	3,987	231	17	9,276	10,054	19,330	4,736	4,727	4,540	5,327	17,836	1,494
. . . ,,	17,290	930	30	5	2,270	2,461	4,731	1,111	1,154	1,159	1,307	3,971	760
rn and Cannings ,,	26,700	2,015	55	6	4,859	5,141	10,000	2,313	2,306	2,546	2,835	9,348	652
sbury . . ,,	16,350	744	23	1	1,772	1,819	3,591	913	887	859	932	3,124	467
ey . . ,,	47,100	1,411	41	5	3,507	3,450	6,957	1,790	1,653	1,717	1,797	6,585	372
borough . ,,	47,310	2,154	56	8	5,138	5,237	10,375	2,627	2,447	2,511	2,790	10,023	352
rditch . ,,	6,180	339	13	..	746	755	1,501	344	206	402	449	1,372	129
minster . ,,	25,170	2,228	165	21	5,080	5,748	10,828	2,565	2,561	2,515	3,187	9,765	1,063
bury . . ,,	11,340	1,585	91	5	3,678	3,910	7,588	1,824	1,837	1,854	2,073	7,092	496
rwelsdown . ,,	18,440	1,254	42	3	2,987	3,127	6,114	1,477	1,444	1,510	1,683	5,685	429
zes . .(Borough)	660	854	86	1	2,190	2,441	4,631	1,057	1,069	1,133	1,372	4,010	621
borough . ,,	170	572	36	..	1,599	1,792	3,391	766	841	833	951	2,848	543
Sarum, Salisbury (City)	480	1,932	163	16	4,496	5,590	10,086	2,082	2,289	2,414	3,301	7,907	2,179
Totals . .	868,060	50,879	2,138	253	128,240	130,493	258,733	61,370	60,194	66,870	70,299	228,395	30,338

In 1831 the number of inhabited houses was 46,281, occupied by 51,659 families, and there were 321 houses building, and 1897 uninhabited.

County Expenses, Crime, &c.—Sums expended for the relief of the poor: 1748-49-50 (annual average), 22,938*l.*; 1776, 54,022*l.*; 1783-84-85 (average), 62,893*l.* The sum expended in

1801 was	128,625*l.*,	being	13*s.*	10*d.*	for each inhabitant.
1811 ..	234,352	"	24	2	"
1821 ..	163,168	"	14	8	"
1831 ..	198,194	"	16	6	"
1841 ..	133,573	"	10	2	"

In each of the following years ending 25th March, the expenditure for the relief of the poor was as under:—

1835.	1836.	1837.	1838.	1839.	1840.	1841.
161,449*l.*	133,472*l.*	105,451*l.*	113,444*l.*	129,525*l.*	133,468*l.*	137,338*l.*

The expenditure for the year ending 25th March, 1834, was 173,925*l.* The total difference in the sum expended in that year and 1840 was 54,290*l.*, or 28 per cent.: namely, in suits of law, &c., 2817*l.*, or 79 per cent.; and in miscellaneous expenses, 11,016*l.*, or 70 per cent. The number of poor-law unions is 17, comprising 329 parishes, which had a population of 229,827 in 1331. There are five parishes, with a population of 10,329, which are not in any union. Each of the undermentioned places is the centre of a union; and the sums expended in the year ended 25th March, 1840, under the heads of In-maintenance, Out-relief, and Establishment and Salaries, were as follows:—

Name of Union.	Population in 1831.	In-Maintenance.	Out-Relief.	Establishment and Salaries.	Total.
		£.	£.	£.	£.
Alderbury . .	13,227	1079	4592	1602	7,273
Amesbury . .	7,084	651	2160	936	3,747
Bradford . . .	11,994	1778	3860	1387	7,025
Calne	8,973	733	3177	631	4,541
Chippenham . .	19,265	1322	4868	1530	7,720
Cricklade and Wootton-Basset	10,275	686	4350	1090	6,126
Devizes . . .	28,638	1493	7989	1732	11,214
Highworth and Swindon .	12,611	832	4766	1042	6,640
Malmesbury . .	13,280	815	4254	1113	6,182
Marlborough .	8,774	804	2944	974	4,722
Melksham . .	18,252	1356	6680	1091	9,127
Mere	7,494	481	3254	688	4,423
Pewsey . . .	11,674	959	4320	910	6,189
Tisbury . . .	9,763	544	4399	863	5,806
Warminster . .	17,150	845	7839	1577	10,261
Westbury and Whorwelsdown	13,164	1070	4329	1068	6,467
Wilton	10,278	1107	4752	1214	7,073

The number of persons relieved in these unions during the quarter ending Lady-day, 1839, was 28,196 (3668 in-door, and 24,528 out-door). In the quarters ending Lady-day, 1840, 1841, and 1842, the numbers were as follows:—In 1840—in-door, 4064; out-door, 25,945; total, 30,009: in 1841—in-door, 4521; out-door, 25,482; total, 30,003: in 1842—in-door, 5457; out-door, 30,370; total, 35,827. The proportion in 1841 of the total number of paupers to the total population was 15 per cent., while the average for England in the same year was 9 per cent., and in no other county was the proportion so high as in Wiltshire. The expense for in-maintenance and out-relief was 100,145*l.* for the year ending Lady-day, 1842, being an increase of 4 per cent. on the preceding year. The number of adult able-bodied paupers relieved in the quarter of 1841 was 7842, and in the corresponding quarter of 1842 the number was 10,893. There were 320 lunatics and idiots chargeable on the poor-rate in 1836, or 1 in 750; in England, 1 in 1033: and in August, 1842, the number chargeable was 357. In 1835-6 there were 1753 bastard children chargeable on the poor's-rate, or 1 in 137 of the whole population; in England 1 in 215. The number of illegitimate births in 1830 was 341, or 1 in 20; being the same proportion for the whole of England. The number affiliated in 1834-5 was 356, and 277 in 1835-6.

The annual value of real property assessed to the property-tax in 1815 was 1,156,459*l.*; property assessed to occupiers, 965,079*l.*; and the profits of trades, professions, &c., were assessed at 380,482*l.* In 1825-6 the centesimal proportion of the various descriptions of property assessed was:—land, 84·3 parts; dwelling-houses, 13·2 parts; mills, factories, &c. 1·8 parts; manorial profits, &c. ·7 parts. The net rental or annual value of real property assessed to the poor's-rate in 1841 was as follows:—

On landed property . .	£899,878
Dwelling-houses . . .	219,931
All other kinds of property .	55,807
Total . .	£1,175,616

In the above year the total amount levied for poor-rates was 176,750*l.*, being a rate of 3*s.* in the pound on the annual value of real property assessed. Taking the total annual value of real property in the county in 1841, it amounted to 4*l.* 10*s.* 5*d.* for each inhabitant; and dividing it by the number of acres, it was 1*l.* 0*s.* 8*d.* per acre.

The county-rate levied at different periods, and the principal disbursements for the same periods, are shown in the following table:—

	1792.	1801.	1811.	1821.	1831.	1838.
	£.	£.	£.	£.	£.	£.
Income . .	2,071	4,099	11,183	12,902	18,421	13,329
Expenditure:—						
Bridges . .	19	34	1,394	1,165	647	432
Gaols . .	848	761	8.131	11,124	1,585	688
Prisoners .	738	1,486	918	1,147	6,233	4,621
Prosecutions	86	276	247	1,888	4,420	2,840
Constables & vagrants	211	248	122	1,107	2,587	567

The particulars of the county expenditure in 1834 are as follows:—Bridges, building, repairs, &c. 964*l.*; gaols, houses of correction, and maintaining prisoners, 5,650*l.*; lunatic asylum, 37*l.*; prosecutions, 2404*l.*; clerk of the peace, 443*l.*; conveyance of prisoners before trial, 784*l.*; vagrants, apprehending and conveying, 16*l.*; coroner, 371*l.*; miscellaneous, 771*l.*; debt, principal and interest, 3030*l.*: total, 14,480*l.*

The length of streets and highways, and the expenditure thereon, were as under in 1839:—

	Miles.	
Streets and roads repaired under local acts	5	
Turnpike roads	591	
All other highways	2284	
		2881
Amount of rates levied		£20,114
Expended in repairs of highways .	£19,558	
Law and other expenses . . .	220	
Total expenditure		£19,779

The number of turnpike trusts, in 1840, was 32; the income from tolls was 37,333*l.*; parish compositions in lieu of statute duty, 139*l.*; and total income, 39,669*l.*; the total expenditure for the same year being 38,029*l.* The bond and mortgage debts amounted to 117,660*l.* In 1836 the debt was equal to 3·4 years' income; for the whole of England the proportion of income to debt being 4·5 years: the proportion of unpaid interest to the total debt was 13 per cent.; in England 12 per cent. In ten trusts there was a surplus revenue in 1841, which, if applied to discharge the debts of each, would pay off their respective debt in periods varying from three to twenty-two years; in two cases in twenty-two years, and in one in twenty-one years.

In 1839 the church-rates amounted to 6398*l.*; and 1418*l.*, applicable to the same objects, were derived from 'other sources,' the amount from estates and rent-charges, included under this head, being 668*l.* in 1832. The sum of 7544*l.* was expended in 1839 for the purposes of the establishment, of which 3359*l.* was for repairs of churches. There was a debt of 1410*l.* secured on the church-rates.

Crime.—Number of persons charged with criminal offences in the septennial periods ending 1819, 1826, 1833, and 1842.

	1813-19.	1820-26.	1827-33.	1836-42.
Total . .	1194	1919	2625	3187
Annual average .	170	274	375	455

The numbers committed, convicted, and acquitted, in each year from 1834 to 1842, were as under:—

	1834.	1835.	1836.	1837.	1838.	1839.	1840.	1841.	1842.
Committed .	384	335	354	482	407	428	462	506	548
Acquitted .	123	100	101	124	102	121	127	146	154
Convicted .	261	235	253	325	305	307	335	360	394

In 1841 the proportion of persons committed, to the total population of the county, was 1 in 472; in England and Wales 1 in 508. In 1841 the increase of crime was 9·5 per cent. on the preceding year; and in 1842 there was an increase of 8·3 per cent. on the year 1841.

Of 548 offenders (491 males and 57 females) tried at the assizes and sessions in 1842, there were 37 charged with offences against the person; 51 with offences against property committed with violence; 433 (including 332 cases of simple larceny) with offences against property committed without violence; 4 with malicious offences against property; 5 for forgery, coining, and uttering base coin, and 18 for various misdemeanours. Of 394 persons convicted, 2, against whom sentence of death was recorded, were transported for life; 14 other offenders were also transported for life; 14 for periods above ten and under fifteen years; 30 for periods above seven and not exceeding ten years; and 23 for terms of seven years; making 83 transported. None were sentenced to imprisonment for periods exceeding two years; 1 was imprisoned for a period not exceeding two years; 31 for above six months and not exceeding one year; and 277 for six months and under; and 2 were whipped: 1 received a free pardon. Of the 154 persons acquitted, 107 were found not guilty on trial; in the case of 41 no bill was found; and in 6 instances there was no prosecution. Nearly one-half (275) of the total number of persons committed were between the ages of 15 and 25; or one-fourth (138) between 15 and 20, and one-fourth (137) between 20 and 25, which are higher proportions for these ages than the rest of England and Wales. The degree of instruction was ascertained in all but six cases: 117 males and 10 females could neither read nor write; 349 males and 45 females could read and write imperfectly; 14 males and 1 female could read and write well; and 5 males and 1 female had received a superior education. The proportion of uninstructed criminals in the county on an average of several years was 91 per cent.; in England and Wales 89·3 per cent.

Savings' Banks.—There are eleven of these institutions in the county, and the number of depositors in 1841 was about 1 in 26 of the total population; but while the average amount invested by depositors in England was 29*l.* each, it was 36*l.* in Wilts; and as the proportion of depositors under 20*l.* is only 1 in 50 (in England 1 in 37), the inference is that few of the labouring classes are able to avail themselves of the savings'-banks. The number of depositors and amount of deposits in each of the following years were as under:—

	1833.	1836.	1837.	1838.	1839.	1840.
No. of depositors	6,907	8,340	8,655	9,112	9,275	9,775
Am. of deposits	£259,026	£309,714	£316,825	£333,029	£336,655	£354,024

The distribution of the sums invested in 1830, 1834, and 1840 is shown in the following table:—

		1830.		1834.		1840.	
	£	Depositors.	Deposits. £	Depositors.	Deposits. £	Depositors.	Deposits. £
Not exceeding	20	3,023	25,566	3,440	28,688	4,683	37,662
"	50	1,981	61,275	2,277	70,600	2,807	87,716
"	100	975	66,533	1,088	75,540	1,392	95,581
"	150	374	45,328	377	44,765	507	60,984
"	200	177	30,079	238	40,601	301	51,626
Above . .	200	82	20,948	70	17,877	85	20,455
		6,612	249,751	7,490	278,071	9,775	354,024

The deposits of 96 friendly societies, not reckoned above, amounted, in 1840, to 12,041*l.*; and 8617*l.* were invested by 206 charitable institutions.

Elective Franchise.—The actual number of county voters registered, in 1835, was 5002 in the northern division, and 3044 in the southern division; and in 1839-40 the numbers registered were as under:—

	N. div.	S. div.	Total 1839-40.	Total 1835-6.
Freeholders of every class .	3751	1709	5460	5167
Copyholders and customary tenants	258	117	375	383
Leaseholders for life or term of years . . .	180	269	449	481
50*l.* tenants at will . .	860	608	1468	1561
Trustees and mortgagees .	14	..	14	50
Qualified by office . .	102	124	226	287
Joint and duplicate qualifications	94	86	180	189
	5259	2913	8772	8118

Education.—Summary of Returns made to Parliament in 1833:—

	Schools.	Scholars.	Total.
Infant-schools . . .	70		
Number of infants at such schools; ages from 2 to 7 years:—			
Males . .		436	
Females . .		451	
Sex not specified .		797	1,684
Daily-schools . . .	695		
Number of children at such schools; ages from 4 to 14 years:—			
Males . .		7,671	
Females . .		6,627	
Sex not specified .		4,393	18,691
Schools . .	765		
Total of children under daily instruction . . .	..	..	20,375
Sunday-schools . . .	437		
Number of children at such schools; ages from 4 to 15 years:—			
Males . .		12,254	
Females . .		13,257	
Sex not specified .		5,644	31,155

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	5	354	59	895	6	435
Daily Schools	95	3017	79	2,855	459	9,147	62	3672
Sunday Schools	17	1290	401	28,519	2	52	17	1294
Total...	112	4307	485	31,728	520	10,094	85	5401

The schools established by Dissenters, included in the above table, are—

		Scholars.
Daily-schools . . .	11, containing	285
Sunday-schools . .	142 "	13,578

The schools established since 1818 are—

Infant and other daily schools	232, containing	11,193
Sunday-schools .	222 "	18,157

Lending libraries of books are attached to 44 schools.

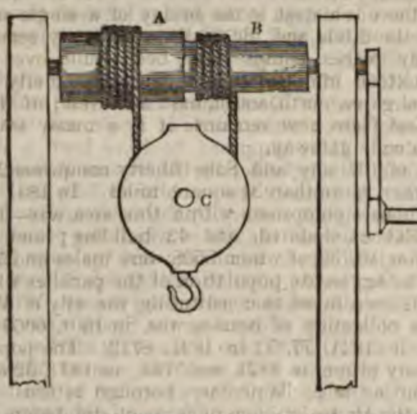
Thirty-six Sunday-schools, attended by 1440 children, are returned from places where no other school exists. Fifty-six schools, containing 2816 children, were both Sunday and day schools. The number of boarding-schools is forty-six, and the scholars are included in the above returns. The total number of children returned as attending Sunday and day schools of all kinds is 51,530: in 1841 the total number of children in the county between the ages of 5 and 10 was 32,554, and 29,758 were between 10 and 15.

WIMBLEDON. [SURREY.]

WIMBORNE MINSTER, a very antient market-town in the eastern part of Dorsetshire, on the road from Salisbury to Poole, seven miles north of Poole, and 100 miles from London. It is supposed to have been a Roman station called Vindogladia; by the Saxons it was called Vinburnam. A nunnery was established here in the beginning of the eighth century by the sister of Ina, king of the West Saxons, upon the site of which the present minster or collegiate church was built; and the word Minster has been added to the town to distinguish it from Wimborne St. Giles's, in another part of the county. Wimborne Minster is pleasantly situated on the Stour, near its confluence with the Allen. There is a weekly market, a cattle market every alternate week, and two annual fairs. The town has little trade. With the exception of the minster there is nothing to indicate its former importance. The nunnery was destroyed by the Danes, when the establishment was converted into a college of secular canons, consisting of a dean, prebendaries, vicars, and other officers, which continued to exist until the dissolution, when the revenues were vested in the crown. Some of the lands were set apart by Queen Elizabeth towards the support of the grammar-school, originally founded by the countess of Richmond, mother of Henry VII., in 1497, though now called after Queen Elizabeth. In the reign of Charles I. the possessions of the school and church were vested in governors, who were to provide for the service of the collegiate church and the maintenance of the school. Parts of the minster were built soon after the Conquest. It is a cruciform structure, 108 feet in length, and consists of a chancel, nave, choir, and side-aisles, a transept, and three porches. The minster once contained ten altars of alabaster and other costly materials, and the high altar was particularly splendid. There are two quadrangular towers, one at the west end, and the other, once surmounted by a very lofty spire, at the intersection of the cross: the whole edifice is particularly deserving of notice. The cathedral service, on Saturday evenings and holidays, has not been discontinued many years. The minster is a royal free chapel, and a peculiar in the diocese of Salisbury. The duties are performed by three incumbents appointed by the corporate body above mentioned. Several royal and noble persons have been interred here; among others King Ethelred, who was slain by the Danes in 872; also the duke and duchess of Somerset, the maternal grandfather and grandmother of Henry VII. There are two antient hospitals for poor aged persons. The entire parish contains 11,880 acres, and there were 4326 inhabitants in 1841. The parish comprises Wimborne Minster (pop. 1687), tything of Holt (1313), tything of Leigh (574), and manor of Kingston Lacey (752). There are several hamlets in the parish.

WINCANTON. [Somersetshire.]

WINCH AND AXLE is a machine constituting a small windlass, and consisting of a cylinder of wood which is capable of turning on its axis between two upright posts of the same material, or between the ends of a cast-iron frame: a lever at one or at each extremity of the cylinder, is attached to an iron axle passing through the latter at right angles to its direction, and is furnished with a handle, which is parallel to that axle. The name winch is given to a lever or handle of this kind, and the word is supposed to be derived from the verb *guincher*, signifying, in old French, to turn, or bend in a curvilinear manner. The machine is used to raise a weight vertically, or to draw an object towards it; for which purposes the object is connected with it by a rope or chain which continually passes over the curve surface of the cylinder as the latter is made to turn on its axis by a man acting at the handle. Since the cylinder revolves once while the handle, or the extremity of the lever to which it is attached, is made to describe the circumference of a circle, it is evident that the mechanical power of the machine is precisely that of the wheel and axle. [Wheel and Axle.] When of a simple form it is employed to raise water from a well, and earth or some other material from the shaft of a small mine: and one of a complex nature is used, by means of a crane, to raise casks or heavy packages from the ground to the upper part of a building.



When great weights are to be raised, the machine is usually fixed in a frame of cast-iron, which is rectangular on the plan, but its extremities or faces have the form of a triangle, or of the letter A. The axle of the cylinder is supported on a horizontal bar at the middle of each end of the frame, and to the cylinder is attached a toothed wheel which turns with it on the common axis: above this wheel and parallel to the cylinder is an iron axle which carries a pinion with teeth working in those of the wheel, and causing the latter to revolve, the pinion itself being turned by means of the lever and handle at one or at each extremity of the frame. A machine of this kind is called a *crab*; and when a weight is to be drawn horizontally, or raised above the cylinder, the machine must of course be bolted to the floor or firmly fixed in the ground, in order to prevent it from being moved from its place. In such machines there is generally, at one extremity of the cylinder, a wheel having on its circumference teeth like those of a saw; and a *click* or catch, which turns freely on a pin, is attached by that pin to the side of the frame in such a manner that it may fall between the teeth. By this contrivance, if the handle should break, or the moving power be taken off while the weight is suspended in the air, the latter is prevented from descending.

Machines of this kind are occasionally constructed which have the power of holding the weight in any part of its ascent or descent without a ratchet-wheel and catch. Such a machine consists of a barrel formed in two cylindrical portions, A and B, of different diameters, but having a common axle: the rope passes under a pulley in the block C, to which the weight is attached, and over the two cylinders, in such a manner that when the handle is turned it uncoils from the smaller, and coils upon the larger portion. Thus every revolution of the barrel causes the larger cylinder to take up a quantity of rope equal in length to its circumference, while there is uncoiled from the smaller a quantity equal to the circumference of the latter: consequently, after each revolution, the quantity of rope between the axis of the cylinder and the pulley is diminished by the difference between the two circumferences, and the weight is raised up through a height equal to half that difference. Hence by mechanics, if $2R\pi$ represent the circumference of the circle described by the handle of the winch in one revolution, $(r' - r)\pi$ half the difference between the circumferences of the two cylinders, W the weight to be raised, and P the power applied to the handle, we shall have, in the state of equilibrium, $\frac{r' - r}{2R} W = P$.

The weight which may be balanced by a given power P will evidently be greater as $r' - r$, or the difference between the radii of the cylinder, is less; and the difference may be made very small without much increasing the friction. The only disadvantage attending the machine, when compared with an ordinary winch or capstan, is that it requires a much greater quantity of rope to raise or move the object through any given distance. It was first proposed in Europe by Mr. George Eckhardt, but machines of a like kind have, it is said, been long in use in the East.

The winch is employed with the common jack, which is used to lift great weights, or to move them through small distances. The handle turns a pinion with teeth, which act on others at the circumference of a small wheel; and on the axle of this is a pinion with teeth, which work in those of a rack-rod. The axles of the wheel and pinions being let into the sides of a case of wood or iron, the revolution of the wheel produces a rectilinear motion of the rack; and one end of the case being fixed to the ground, or against an immovable object, the extremity of the rack at the opposite end forces forward the body which is to be displaced. Sometimes, instead of a rack, the machine is furnished with a wheel whose axle is hollow, and cut in the form of a concave screw; within this screw is one of the convex kind, which by the revolution of the wheel and its axle is made to move in the direction of the latter, and thus to press before it the object which is to be removed. This machine has however considerable friction.

The force exerted by a man in turning a winch vertically varies according to the position of the lever with respect to the horizon. When the lever, or that part which is perpendicular to the axle, is perpendicular to the ground, and the handle is at the highest or lowest part of the circle described by the end of the lever, the man either pushes the handle directly from him or pulls it directly towards him; and in each case he exerts a power which is estimated at twenty-seven or thirty pounds; but when the lever is in a horizontal position, the man either throws a great portion of his weight on the handle to press it down, or he exerts his muscular force in a direct manner to pull it upwards; and the force exerted in these positions is estimated at 140 or 160 pounds. The force exerted must evidently have different values between these quantities in other positions of the winch; and the practice is to cause two men to work at the same time to turn the machine, one being at each extremity of the axle of the cylinder. The levers of the two winches are placed at right angles to one another; consequently when one man is pushing or pulling horizontally, the other is pressing or pulling vertically, and thus the operation of turning goes on with nearly uniform intensity; the first man working in the least favourable position when the other is working in that which is most so. [Windlass.]

WINCHCOMBE. [Gloucestershire.]

WINCHELSEA. [Sussex.]

WINCHESTER, an antient city, a municipal and parliamentary borough, and the see of a bishop, in 51° 4′ N. lat., 1° 18′ W. long., is 62½ miles south-west from London by the road, 64 miles by the South-Western Railway, and 12¾ miles from the railway station at Southampton.

Winchester is one of the most antient towns in England: its origin is lost in the fables of tradition. The Britons are said to have called it *Caer Gwent*, or the White City; the Romans by whom it was first subdued named it *Venta Belgarum*; the Saxons, who were the next possessors, named it *Witanceaster*, which has become Winchester; in Latin deeds and by the Latin writers it is called *Wintonia*.

Winchester appears to have flourished under the Romans as long as they remained in the island. The massy walls, composed of flints and mortar, which inclosed the city, are considered to have been originally built by them. In 519 it was conquered by Cerdic the Saxon, who afterwards made it the seat of his government, and it continued to be the capital of the West Saxon kings till Egbert, the first king of the whole heptarchy, was crowned there, and then it may be said to have become the metropolis of England. Though sometimes plundered and in the possession of the Danes, it continued to be the capital of successive Saxon kings till 1013, when Sweyn, the Danish king, obtained possession of England, and Winchester became the seat of his government. After his death a fierce struggle ensued, and England is said to have been ultimately divided into two kingdoms; London became the capital of Canute, and Winchester of Edmund Ironside, till Edmund's death in 1016, when Canute became sole king and Winchester sole capital.

After the Norman conquest Winchester continued to be the capital, and during the reign of Henry I. attained the summit of its greatness. It was surrounded by strong walls; was defended by a castle built by William the Conqueror on the west, and by another, subsequently erected for the residence of the bishop, on the east; there was an extensive palace and numerous mansions of the nobility; a cathedral, three monasteries of royal foundation, and a very large number of churches; the suburbs extended a mile from the walls in every direction, to Worthy on the north, to St. Cross on the south, to Week on the west, and to St. Magdalen's Hill on the east.

In the reign of King Stephen Winchester began to 'fall from its high estate.' While Stephen was a prisoner in Gloucester Castle a contest commenced between his queen and the Empress Matilda, aided by their respective partizans, which was carried on for several weeks in the streets of Winchester, at the termination of which nearly the whole of the town north of the High Street, the royal palace, the abbey of St. Mary, Hyde Abbey, and about forty churches, were burnt down or laid in ruins. The death of Stephen, in 1154, put a stop to the calamities of civil warfare. Henry II. resided much at Winchester; he rebuilt the palace, and, to a considerable extent, renewed the city: but London seems to have found more favour in the eyes of subsequent kings, and Winchester lost its dignity as capital of the kingdom.

In the contests between Henry III. and his barons, Winchester suffered severely, both parties alternately gaining possession of its castles, and carrying on the work of destruction in the city. From this time Winchester, though partly upheld by the splendour of its cathedral and other ecclesiastical and scholastic establishments, seems to have declined rapidly. In the reign of Henry VI. a petition was presented to the king, which stated that 997 houses were uninhabited and seventeen churches were shut up. The work of spoliation was added to the other calamities of Winchester when Henry VIII. suppressed the monasteries in 1536 and 1537. The minor establishments were the first to suffer: the Sustern Spital, or convent of hospitable nuns, near King's Gate; the Carmelites, in King's-gate Street; the Augustines, near South-gate; the Dominicans, at East-gate; and the Franciscans, in Middle Brook Street. Subsequently the priory of St. Swithin was suppressed, and the greater part of its revenues were transferred to the dean and chapter of the cathedral; also Hyde Abbey, which had been rebuilt; and St. Mary's Abbey. The hospitals of St. John the Baptist, St. Mary Magdalen, and St. Elizabeth were either suppressed or plundered, and the structures pulled down or suffered to go to ruin.

The last of the great sufferings of Winchester were during the civil war between Charles I. and the parliament. The city adhered to the king. On the 29th of March, 1644, a battle was fought on Cheriton Down, in which Sir William Waller, the parliamentary general, was victorious, and his soldiers vented their puritanical rage on the stained-glass windows, the monuments, and relics of the cathedral. Waller soon carried away his troops to besiege Oxford, and Winchester was unmolested till after the battle of Naseby, when Cromwell was sent to reduce it under the authority of the parliament. After a week's siege of the city he performed his task, and he then undermined and blew up Winchester Castle, and laid Wolvesey Castle and the other fortified places in ruins. St. Mary's College escaped from injury, it is said through the firmness of one of the parliamentary officers, who was a Wykehamist. In 1666 a very large number of the inhabitants of Winchester were destroyed by the plague. An obelisk, with an inscription, commemorates the event. Charles II. took a liking to the place, and employed Sir Christopher Wren to design and erect a palace, which he intended for a summer residence, on the site of Winchester Castle. The king laid the foundation-stone, March 3, 1683, and the work was carried on with vigour till the death of Charles, in 1685, when a stop was put to it, and it has never been completed.

The city is built on the west bank of the river Itchin, on the slope of an eminence which rises gently to the east. The river is made navigable as a canal from Winchester to the sea. The city comprehends a large part of the buildings which constitute the town; the rest of it is in the liberty of the Soke. There are several parishes either totally or partially comprised within the city boundary; the rest of the town includes several other parishes and certain extra-parochial districts. The principal street, called the High Street, runs nearly east and west through the middle of the city, and is about half a mile long. Nearly all the other streets are either at right angles to the High Street or parallel to it. Most of the houses are good, though many are old, and the streets are well paved and are lighted with gas.

The liberty of the Soke encompasses the city on almost every side, and a small part is within the city. The Soke is divided into the East Soke and the West Soke. Part of the East Soke is on the east bank of the Itchin, over which there is a neat stone bridge of a single arch. Portions of the ditch and old walls of the city remain, but in many places houses have been built over the ditch, and extend into the Soke. The antient city had four principal gates, north, south, east, and west; of these only the West Gate now remains: it is a massy square tower over a wide gateway.

The area of the city and Soke liberty comprises 2250 acres, or rather more than 3½ square miles. In 1841 the number of houses comprised within this area was—1671 inhabited, 133 uninhabited, and 42 building; and the population was 10,732, of whom 5508 were males and 5224 females. The aggregate population of the parishes which may fairly be considered as constituting the city of Winchester as a collection of houses, was, in 1801, 6069; in 1811, 6681; in 1821, 7739; in 1831, 8712. The population of the city proper in 1821 was 5165; in 1831, 5280.

Winchester as a parliamentary borough returns two members to the House of Commons, as it did before the Reform Act. The number of 10*l*. householders registered under the Reform Act in 1832 was 465. In 1839-40 the number was 572, and there were 46 other qualified voters: making a total of 618. The total number on the register in 1835-6 was 576. The population of the parliamentary borough in 1841 was 9370.

The corporation, previous to the Municipal Reform Act in 1835, was styled 'the mayor, bailiffs, and commonalty of the city of Winchester.' The governing charter was 30 Eliz., and the corporate body consisted of a mayor, six aldermen, twenty-four men, and an indefinite number of freemen, generally amounting to about 100. There was also a recorder, two bailiffs, and several other officers. By the Municipal Reform Act the borough is divided into three wards, with six aldermen and sixteen councillors. The number of burgesses, or municipal electors, in 1837 was 817. The total annual expenditure of the borough in 1840-41 was 2163*l*. 17*s*. 6*d*., the chief items of which were —494*l*. 15*s*. 1*d*. for police and constables; 378*l*. 10*s*. 10*d*. for salaries and other allowances to municipal officers; 350*l*. for gaol, and maintenance, &c. of prisoners;

69*l.* 10*s.* 10*d.* to coroner; 63*l.* 1*s.* 6*d.* for public works; 61*l.* 15*s.* 1*d.* for printing, advertising, &c.; 85*l.* 8*s.* 11*d.* for law expenses. There are charters of Henry II., Richard I., John, and Elizabeth. The franchises of the city were surrendered to Charles II. 28th June, 1684 (36 Chas. II.), and the surrender was enrolled in the court of Chancery, March 12, 1688 (4 James II.). A new charter was granted September 15, 1688 (4 James II.), which recites the surrender, and then regrants the franchises in nearly the words of the charter of Elizabeth: this charter was confirmed and extended by another, Nov. 6, 1688.

The bishopric of Winchester extends to Hampshire, Surrey, Guernsey and Jersey, and two or three benefices in Wiltshire and Sussex. The net yearly income of the bishop, as given on the average of three years preceding 1831, was 11,151*l.* By the same average the net income of the whole of the benefices in the bishopric was 143,614*l.*, and the annual stipends paid to curates amounted altogether to 19,858*l.* The gross yearly income of the dean and chapter of Winchester cathedral was by the same average 15,573*l.*, and the average yearly payments charged upon and paid out of this income was 2790*l.*; leaving a net income of 12,783*l.*

The town has no trade of consequence, but the statements of population show that it is in a state of gradual improvement. Being the centre of an agricultural district, it has a good corn-market, which is well attended. Few cattle are sold, but there is a large annual sheep-fair. Several local acts of parliament have been obtained for the improvement of the city and suburbs, most of which relate to the navigation of the Itchin.

Winchester Cathedral, which is one of the largest cathedrals in England, is in many respects one of the most interesting. The entire length is 545 feet. From the west entrance to the choir is 356 feet; the length of the choir is 135 feet; and the Lady Chapel, at the east end, is 54 feet, which makes the total length. As a distinct part, the nave is 250 feet long, 86 feet wide including the aisles, and 78 feet high. The choir is 40 feet wide. The length of the transepts is 186 feet. The square of the tower is 48 feet by 50, and the height is 138½ feet, which is only about 26 feet above the roof: of course it has a low and squat appearance, and was perhaps not intended to contain bells, but only to throw additional light into the choir, and increase the interior effect by additional height: it is said to have been without floors till the reign of Charles I., when the present bells were suspended.

Viewed from the exterior, the west front is by far the most imposing part of the building: the deeply recessed entrance doorway, with the ornamental gallery above it; the large and beautiful window, the rich effect of the mouldings, the buttresses, the pinnacled towers, and the gable termination surmounted by the canopied statue of Wykeham, cannot be looked at without great admiration. No other part of the exterior is at all equal to this part. On entering the building, the view from the west end to the east is magnificent: the vast length of vista formed by the nave and choir, with the splendid ceiling, the columns and arches on each hand and overhead, and the eastern window 'casting its dim religious light' from behind the choir, produce a combined result of solemnity and beauty equalled by few cathedrals in Europe. The spectator, while he admires the height of the pillars of the nave, is struck with their wide circumference and massy appearance, and his admiration is perhaps rather increased than diminished when he learns that they are the Saxon or early Norman pillars inclosed in a Gothic casing of clustered columns. With a similar adaptive skill, the semicircular arches have been converted by intersections into pointed arches, and the original Saxon nave thus made Gothic.

The original structure of Winchester Cathedral, which is said to have been erected by Lucius, a British king converted to Christianity, was destroyed by the pagan Cerdic, and rebuilt by one of his successors, the Christian Kinegils. Some of the most substantial walls and pillars of the present structure were erected by St. Ethelwold, bishop of Winchester, who lived to finish it, and to dedicate it to St. Swithin in 980. In 1079, having been much damaged by the Danes, it was repaired by Bishop Walkelyn, who built the present tower, with part of the nave and transepts, and in 1093 re-dedicated the church to St. Peter, St. Paul, and St. Swithin. The east end, from the great east window, about a century afterwards by Bishop Godfrey de Lucy, and the whole of the west end was repaired and renewed by the successive bishops Edyngton and Wykeham. The grandeur of the west front is due to Wykeham. The part between the tower and De Lucy's improvements at the east end was rebuilt in the early part of the sixteenth century by Bishop Fox, whose statue, under a canopy, terminates his improvements to the east. There have been many recent restorations and repairs of the cathedral, which have been executed with good taste, at an expense of from 40,000*l.* to 50,000*l.* Among these may be especially mentioned the construction of a choir-screen of stone, in the pointed style, to supply the place of the elegant but incongruous composite screen erected by Inigo Jones.

Among the monuments in the cathedral may be mentioned the tomb of William Rufus, of plain grey stone, without inscription, in the choir; the six mortuary chests of wood, carved, painted, and gilt, in which Bishop Fox deposited the remains of Saxon kings and other distinguished persons, which he transferred from the decayed lead coffins in which they had been buried; and especially the beautiful chantries or oratories of the bishops Edyngton, Wykeham, Beaufort, Waynflete, and Fox.

Over the altar is a large painting by West of the Rising of Lazarus from the Dead, which is considered one of his best works.

The present establishment of Winchester Cathedral, which, after the dissolution, was dedicated as a church to the Holy Trinity, consists of one dean, twelve prebendaries, six minor canons, ten lay clerks, or singing men, eight choristers, and other members. The last prior was William Basyng, who was made first dean, and died in 1548.

Winchester College (*St. Mary's College*), which is outside the city boundary on the south-east, was founded by William of Wykeham in 1387, on the site of 'the great grammar-school of Winchester,' at which he had been educated. The college was founded and endowed by Wykeham as a preparatory college to New College, Oxford, which he had founded a short time before. The college was opened March 28, 1393, for a warden, 10 fellows, 3 chaplains, 3 clerks, a master, an usher, 70 scholars, and 16 choristers; in all 105 on the foundation. An election is held annually by the wardens of New College and Winchester College, two fellows of New College, and the sub-warden and head-master of Winchester College, to supply vacancies which may happen in New College during the subsequent year. Besides the scholars on the foundation, there are generally upwards of 100 boys not on the foundation, who are lodged in a spacious quadrangular building contiguous to the college.

The entrance to Winchester College is by a gateway into an outer court, which leads by another gateway under a lofty tower to an inner square court, each side of which is 32 yards. The chapel and hall form the south side of this court; they are beautiful specimens of Gothic architecture, worthy of the founder. The cloisters adjoin the chapel, and form a square, each side of which is about 132 feet. In the centre of the area of the cloisters is the library of the college, which was originally erected and endowed as a chantry by John Fromond in 1430. The chaplain was removed at the Reformation, and the building remained unappropriated till about 1629, when it was converted into a library by the liberality of Dr. Pinke, warden of New College. It is a handsome building, corresponding in style with Wykeham's original erections. The school-room, which was built by a subscription among the Wykehamists in 1687, at a cost of 2592*l.*, is 90 feet by 36 feet, and high in proportion. Over the entrance is a bronze statue of Wykeham, by Caius Gabriel Cibber, the father of Colley Cibber, which he modelled and cast at his own expense, and presented to the society. There is also a hall, 50 feet by 30, in which the commoners dine.

The ruins of *Wolvesey Castle* are at a short distance south-east from the college. This castle, once the residence of the bishops of Winchester, was built, in 1138, by Henry de Blois, brother of King Stephen and bishop of Winchester, on the site of a former palace of the Saxon kings. It was a place of great strength till it was dismantled in the reign of Henry II. It continued to be the residence of the bishops till it was demolished by Cromwell in 1646.

The episcopal palace, begun by Bishop Morley, in 1684, and completed by Bishop Trelawny, was suffered to go to arranged the library of Cardinal Archinto, who gave him free apartments, but no salary. He went also in the same year to Florence, to make a catalogue of the cabinet of cameos, &c. of the late Baron Stosch, which detained him nine months ('Description des Pierres gravées du feu Baron de Stosch'). Upon his return to Rome, the Cardinal Albani offered him the place of his librarian and custos of his gallery of antiquities, with apartments free, and a monthly salary of ten scudi: a situation exactly suited to the taste of Winckelmann, and which, with his salary from Dresden, which was still continued, enabled him to live at ease and in comfort; for about thirty shillings a week and a free lodging was, in Winckelmann's time, a good bachelor's allowance at Rome.

In 1762 his 'Remarks upon the Architecture of the Antients' ('Anmerkungen ueber die Baukunst der Alten') was printed in Germany. In 1763 he received the appointment of Antiquario della Camera Apostolica, with a salary of about 15 scudi per month; he had also from the Cardinal Albani, who succeeded in 1761, after the death of Cardinal Passionei, to the post of librarian of the Vatican, a retaining salary of 50 scudi per annum, for the first vacancy in the Vatican library. In 1764 appeared at length, at Dresden, his 'History of Antient Art' ('Geschichte der Kunst des Alterthums'). About the same period appeared his 'Sendschreiben ueber die Herculanischen Alterthümer,' and 'Nachrichten von den neuesten Herculanischen Entdeckungen.' He now became known throughout Europe, was elected a member of several foreign scientific and literary societies, and acquired many friends and some enemies, especially among dilettanti, who found some of the critical opinions and theories of Winckelmann particularly obnoxious. In 1765 the king of Prussia offered Winckelmann, through Colonel Guichard, the superintendence of the library and museum of antiquities of Berlin, but as Winckelmann demanded a salary of 2000 dollars (300*l.*), double what the king offered, the negotiations ceased. In 1766 appeared his 'Monumenti Antichi Inediti,' with 227 plates; in 1767, 'Anmerkungen zur Geschichte der Kunst,' as a sort of supplement to his History; in which also he corrected an error regarding two pictures which he had been led to believe were antient by the painter Casanova, but which that person himself had painted.

In 1768 he revisited Germany with the sculptor Cavaceppi, after an absence of twelve years, but he had no sooner passed the Alps than he complained of the chilling appearance of everything around him, and wished to return to Italy. Cavaceppi however with much difficulty persuaded him to go to Munich, where he was well received, and even as far as Regensburg; but Winckelmann would not go one step farther, and he changed his course for the road to Vienna, on his way back to Italy. His friend accompanied him, and they arrived on the 12th of May at Vienna. In Vienna the greatest attentions were paid to him, and several persons of distinction endeavoured to persuade him to prosecute his journey to Berlin—his original destination—but all failed. Winckelmann left Vienna for Trieste in the beginning of June: the last portion of his journey he made in company with an Italian scoundrel of the name of Francesco Arcangeli. This man had been cook to the Count Cataldo in Vienna; he perceived the simplicity of Winckelmann's character; he gained his confidence, and Winckelmann showed him a gold medal and other presents of value which he had received at the court of Vienna. At Trieste he was obliged to wait for a vessel to Ancona, and as he was sitting in his room at his inn, on the 8th of June, his travelling companion came to take leave of him, telling him that he was obliged to go into the Venetian State on business, and he requested him before he went to let him again look at the medal which he had received at Vienna. Winckelmann, as unsuspicious as a child, immediately complied, when the villain suddenly attacked him with a knife; a struggle ensued, and Winckelmann fell with five stabs in the belly. At this moment a child, with whom Winckelmann had been playing, knocked at the door; the murderer fled without his booty, but he was afterwards caught and executed. Winckelmann died seven hours after he had received the wounds, in the 51st year of his age. He bequeathed his property, with the exception of a small sum of money, to the Cardinal Albani. The manuscript additions and notes he had prepared for the new edition of his 'History of the Arts of Antiquity,' were deposite the Imperial Academy of the Arts at Vienna, and in a new edition of the work was published there by Academy, but it was so carelessly done that it created neral disappointment. There are several portrait Winckelmann, but the best is that by Maron in the gal at Weimar; an engraving of it is prefixed to the Ita edition of the 'History of Antient Art,' by Fea, and to German Dresden edition of Winckelmann's comp works, in eight volumes. Angelica Kauffman also pain his portrait, an etching of which is prefixed to Knir 'Harzmalerei der Alten' ('Resin-painting of the tients').

Winckelmann's chief work is his 'History of Ant Art,' but it is very incomplete, as he himself was aware; nor can it be looked upon as any more than w the Germans call 'Ideen zur Geschichte,' and had he l he would most probably have left a very different w As it is however, when we consider that he had to pion his own way through an untrodden path, it is a wor great merit, although to him, owing to the vast stor classical learning which he brought to the task, it have been a labour of comparatively easy accomplishm A history of antient art it is not: it is rather a crit account of the remains of antient art; and in some p certainly hypercritical, and in others a mere elaboratio theories. Painting is little more than touched upon. reputation of Winckelmann was limited to the learned fore Goethe wrote his eloquent dissertation upon the racter of his genius and writings, which was publishe 1805 at Tübingen, together with his letters to Beren twenty-seven in number, and a sketch of the history of arts of the eighteenth century, under the title of 'Wink mann und sein Jahrhundert.' Five collections of Win elmann's letters have been published at different perio amounting in all to four hundred and twenty-five.

One consequence of the writings of Winckelmann, that a productive one, is, that they have led many schol and artists to turn their attention to a subject before least for a period, comparatively neglected; and the res has been several learned and valuable works, both Fren and German, upon the history and archæology of art. Th subject however is still far from being exhausted, and these works, which treat more particularly of sculpture and architecture, little has been added, either critically or historically, with regard to the archæology of painting, what may be gathered from the old works of Junius and Carlo Dati, if we except a few special and speculative treatises upon the technical practice of the antient painters: a critical and technical history of painting, as concise and comprehensive whole, remains yet to be accomplished.

Some of Winckelmann's views have very properly met with strong and persevering opponents, as, among many others, Lessing, the Marquis Galiani, and the Abate Fea, whose Italian edition of Winckelmann's 'History' however was for a long time considered the best: there is also a French translation with Fea's notes. In 1808 a complet edition of his works, with the exception of the 'Monu menti Antichi Inediti' and the catalogue of Baron Stosch' cabinet of gems, was commenced to be published at Dre den, edited by Fernow, Meyer, Schulze, and Siebelis was completed in 1820, in 8 vols. 8vo., including index This edition contains a few short treatises which have n been mentioned in this notice, the biography of which h been taken from the short Life of Winckelmann prefixed the Dresden edition of his works.

WIND is a motion of the atmosphere independent that which it has in consequence of the diurnal and nual movements of the earth. The latter motion be performed in a part of space which may be considered devoid of any resisting medium, the particles of air su no partial displacements on that account; and the frict of the particles against each other, and against the ea which they surround, must have long since brought diurnal movements of the atmosphere and earth to a st of equality: thus the angular velocity of the air on parallel of terrestrial latitude being the same as that o observer on the same parallel, the air would seem to b rest about him. But if, from any disturbance of the eq librium of the atmosphere, the particles should move rapidly than the observer from west to east, or should quire movements in some other direction, then the tion of a wind would be experienced. The tides which ke place in the atmosphere by the attractions of the sun, oon, and planets on the particles of air giving rise to fferences in the heights of the vertical columns, they ust necessarily cause inequalities of pressure in horintal directions, and thus produce winds or currents of r; but it has been shown by La Place that these currents e scarcely sensible; and such attractions are by no means equate to the production of the winds which are observed the earth's surface.

The phenomena and causes of the great currents of the nosphere have been already described and explained e the references at the end of this article); therefore only winds of a regular character which remain to be ticed are the land and sea breezes which occur diurnally the coasts and in the islands of the tropical regions, and periodical winds which are observed to prevail in ne parts of Europe. The first are most probably caused the inequality of the sun's action on the land and water; both, by the tendency of the atmosphere to preserve a te of nearly uniform density. It is well known that the 's rays in passing through a glass vessel filled with a nsparent fluid communicate to the latter very little heat, that if the fluid be rendered opaque, or an opaque ly be introduced into the vessel, the temperature is seny raised in consequence of the caloric combining more dily with the opaque than with the transparent material. w, from this cause, during the day the land acquires a perature higher than that of the neighbouring ocean: atmosphere above it consequently becomes rarefied, from about 9 A.M. the air from the sea flows towards land, to occupy the partial vacuum there produced. proportion as the heat of the land goes on increasing, force of the sea-breeze also increases, and this conues till 2 or 3 P.M. After that time the temperature er the land diminishes more rapidly than over the sea, the heat more readily disengages itself from the land n from the water, and about sunset the breeze from the ceases. During the night, the land continuing to cool, e air over the sea becomes comparatively warmer and ore rarefied, and a breeze from the land takes place: is wind augments in force till near sunrise, when the mperature of the earth begins to increase, and about A.M. the wind blows from the sea as at first. These nd-breezes diverge in every direction towards the coasts f the tropical islands from the high lands in their interior. Ir. Redfield modifies the hypothesis above stated by ssuming that when the stratum of air lying on the surface f land which ascends towards the interior of a country ecomes rarefied by the sun's heat, it is forced by an xcess of pressure at its lowest part to move up the slope; nd during the night the stratum of air on this inclining urface acquiring greater density, its gravity causes it to descend towards the sea. (*Amer. Journal of Science*, vol. xxxiii., No. 1.)

The etesian winds (so called from ἐτησίαι, *annual*) is a designation formerly given only to those which every summer blow during six weeks over the countries bordering the Mediterranean, but it has since been applied to other periodical winds, as those which blow on the coast of Holland. They commence in the Levant about the middle of July, rising at 9 A.M., and continuing during the day-time only: the direction of the current of air is from orth-east to south-west; and it is probably caused by the arefaction of the atmosphere nearly under the tropic of ancer, in consequence of the heat of the sun at that eason. Pliny states that, in Spain and Asia, the etesian inds blow from the east; and he adds that they also take lace in winter, when they are called ornithian winds: ese are however said to be more gentle than the others, d to continue during nine days only. (*Nat. Hist.*, lib. ii., 47, &c.)

Winds depend in a great measure on variations in the mperature of the atmosphere; they are therefore not bject to any known laws, and, except in a few cases, eir phenomena do not admit of explanation. It may be served however, in addition to what has been said reecting the *trade* and other regular winds, that those hich prevail in the temperate zones are probably the sults of currents proceeding about the earth from the opical regions. Mr. Dove suggests, in the 'Philosophical agazine' for September, 1837, that when the sun is on e meridian of any place, as London, situated beyond those regions, the currents of heated air which proceed from the point vertically under him must arrive at that place from the south earlier than at any other place eastward or westward of it on the same parallel of latitude. But in proportion as the sun becomes successively vertical at different points westward of the meridian of London, the currents of air, in describing great circles of the sphere, arrive later, and in a direction from the westward of south; and when, during the summer, he is vertically over a point about 60 degrees west of London, that is, in the evening, they arrive nearly from the west. At midnight, when the sun is on the meridian under the horizon, the current of air passing over the north pole is felt as a north wind; and, after this time, the currents coming from points having less than 180 degrees of longitude eastward are felt as easterly winds, which become due east in the morning when the sun is about 60 degrees eastward of the meridian. In this order the movements take place daily, except when the currents are disturbed by accidental circumstances or by the influence of currents which proceed from the pole to the equator in order to supply the place of the heated air which ascends from the surface of the earth between the tropics.

The sun is not the sole cause of the currents which are observed in the atmosphere, for they often arise from the condensation of the aqueous vapours which are constantly rising from the surfaces of rivers and seas. Such vapours, being lighter than air, ascend in the atmosphere, carrying with them a quantity of caloric, which escapes on arriving in a region where there is less of this element than at the surface of the earth; and the vapour being then reduced to a state of water, a partial vacuum is produced, into which the neighbouring air rushes. The caloric is, at the same time, conveyed by the wind with the drops of water, and thus the region in which the rain is falling is sometimes warmer than those which surround it. Rain-winds are produced by the air which descends to the ground with the globules of water; the particles of air being disengaged from the globules on the latter striking the ground, are then driven off, with considerable force, in every direction from the place where the rain is falling. In explaining the cause of the cold and dry state of the atmosphere which in the north-western parts of Europe usually accompanies a north-east wind, M. Monge observes, in the 'Annales de Chimie,' that the currents of air from that quarter, having passed over mountain-lands, experience, from their elevation, a diminution of the general atmospherical pressure, in consequence of which they lose part of the water which they held in solution, and thus they acquire greater specific gravity. Hence, in advancing over the lower lands of Poland and the north of Germany, the weight of the atmospherical column is increased; the mercury then rises in the barometer tube, and the upper strata of air, whose temperatures are lower than that of the air near the earth, descend towards the ground. The air in these strata, being far from the point of saturation, causes also an abundant evaporation of the water in the lower regions of the atmosphere; and this, by carrying off caloric, contributes greatly to produce the degree of coldness which is experienced.

All mountain districts are subject to sudden and violent gusts of wind from the interruptions which the ridges of high land create to the general currents of the air; but that which is called the Helm-wind at Crossfell in Cumberland is one of the most remarkable of these phenomena. It occurs at uncertain times between the end of September and the month of May, and occasionally, though rarely, in summer. It is stated that, when not a breath of wind is stirring, and scarcely a cloud is to be seen, there is suddenly formed a line of clouds, called the 'Helm,' extending nearly north and south along the top ridge of the mountains; and nearly parallel to this, another line of clouds, called the 'Bar,' forms itself: the first of these lines of clouds is well defined at its western, and the other at its eastern edge; and the lines unite together at their northern and southern extremities so as to contain between them an elliptical space whose length, in the north and south direction, varies from 8 to 30 miles, and its breadth, in an east and west direction, from half a mile to 4 or 5 miles; the highest point of the ridge of mountains being about the middle of the first line of clouds. In a few minutes after the formation of the Helm a violent wind begins, within the space between the clouds, to blow from some eastern point of the compass, but generally from due east to due west: its force is such as to break trees, disperse the grain in stacks, and overturn a cart with its horse: it continues frequently for nine successive days, and its noise is said to resemble that of the sea in a violent storm, but it is seldom accompanied by rain. No satisfactory hypothesis has yet been offered to account for the phenomenon; but that which seems most probable is, that the air from the coast of Northumberland, being cooled as it rises to the summit of the mountain and there condensed, descends from thence with great force, by its gravity, into the district at the foot of the western escarpment. (Rev. J. Watson, in the *Reports of the British Association*, vol. vii.)

If we contemplate the influence of the winds in the economy of human life, we shall find them highly beneficial. Though storms are often destructive to life and property, both at sea and land, yet they contribute greatly to preserve the health of animated beings by the dissipation of noxious exhalations: the winds impel the clouds from place to place, and thus diffuse over great tracts of country the rains which contribute so much to fertilize the ground. Wind is extensively employed in giving motion to machinery; and, till the recent application of steam, it was the only power by which ships were transported across the ocean between different regions of the earth. [ATLANTIC OCEAN; MONSOONS; TRADE-WINDS; WHIRLWINDS.]

WINDAGE is the quantity by which the bore of a gun, mortar, or howitzer, exceeds that of the shot or shell which is to be discharged from it.

The deviations of shot and shells from a truly spherical figure, and the inequalities in the bore of the ordnance, were formerly considerable; and on these accounts it was necessary to have a sufficient difference between the presumed diameters of the ball and bore, in order to ensure the possibility of making the former enter into the latter: it followed from the greatness of this difference, which in the British service was about one-twentieth of the diameter of the bore, that much of the fired gunpowder escaped without producing any impulse on the shot, and that the latter was driven from one part of the surface of the bore to another; so that, on being expelled from the gun, it deviated widely from the intended direction of its flight.

From the year 1775, when Dr. Hutton made his first experiments on the velocities of shot, the disadvantage attending a great windage was known, and a diminution of its quantity was proposed: but the precise amount of the force lost by it was not ascertained till the years 1784 and 1786, when experiments were made for the purpose, in part, of determining that important circumstance. From these it appeared that about one-fifth of the charge of powder was lost by a windage equal to ·06 inch, or $\frac{1}{33}$ of the calibre (= 2 inches), and a further loss, amounting to between $\frac{1}{7}$ and $\frac{1}{8}$ of the charge, was occasioned by an increase equal to one-tenth of an inch above the former windage.

The correct geometrical forms which are now given to the balls, and also to the bores, permit the windage to be reduced much below its former value; and the following table contains, in fractions of the calibre, that which is now allowed in this country for the shot and shells appertaining to some of the heavier natures of ordnance:—

For 10-inch mortars and howitzers	$\frac{1}{33}$ to $\frac{1}{30}$
For 68-pounder carronades (diam. of bore = 8·05 in.)	$\frac{1}{50}$ to $\frac{1}{40}$
For 32-pounder guns (diam. of bore = 6·41 in.)	$\frac{1}{31}$ to $\frac{1}{24}$
For 24-pounder guns (diam. of bore = 5·823 in.)	$\frac{1}{33}$ to $\frac{1}{24}$

WINDAU is a seaport in Courland, at the mouth of the river Windau, which rises in Wilna, traverses Courland in a northern direction, has a fall or cataract of some yards near Goldingen, and empties itself into the Baltic at Windau, where it forms a small harbour; but there is a capacious roadstead, well secured by sand-banks which break the swell of the sea. Windau is a small ill-built town, with unpaved streets: there is an antient castle, situated on an eminence, the church of which is now the parish church. The population hardly exceeds 1200 or 1300, mostly merchants and shopkeepers. There is a productive fishery at the falls of the Windau. About 100 ships commonly visit the town, which take in cargoes of flax, hemp, linseed, hempseed, corn, timber, raw hides, tallow, and salt meat.
Windau appears to have been formerly a pla
importance than at present. The Estates of Co
to meet there. (Hassel; Stein; Cannabich.)

WINDEL-ELF. [BOTHNIA.]

WINDERMERE. [LANCASHIRE; WESTMO

WINDHAM, WILLIAM, was born on the 3
1750, in Golden Square, London, and was th
of Colonel William Windham, of Felbrigg i
The Windhams had been settled in Norfolk eve
eleventh or the beginning of the twelfth centu
their name from the town of Wymondham,
Windham, where they resided till the midd
fifteenth century, when one of Mr. Windham'
purchased the property at Felbrigg. Mr. Wi
his father when he was only eleven years old. H
placed at Eton at the age of seven, and was cont
by his guardians who were Dr. Dampier, th
master at Eton and afterwards dean of Durha
the actor, Mr. Price of Hereford, and Dr. Stilli
he was sixteen. He was then sent for a year
versity of Glasgow, where he applied himself
diligence to the study of mathematics, a study f
retained his fondness and which he pursued w
in his later life. In September, 1767, he was e
gentleman-commoner at University College, O
left Oxford in 1771, having in the mean time
offer from Lord Townshend, an intimate fri
father's, when appointed lord-lieutenant of Irel
with him to Ireland as his private secretary. At
of his life so marked was the future statesman's i
to politics, that, as we are told by Mr. Amyot,
pher, on Mr. Windham's own authority, it was
joke of one of his contemporaries, that 'Wind
never know who was prime minister.'

On leaving Oxford, Mr. Windham went a
1773 he joined an expedition of discovery then s
under the command of Commodore Phipps, after
Mulgrave, towards the north pole. Illnes
obliged him to land on the coast of Norway, an
the expedition.

Mr. Windham's first appearance as a public s
in connection with politics, was at a county-m
at Norwich, on the 28th of January, 1778, in o
on foot a subscription in aid of government, for
the war with the American colonies. Lord
having proposed, and the Hon. Henry Hobart,
the earl of Buckinghamshire, having seconded t
of a subscription, Mr. Windham came forward
to oppose it, and to denounce the conduct of the
war. Two years after, the interval having been
Mr. Windham almost entirely abroad, the mem
speech led to his being put in nomination, in h
and without his knowledge, for the city of Norw
general election of 1780. He happened to
Norwich, on his return from abroad to Felbrigg,
rant of the use which had been made of his n
days before the poll commenced. He then enter
into the contest, but he was not elected: thoug
tion on the poll was, under all the circumstance
factory as to induce him to reserve himself for N
a future occasion.

In 1782 he declined an offer to allow himsel
in nomination for Westminster whenever a
should arise. After his return from abroad, and
cessful contest for Norwich, he lived principally
mixing much in literary and political circles.
a member of the celebrated Literary Club, of wh
son and Burke were leading members. His poli
pathies were with Burke and Fox, and generally
section of the then opposition which owned Lord
ham for its leader. On the formation of the
ministry in 1783, of which the Duke of Portlan
nominal head, and Fox and Lord North the most c
members, Mr. Windham received the appointme
secretary to the earl of Northington, who was
lord-lieutenant of Ireland. Mr. Windham howeve
his office in August of the same year. It is
Hardy's 'Memoirs of the Earl of Charlemont,'
reason of his resignation was a distribution of pat
Lord Northington in favour of the old court pa
opposition to the views of Lord Charlemont and t
in Ireland. The coalition-ministry was itself
before the close of the year 1783. In March o

ceeding year Mr. Pitt dissolved parliament, and Mr. Windham again contested Norwich, and this time with success.

Mr. Windham made his first speech in parliament on the subject of the Westminster scrutiny, on the 9th of February, 1785. The particular motion was, to order the high bailiff to make an immediate return: it was opposed by Mr. Pitt, to whom Mr. Windham replied, and he was followed by Mr. Fox, who congratulated the House on 'the accession of the abilities they had witnessed.' Mr. Windham was appointed one of the managers of the impeachment of Warren Hastings, the particular charge intrusted to him being the breach of a treaty made with the Nabob Fyzoola Khan in 1774, after an invasion of his territories by the Company's troops, and the payment by the Nabob of the sum of 150,000*l*. on ratifying the treaty. On the Regency questions which arose in 1788 out of the king's illness, Mr. Windham took a decided and zealous part in favour of the hereditary right of the Prince of Wales to the regency, and against any restrictions on his power. When this parliament, Mr. Windham's first parliament, was dissolved in June, 1790, he had already acquired a ripe political reputation.

Mr. Windham was again elected for Norwich in the new parliament. In the division of the Whig party, which was shortly after caused by the events of the French Revolution, he took part with Mr. Burke, Lords Fitzwilliam and Spencer, and the Duke of Portland, and zealously supported the war with France. In 1794, the Duke of Portland, Lords Spencer and Fitzwilliam, and Mr. Windham joined Mr. Pitt's cabinet, Mr. Windham receiving the appointment of secretary-at-war. He held this office until February, 1801, when he resigned, together with Mr. Pitt, Lord Loughborough, Lord Grenville, Lord Spencer, and Mr. Dundas, because the king would not consent to the measures for the relief of the Roman Catholics in Ireland which they considered indispensable to the success of the legislative union. During the seven years that Mr. Windham had been in office, he had introduced many useful reforms into the administration of the army. On the 10th of July, 1798, he had married Cecilia, a daughter of Admiral Forrest, a very gallant and distinguished officer; and this marriage added much to the happiness of his life.

Mr. Addington was placed at the head of the new administration, which immediately applied itself to bringing the war to a termination, and in the autumn of 1801, during the prorogation of parliament, arranged the preliminaries of the peace of Amiens. Mr. Windham took a very prominent part in opposing this peace. On the 13th of May, 1802, he moved an address to his majesty, deploring the sacrifices which had been made by the treaty, and the increase of territory and power which it had confirmed to France; a similar address was moved in the House of Lords by Lord Grenville. The address was rejected in both Houses by overpowering majorities. Mr. Windham's course with reference to this peace caused the loss of his re-election for Norwich, on the dissolution of parliament in the summer of 1802. An attempt was made, on his being defeated at Norwich, to bring him forward as a candidate for the county of Norfolk, and a subscription was immediately set on foot by his friends to effect this object: but Mr. Windham declined the offer, and, through the interest of the Grenville family, he was elected for the borough of St. Mawes.

The peace of Amiens was not long-lived: after the renewal of the war in 1803, Mr. Addington's administration, which had begun with general support in parliament and with the confidence of the country, was suddenly shaken materially. Mr. Pitt and Mr. Fox had both advocated the peace of Amiens, and the former especially had given Mr. Addington effective support at the outset of his administration. But when the war broke out again, a general opinion prevailed that the ministry was incompetent to carry it on: and both Mr. Pitt and Mr. Fox joined, and by their influence largely increased, an opposition that had been before confined to the small party led by Mr. Windham in the House of Commons and by Lord Grenville in the House of Lords. A series of divisions, on questions all more or less relating to the conduct of the war, in which the minister's majority gradually dwindled down to an exceedingly small one, caused Mr. Addington's resignation in April, 1804. Mr. Pitt was commissioned by the king to form a new ministry, and endeavoured to form one which should comprise Mr. Fox as well as Lord Grenville and Mr. Windham. But the king would not hear of Mr. Fox's name: and on Mr. Pitt yielding to the royal objection to that statesman, Mr. Windham and Lord Grenville refused to join his ministry.

Mr. Windham was now again united in opposition with his old political friend and the friend of his school-boy days, Mr. Fox, against a ministry which, formed exclusively out of Mr. Pitt's old connection, could obtain the confidence of neither. The death of Mr. Pitt in 1806 brought him into office, in Lord Grenville's administration of the Talents, when Mr. Fox was made foreign secretary, and Mr. Windham secretary for the war and colonial departments. He applied himself diligently, on entering office, to the consideration of the best means of increasing the military force of the country: and on the 3rd of April, 1806, he opened his views on this question at great length to the House of Commons, in moving for leave to bring in a bill to repeal the Additional Force Act. His chief object was to better the condition of the soldier, and make the army a more inviting profession. The object on repealing the Additional Force Act was to remove the obstacles created by its high bounties to the ordinary recruiting service. Mr. Windham's various particular proposals for increasing the pay and pensions of officers and soldiers, and for shortening the time of service, were carried into effect by large majorities. Mr. Windham's period of office ended on the 25th of March, 1807, when the administration of the Talents came to an end, owing to a disagreement with the king on the subject of a proposal to give the Roman Catholics privileges in the army. Mr. Windham had shortly before declined an offer of a peerage, and at the general election in the preceding autumn had been returned for the county of Norfolk, but having been petitioned against, and having lost his seat for that county on petition, had taken his seat for the borough of New Romney, for which place he had also been elected.

The new ministry again dissolved parliament; and, by the interest of Lord Fitzwilliam, Mr. Windham was now chosen for Higham-Ferrars. In the session of 1808 Mr. Windham strongly denounced the expedition against Copenhagen, and, in the subsequent session, the ill-fated Walcheren expedition. On the resignation of Lord Castlereagh and Mr. Canning, after the failure of the Walcheren expedition, and on the consequent offer of Mr. Perceval to Lords Grey and Grenville, which they ultimately declined, there was a prospect of Mr. Windham's return to office, which he contemplated with no pleasure. 'I have not virtue enough,' he writes to Mr. Amyot, to whose biographical sketch, prefixed to the collection of Mr. Windham's speeches, we are principally indebted for this account, 'to wish the ministers out, at the risk of being one of those who may be called upon to succeed them. . . . . If I could always be as well as I am here, if Downing Street were in Felbrigg Park, or a dozen miles from London, I should think much less about it; but the being called upon to read and write, to consider and decide, when one is exhausted and worn down with one's duty in parliament, has something in it that hardly any advantages or gratifications can repay; and I am afraid my inabilities in point of health and strength are not got the better of, even in the two years that have elapsed since I was last in office.' And again, 'I have had letters, with copies of the correspondence, both from Lord Grey and Lord Grenville. I should think that the ministers will contrive to go on, and I cannot but hope it: for, in the other event, I am sure I don't know what is to be done. . . . I feel but little stomach to return to office, unless I can have *carte-blanche* as to my military plans; and even then the whole is so *be-devilled*, that there is no restoring things to their original state.' Ill-health had much to do with this disinclination for official life. He had been for some time past a constant sufferer from rheumatic complaints. In May, 1810, he found himself afflicted with a large tumour in the hip, which, having been neglected till then, caused him much alarm, and ultimately brought on his death. In July of the preceding year he had, on his return home one evening, seen a house on fire in Conduit Street, dangerously near to that of his friend Mr. Frederick North, who was at the time abroad, and whose valuable library was thus threatened with immediate destruction, and had given most zealous assistance in carrying away

Mr. North's books, succeeding in saving about four-fifths of them before the house was consumed. During his exertions he fell and hurt himself in the hip; and this was the origin of the tumour. In May, 1810, it was found necessary that he should undergo an operation for the extraction of the tumour. The operation was performed on the 17th of that month; at first everything went on well, but symptomatic fever afterwards came on, and he then grew daily worse, until the 3rd of June, on which day he died.

Mr. Windham has left behind him a reputation not so brilliant as those of his contemporaries, Pitt, Fox, and Burke, yet one which is generally associated with theirs, and not unworthy of the association. His was a refined and highly cultivated mind, and if his eloquence had not the power or force to make it, as Mr. Canning justly said, 'the most commanding' they had ever heard in the house, it was 'the most insinuating.' His political life was marked throughout by a high sense of honour; and if his opinions may in some respects have erred on the side of moderation, as for instance on the subject of Parliamentary Reform, which, first and last, he opposed, he had always the courage to avow opinions which placed him in opposition to those with whom he usually acted, and exposed him to popular disapprobation. He was an accomplished scholar and mathematician. Dr. Johnson, writing of a visit which Windham had paid him, says, 'Such conversation I shall not have again till I come back to the regions of literature, and there Windham is "inter stellas luna minores."' In a word, Mr. Windham has been described, and the description has been generally adopted as appropriate, as a model of the true English gentleman.

His speeches have been collected and published in 3 vols. 8vo., with a Life prefixed, by Mr. Thomas Amyot, who was for some years his private secretary.

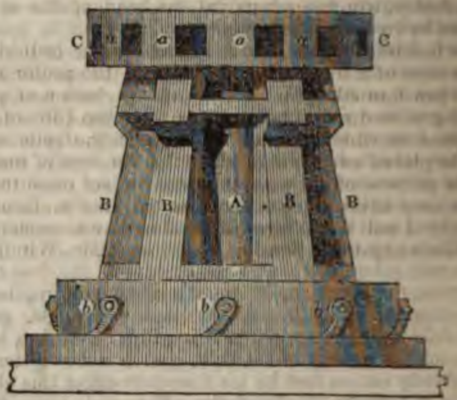
WINDLASS is a general name for any machine consisting of a barrel, of a cylindrical or conical form, which turns between two points of support on a pivot at each extremity of its axis, or upon a pivot at one extremity only. The machine, by means of a rope or chain passing round the barrel, raises heavy burthens, or draws them towards itself. Thus the *winch and axle*, the *windlass* by which on board of small ships the anchors are weighed, and even the *capstan*, are as many different forms of the same machine.

The mechanical properties of all these machines are those which have been described under WHEEL AND AXLE; and in the two last the power of men is applied at the extremities of handspokes or levers inserted at their opposite extremities in holes made in the axle or barrel to receive them. In the capstan, the axis of the barrel being vertical, the handspokes are in horizontal positions, and the men exert a continuous pressure against them while walking round; but in the machine to which the name of windlass is more particularly applied, the barrel is a horizontal cylinder, as in the winch and axle. In order to turn the cylinder on its axis, the men mounting on it plant their handspokes vertically in a series of holes formed at intervals for the purpose; then grasping them as high as they can reach, they pull towards themselves: when the cylinder is turned nearly a quarter round, the handspokes being almost in horizontal positions, the men throw upon them the whole weight of their bodies and by the weight the cylinder is still further turned. After this, the handspokes are drawn out and planted in other holes, which now are in vertical positions, and the like exertions of muscular force and pressure are repeated till the anchor is weighed or the weight raised. The machine permits the power of men to be applied, in one position of the handspokes, in the most advantageous manner; and in this respect it may be considered superior to the capstan: the lengths of the handspokes are, however, limited to about six feet, whereas those of a capstan may, in almost every case, be much longer; and it may be added that the latter machine allows a greater number of men to act at once.

The vertical windlass, or capstan, was originally a short cylindrical column turning on its axis by means of levers or bars of considerable length which passed quite through the perforations made to receive them at the top of the column; the pivot or axle upon which it turned entered, as at present, into the floor or deck upon which the machine was placed. It appears to have been first used, at least in Europe, on board of Portuguese or Spanish ships for the purpose of weighing the anchors, and it was introduced in the British navy in the time of Queen Elizabeth: its name is supposed to have been derived from 'cabestante,' which in the Spanish navy is the name given to the machine. In its original form it was subject to a great defect arising from the trouble and delay which was caused by the necessity of raising the coils of rope on the surface of the cylinder when, after several turns, they arrived at its foot. For this purpose it was necessary to cease turning the machine, and to secure the rope or messenger, that the weight might not descend while the upper coils were being removed from the cylinder, and while the three or four lowest, which it was necessary to leave on, in order by their friction to hold up the weight when the fastenings by which the rope was secured should be cast loose, were raised to the top of the cylinder. After this, the revolutions of the machine recommenced. The removal of the coils from the lower to the upper part of the cylinder is called 'surging the messenger;' and the method just described evidently causes a considerable loss of time, which on ship-board may be an inconvenience of great magnitude.

In 1739 and 1741 the French Académie des Sciences offered prizes for the best 'Mémoires' on the subject of capstans, and several methods were in consequence proposed for constructing them, so that without suspending the motion the rope might raise itself on the barrel. In 1794 Charles Lalande suggested that the cylinder should be surrounded by a spiral projection of wood, like the thread of a screw, between the turns of which the rope might coil itself as the cylinder revolved, and thus continually rise to the upper extremity, from whence it might be afterwards removed by hand. The same astronomer also invented a species of paull, which was afterwards generally adopted, and is still in use; it consists of an arm of metal capable of turning on a pivot near the lower extremity of the barrel; and as the latter revolves, dropping by its weight into a notch cut in the upper surface of a ring of wood or metal which is fixed to the floor or deck round the base of the machine.

Capstans are now generally made, as in the subjoined figure: the axle or central part of the barrel, which appears at A, is a cylinder of oak, on the surface of which are strongly fastened six ribs, B, B, &c., or whelps, as they are called, like buttresses; these are at equal distances from one another, and have their faces inclined to the axis so as to give to the part of the machine on which the rope or messenger is to turn a pyramidal or conical figure. The upper part, C C, of the capstan, which is cylindrical, and is called the drum-head, has notches on its inferior surface to receive the heads of the ribs; and on its convex surface are the holes *a a*, &c. for the reception of the bars by which it is to be turned. The ribs, by the friction which they create, prevent the rope from slipping round the barrel; and the conical form allows the rope easily to ascend towards the upper part as it winds about the barrel. Paulls similar to those above mentioned are shown at *b b*, &c.

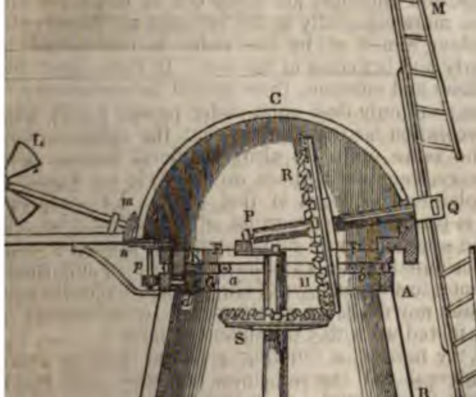


Frequently the capstan is made to consist of two parts, each similar to that which has been described, and attached one above the other to the same vertical axle; one of them being on the quarter-deck, and the other on the main-deck of the two parts are turned by men who act against the both at the same time.

in Phillips a few years since invented a double , similar in appearance to that which has just been and having an iron axle with which both may be ed so as to turn together, like the former, if re- But an apparatus is provided by which the lower can be disengaged from the axle, and by which ame time the latter can be connected with wheel- low its barrel. In this state, the upper capstan rned round as usual, the axle, which has a pinion lower extremity, gives motion by that pinion to othed wheels at equal distances from one another ircumference of a circle whose centre is in the axis inion; and the teeth of these wheels working in the interior circumference of a ring which sur- hem, and which is fixed to the base of the lower , gives a revolving motion to the latter, with a hich, from the sizes of the wheels, is four times as s that which is applied at the drum-head of the apstan. In estimating the whole power of this capstan there must moreover be added to that as been mentioned, the power resulting from the exerted by the men who turn the lower capstan ars in its own drum-head.

DMILL is a building containing machinery for corn, pumping water, sawing wood, or for any depending on wheelwork, to which motion is icated by the impulse of the wind. Windmills are kinds: in one, the wind is made to act upon r sails, generally four, which are disposed so evolve by that action in a plane which is nearly ; and in the other, the axis of revolution being pre- ertical, any point on the surface of a vane revolves izontal plane. The former is called a vertical, and er a horizontal windmill.

time when windmills were invented is quite uncer- ese useful machines do not appear to have been to the Greeks or Romans, and it is presumed that ginated in the ages of comparative darkness which d the thirteenth century. The earliest traces of istence are found in Holland; and they were pro- rst used to remove the water from the marshes of ntry, which, from its flatness, is incapable of being by hydraulic machinery.



building is generally a wall of timber or brickwork orm of a frustum of a cone; and the smaller kind of en formed of timber is capable, by means of a lever, turned round horizontally on an axis, in order that ne in which the radii or arms of the sails revolve placed perpendicularly to the direction of the wind, purpose of allowing the latter to act upon the sails ost advantageous manner. In other kinds of mills ical wall A B is terminated above by a wooden dome h is capable of revolving horizontally upon it. A ring, wood, forming the lower part of the dome, rests ring G H, of the same material at the top of the nd the surfaces in contact being made very smooth, rmer may easily be turned round upon the latter, being prevented from sliding off by a rim which projects from it, as at K, and descends over the interior circumference of the lower ring. The revolution is however facilitated by placing between the two rings of wood one of metal, in which are fixed four or six small wheels or rollers, as *a b*, on horizontal axles. The weight of the dome is supported on these rollers, which turn by its motion. Small wheels or rollers, as *d*, are also fixed on vertical axes in the projecting rim just mentioned; and as the dome revolves the circumferences of these rollers press against and turn upon the interior faces of the ring which is fixed on the top of the wall.

The dome in turning carries with it the windsails M N and their axle P Q: and thus the latter may be made to coincide with the direction of the wind, or the plane in which the radii of the sails turn may be made perpendicular to that direction. The revolution is sometimes accomplished by the force of a man applied to a winch near the ground: an endless rope, as it is called, or one whose ends are spliced together, passes under a pulley on the axle of the winch, and over one near the top of the mill; and the latter pulley in revolving gives motion to a wheel and pinion, the last of which works in teeth on the exterior circumference of the ring which forms the lower part of the dome.

But in general the wind itself is made to turn the dome of the mill so that the sails may continue in the proper position with respect to the direction of the wind: for this purpose there is provided a set of small vanes L, which are situated at the extremity of a long horizontal arm projecting from the dome in a plane passing through the vertical shaft of the mill, and on the side opposite to the great sails. These vanes turn on a horizontal axis at right angles to that plane, and are set in motion by the pressure of the wind when the latter deviates from the plane of their motion, or from a plane perpendicular to that in which the radii of the great sails revolve: a pinion on the axis gives motion to a wheel, and the axle of this last carries a pinion *m*, whose teeth work in those of the wheel *n*; the axle of this last carries a pinion *p*, whose teeth work in others which are formed on the exterior circumference of the ring G H, forming the base of the dome. By this means the dome is made to revolve horizontally so as always to present the axle P Q of the wind-sails in the direction of the wind.

This axle is usually inclined about 10 degrees to a horizontal line: it is supported at the inner extremity P, which is at or near the centre of the base of the dome, on the top of the vertical shaft S T of the mill, and near the opposite extremity on a block under a perforation in the dome. The axle passes through this perforation, and the radii or arms of the sails are affixed to it on the exterior; the axle and the sails which it carries revolve with the dome about the lower point of support. A toothed wheel R is fixed perpendicularly on the axle, and revolves with it by the pressure of the wind on the sails; and the teeth or cogs of this wheel drive those of a lantern or pinion S on the vertical shaft of the mill. To this shaft as an axle the upper millstone is fixed so as to revolve with it in a horizontal position; and the corn being placed in a hopper or funnel, is allowed to run from thence between the stones through a small channel, and through a perforation about the centre of the upper one. The lower millstone is stationary, and the corn being ground, the meal is received in vessels underneath. The principal wheel R is furnished with a *brake*, by which its motion may be checked or stopped at pleasure.

The four radii, or *whips*, as they are called, of the sails, are let into the axle at right angles to it and to one another, so that a plane passing through them will decline about 10 degrees from a vertical position: into each of these radii or arms are fixed a number of staves of wood, each five or six feet long, at right angles to it and inclined to the plane passing through the arms, but approaching nearer to coincidence with such plane as they are [illegible] distant from the axle: the ends of these staves are [illegible] in a rod of wood extending nearly the whole length [illegible] arm; and thus there is formed a sort of lattice-[illegible] which canvas is spread to receive the action [illegible] In some cases each radius or whip of a [illegible] above thirty feet in length from the axle to [illegible]

The variations in the force of the wind [illegible] quantity of canvas on the sails should [illegible] ingly; and the contraction as well as the expansion of a sail is usually effected by means of ropes fastened to it in three places or more. These ropes may be either drawn tight or relaxed as required; but for either purpose it is necessary that the mill should for a time be stopped; and as the stoppage is attended with great inconvenience, several methods have been devised for rolling and unrolling the sails while in motion. One of these, which was invented by Mr. Bywater, consists in the application, on each arm or whip, of a cylinder or roller to which the canvas is attached: this extends the whole length of the arm, and has a toothed wheel at the extremity nearest to the axle; the teeth of this wheel work in those of two other wheels, and the motion of one or the other of these being stopped, the cylinder rolls up or unrolls the canvas, being made to turn on its axis by the action of the wind on the sail. Several methods have also been proposed for equalizing the action of the wind on the sails of a mill, and they consist generally in the employment of a series of valves fixed in the frame-work of each sail. These valves revolve on pivots which are let into the frames; and as the force of the wind increases, they present, in turning, less of their surfaces to its action, so that the pressure is rendered nearly equable. None of the methods seems however to be in use, probably on account of the great additional expense with which the construction would be attended.

A horizontal windmill is a great cylindrical frame of timber, which is made to revolve about a vertical axis, and its convex surface is formed of boards attached in vertical positions to the upper and lower parts of the frame. The plane of each board is oblique to the lines in which the wind impinges on it, the direction in which the latter blows being supposed to be parallel to the horizon; and the whole is inclosed in a fixed cylinder having the same vertical axis as the other: this consists of a screen formed by a number of boards which are disposed so that, in whatever direction the wind may blow, it may enter between them on one side only of a vertical plane passing through the axis. The wind thus entering acts upon the oblique surfaces of the boards about the interior cylinder on one side of the axis, while it is, in a great degree, prevented by the screen from acting upon the boards on the opposite side; these boards therefore meet with small resistance when, during each revolution, they come up towards the quarter from whence the wind blows. In horizontal mills one board may receive an impulse equal to that which the wind communicates to a sail of equal area in a vertical mill; but in the latter all the sails are acted upon equally at the same time, whereas in the former only one or two can receive the impulse of the wind, and there is always, besides, some resistance experienced in returning against the wind. Mr. Smeaton estimated that the power of a horizontal mill was only about one-tenth of the power of a vertical mill, the dimensions of the sails or vanes being equal in both; but it is observed by Sir David Brewster that in this estimate no account is taken of the resolved part of the wind's force which presses the pivot of the axle against its support, and which is lost on the sails of the vertical mill; and he concludes that the power of the latter is not more than three or four times as great as that of a horizontal mill. The effective power of the vertical mill is however so much greater than that of the other kind, that the latter is now seldom constructed.

For an account of Mr. Beatson's improved construction of horizontal mills, see Brewster's edition of Ferguson's 'Lectures,' vol. ii. The effective force of the wind in turning the sails of a mill is investigated in the article WINDSAIL.

WINDOW. Though almost unknown in antient architecture, at least in the religious and other monumental structures of the Egyptians, Greeks, and Romans, which were not of a nature to require them, windows are exceedingly important features in the Gothic and other styles, and that not only for one, but every class of buildings. In the Gothic more especially they are so characteristic by their general forms and proportions, as well as their decoration and details, as to be in that style equivalent to what the orders are in the temple architecture of antiquity. Gothic without windows would be as deficient in expression as Grecian architecture without columns. Grecian architecture, on the contrary, hardly admits windows, since, instead of adding to, they rather mar its expression and detract from its character. There are indeed some examples of windows both in Grecian and Roman buildings—for instance, in the Erechtheum at Athens, and the Temple of Vesta at Tivoli—yet no more than barely to serve as authorities, and to show how apertures of the kind were designed. Besides being of exceedingly rare occurrence in classical architecture, the windows themselves were very few in number, and never placed so as to form more than one tier or story of them; consequently the effect was totally different from that attending two or more continuous ranges of windows placed one over the other. In fact, however well they may be designed in themselves, it is almost impossible to reconcile windows, at least any great number of them, with *columnar* composition; hence many modern buildings, which affect to be ultra and purely classical in other respects, are in a compound style, formed by application of two different modes, which, if not essentially incompatible, are of very opposite character, viz. the *columnar*, and the *fenestrated* or that in which windows are the chief features. Our so-called Grecian style of the present day is almost so entirely of this mixed character, that while it is hardly possible to point out exceptions, it is scarcely necessary to specify instances. We may however remark of the Post-Office, London, that it exhibits all the three modes; the columnar in the portico, the fenestrated in the division on each side of it, and windows and columns together at the extremities: and though intended to correspond with the portico and balance it in the design, these last-mentioned parts show how greatly the effect of columnar architecture is weakened by the introduction of windows. Nor is the effect better when, instead of the columns being engaged, or else merely detached, as in that example, from the wall behind them, they are brought so far forward as to form a colonnade before the wall. Such is the case with the façade of the Law Institution, which has besides too much the look of an astylar or fenestrated front placed behind a columnar screen or the frontispiece of a temple. Not the least difficulty which attends the application of columns to fenestrated composition arises from the one system requiring an almost opposite mode of treatment from the other; for while much of the beauty of an order depends on the columns being at no very great intervals apart, not more than between two or three diameters, the piers between windows ought to be of considerable width; the consequence is, either the intercolumniation must be very faulty, the columns put so far apart as to give the whole a straggling appearance, or the windows will seem to be squeezed in between them. Of this the front of the Royal Institution, in Albemarle Street, is a striking instance: it consists of a single large Corinthian order, the entire height of the building, well proportioned in itself and in regard to intercolumniation, yet quite disproportioned to the windows, which look both too small and too much crowded, and which are also of very poor character in themselves and have no other dressings than plain architraves, and therefore are quite out of character with the order, more especially as the columns are fluted: thus the grandeur aimed at by the order is neutralized by the poverty and littleness of the rest. If there must be both windows and columns, there should be consistency of character; not only does each order require a different mode of decoration for the windows, but the different examples of the same order do also; the florid Grecian Ionic, for instance, requires a more ornate style for windows than the plainer specimens of that order. Yet so little attention is paid to the proportion of decoration, that windows of the same character and design are generally employed indiscriminately for all orders; nor is it by any means uncommon to see windows of the plainest description, or even without any dressings or attempt at architectural expression, mixed up with Corinthian columns.

If the front of a building professes to be no more than an external wall, mere 'holes in a wall' will serve well enough for windows, but in architectural design it is quite contrary to the fundamental principles of the art to leave such openings mere naked gaps. Every sort of aperture, whether for a door, a window, or a fire-place, requires to have 'dressing' or border to it, otherwise it looks unfinished and incomplete, and the effect to the eye is as unsatisfactory as would be that of a picture hung up without a frame; if then there is to be any degree of enrichment, or even of mere architectural finish and the expression derived from it, doors and windows claim it in the first place. Unless decoration be bestowed upon them, instead of being features in the design, they will show themselves only as blemishes, and in proportion as ornament is applied elsewhere, the whole will become incongruous patchwork. The principle to be attended to is so generally disregarded, and its being neglected has occasioned such a false and vicious system of architectural design, that it cannot be too strongly inculcated and enforced. Adam's buildings are most striking instances of the faulty practice of leaving windows mere naked apertures, while even excess of decoration is affected elsewhere: hence his festoons, panels, pilasters covered with arabesques, and other things of that kind, look no better than mere frippery. Even now, when it has become more general to bestow some sort of dressing on windows, there is seldom that study given to them which could be wished. Either the dressings are meagre or tame and insipid, and the windows are not so much the architect's own compositions, as patterns appropriated by him from the common stock, and applied perhaps nearly at random.

It is one very great advantage of the Gothic or Pointed style, that there the windows derive strong architectural expression from the apertures themselves; which, with the mullions, transoms, and tracery inserted in them, mainly form the design and decoration; while the external mouldings and ornaments contribute to them only in a subordinate degree. Consequently, if otherwise quite plain, the windows can never appear mere vacant spaces. Widely different is it in those styles where the ornamental design is confined to the mere exterior or framing of the aperture: therefore however they may be so decorated, the openings will, if of very large dimensions, always have a vacant look, and the glazing of the windows will appear to be in want of adequate support. Such is the case with the windows of St. Paul's, where the apertures are filled in only with very ordinary glazing in small panes, and consequently are so far from being pleasing, as to produce a sombre, dingy appearance; whereas in Gothic windows the glazing shows itself to be firmly supported by the mullion, and is never extended over such large unbroken surfaces, let the size of the window be what it may, as to produce an effect of blankness. It is another advantage peculiar to that style that it allows windows to be of any dimensions—of the smallest as well as the largest, and windows of very different sizes and proportions to be introduced into the same elevation. For further remarks on this subject the reader may refer to what has been said on GOTHIC ARCHITECTURE, p. 324, and ORIEL; since we must here confine ourselves to windows in the Italian or modern style generally.

The same general principles, although not the same special rules, apply to doors and to windows, both being apertures in the walls of buildings; and it may be as well here to remark that, unless otherwise expressed, in speaking of them as features in architectural design, it is not the actual door or the glazed window which is understood, but the doorway, or the window opening, and the '*dressings*' around them, which last term is employed to designate the whole of the decoration bestowed on such apertures, or, in other words, the entire 'composition.' And as in the style now referred to doors and windows do not differ very greatly in their proportions, the same composition may, with slight modification, be applied to either purpose. There are however distinctions to be attended to, since both the proportions and decorations of windows depend in some degree on their situation or the particular story of the building to which they belong. The principal story, or that immediately over the basement or ground-floor, requires to be marked by windows more highly decorated and of loftier proportions than the rest For these the apertures are generally made from 2 to 2½ squares, or even something more, that is, their height is something more than double their breadth. Those on the next floor rather less than two squares, and for the third they are made *mezzanines*—either a perfect square or very little more. The character and proportions of ground-floor windows depend very much upon the manner in which that part of the elevation is treated; if it be no more than a low rusticated basement, the windows will only be of mezzanine form, without dressing—or at the most a few mouldings surrounding the apertures, the rusticated surface of the wall itself here producing a sufficient degree of finish and decoration; or if more be required, it can be obtained by distinguishing the rustics around the windows, making them smooth, if the others be rough, or *vice versâ*. Thus while the windows here are kept subordinate features in the design, the basement generally acquires a character of greater solidity, owing to the greater apparent breadth of the piers or spaces between the openings, which are not encroached upon, as in the other floors, by the external dressings of the apertures. Nevertheless, though a good one in itself, the above is only one general mode of treating what admits of very varied and almost opposite modes. In the basement of the Strand front of Somerset House, for instance, which, although secondary to the order, is almost of equal importance and effect in the general composition, the windows are more than usually decorated, having Doric pilasters, entablatures, and pediments, and their sills resting upon bold consoles or trusses. It is true they are set within arcades, and therefore preparation is so far made for their dressings, which are thus framed in from the rusticated surface, so that their richness does not seem at variance with the latter; the richness itself too is of a bold character. When the ground-floor is not a distinct basement, its windows require to be equally dressed, or very nearly so, with those of the principal floor, with little other difference as to proportion and design than what is necessary for preserving some distinction and avoiding monotonous repetition; because, though it is desirable that all the windows on a floor should be of uniform design, except that a centre window may occasionally be more decorated and rendered a more conspicuous feature than the rest, it is hardly less desirable to avoid the sameness arising from all the windows of a front being too nearly alike. Where the ground-floor is the principal one also, as is now frequently the case in villa residences, in which all the chief rooms are below, and perhaps only a single chamber-floor over them, the lower windows are of course the most important in design; yet, whether the principal or secondary, they ought to be in keeping with the rest of the design. This rule, or rather this law of æsthetic composition, has been admirably well attended to by Mr. Barry in the Travellers' and Reform Clubhouses, London, and, on the contrary, violated in the exterior of Goldsmiths' Hall, where, although there are two ranges of windows included within the same order, and the upper windows are decorated in an unusual degree, almost to excess, those below have no dressings, not even any kind of rusticated borders in lieu of them, but are merely so many plain apertures on a surface scantily streaked with horizontal rustic joints. Accordingly, while the lower division of the front looks poor, and is deficient in boldness, the upper windows seem overloaded with ornament.

What has been said in regard to the sequence of the different tiers of windows in an elevation, is to be understood only generally, there being many exceptions, and not a few anomalous cases. In the façade of the Palazzo Massimi at Rome, one of Peruzzi's best works, there are two tiers of mezzanine windows above those of the principal floor; in the celebrated Palazzo Farnese, on the contrary, the second-floor windows (which are also the uppermost) are somewhat loftier than the others, at least in their apertures, owing to these last being arched, and are further remarkable as having pediments, which are seldom used for windows higher up than the first floor. In Sangallo's façade of the Palazzo Sacchetti, there is a range of mezzanines between the windows of the first and the uppermost floor, and instead of being made principal in the design, the former are considerably less than those of the ground-floor, and are moreover singular as being *Atticurg*—a term applied by some to those doors and windows which are narrower at top than at bottom, as in the Erechtheum. [DOOR, p. 86.] The façade of the Palazzo Negroni, by Ammanati, is similar in its general character to the preceding, there being a row of mezzanine and square windows between the first and third floor; and it also resembles it in the importance given to the ground-floor windows. In regard to windows of the last-mentioned class, the Palazzo Buoncompagno at Rome, a work attributed to Bramante, offers an unusual example, for there the lower floor and its windows are made the next principal features after those immediately above them; in both the apertures themselves are round-headed, with imposts and archivolts, but flanked by pilasters supporting an entablature, whereby the general form of the *chambranle*, or dressing, becomes square-headed: the chief difference between these two tiers of windows is, that those above have pediments (alternately angular and segmental), while the others have none.

It may not be improper to make some additional observations relative to the application of windows in architectural composition. Susceptible as they are of decoration in various degrees, windows do not, like columns, produce richness in proportion to the number and frequency of them: on the contrary, they require to be thinly spaced, and that not only as regards the breadth of the piers between those in the same range, but also the distance between the windows on one floor and those on the succeeding one. So far from a great number of windows and stories in a building contributing to give it a character of dignity, they produce rather a contrary effect, by destroying that breadth and repose which are essential to such character. It is not the mere copying the forms and decorations of its windows that will give the effect of the Italian 'palazzo style,' since so very much of its character depends upon other circumstances, and on the proportions between the solids and voids. Hence, as Wiebeking has remarked, the general architecture both of London and Paris, even in the best streets, is very poor, owing to the windows being so numerous and so closely crowded. There is a prejudice against wide piers between windows in this country, as being suited only for a southern climate where shade is desirable; but narrow piers are equally unsuitable for a northern one, since they cause a room to have a cold, unsheltered look at inclement seasons of the year. Some have attempted to lay down rules for proportioning the superficial area of the openings, or windows of a room, to the cubic space of the room; but besides being rather fantastical in itself, this cannot be consistently followed in practice, because the size of windows and breadth of piers determined upon for one room must be adopted for all those in the same front—at least upon the same floor. Nicety of that kind would require that in a north or north-east aspect the relative proportion of windows and solid wall should be very different from that adapted for a southern one; and be made also to vary according to the actual situation of the building with regard to others, since, with respect to light, it certainly makes a very great difference whether rooms face a narrow or a wide street, whether the opposite buildings be lofty or low.

Nothing has yet been said on the various modes of decorating windows, and the members of which their dressings are composed. To begin, therefore, with what is the primary element of such architectural embellishment, we have first of all a simple border or *architrave*, similar to that represented in Door, page 26, which figure also explains the mode of *elbowing* or *kneeing* the architrave, as it is variously termed, so as to extend the lintel or horizontal part over the aperture, which is usually done, if the dressing consists of a mere architrave, in order to give more importance to that part, and avoid too great uniformity of outline. The breadth of the architrave depends greatly upon circumstances, on the character of the general design, and on the taste of the designer: where the dressing consists of no more than an architrave, greater breadth may be given to it (nearly a quarter of that of the aperture) than where the sides are flanked by other members and mouldings forming a second or external architrave. In like manner the character of the architrave itself admits of great variety of expression: it may be merely a single plain surface surrounded by mouldings, as in the example just referred to, or it may be divided into two, three, or even more *faciæ*, and may have some of the principal mouldings carved; for its being a single border to the window-opening is no reason why it should not be a rich and effective one also.

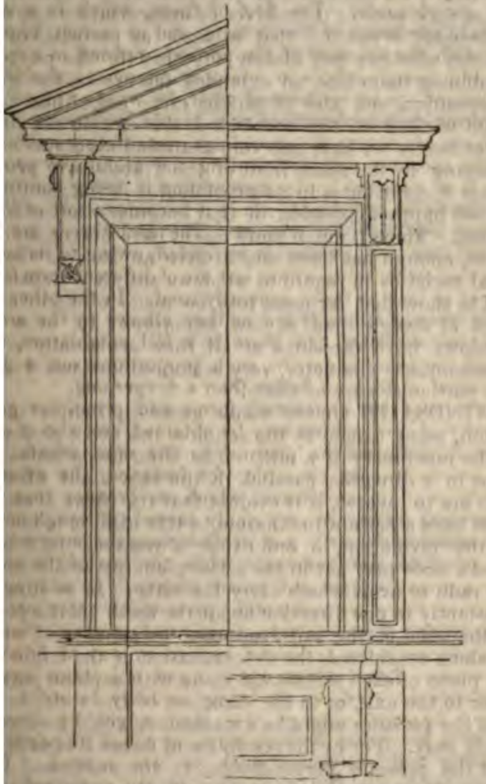
The next step in the progress of decoration is to surmount the lintel by a cornice, which is extended the full width if the architrave around the window be '*elbowed*,' or else rests upon consoles; nor is it by any means unusual to employ both elbows and consoles. After this, further decoration is obtained by introducing a frieze between the mouldings of the lintel and cornice, thus producing a regular entablature, which, however, may be variously proportioned and decorated. To convey an adequate idea of the very great diversity of design which is met with in regard to these few circumstances of composition, would require a very great number of examples, and those drawn upon a tolerably large scale.

The following remarks apply to the two examples from the Erechtheum and the Pantheon, represented in the article Door, p. 86; but it must be premised that those cuts show only the general forms, without the lesser details and their enrichments. The first of these, which is a most exquisite specimen of Greek taste, and in perfect accordance with the columns of the portico—refined in expression, and though simple in composition, even luxuriant in enrichment—is an instance of what, for want of more precise terms, may be described as a double architrave dressing, for in addition to the mouldings immediately surrounding the aperture, and constituting the architrave proper, there is an external border surrounding it, being continued over the lintel architrave, where it becomes a sort of frieze between that and the cornice. The architraves are not elbowed, but the cornice is extended, owing to its being supported on consoles, which last are of different form from, and not so long as those generally used. In the other example referred to, there are neither elbows to the architrave nor consoles, but there is a full entablature, and though the frieze is narrow, such proportions suit a door or window of the kind better than a deeper one.

With these few elementary forms and principles great diversity of composition may be obtained, and also of character, from almost the plainest to the most ornate. In the last-mentioned example, for instance, the external mouldings of the architrave, which are broader than any of the three faciæ, are very richly carved (although not so represented in the cut); and in other cases the outer mouldings are bold and numerous, while the rest of the architrave is a single plain and broad surface. In addition to the above, there are many other parts which enter into the composition of window-dressings, and among them a principal one is the *pediment*, applied by way of finish to the whole. Some critics have urged objections against pediments to windows, as being contrary to strict propriety: hypercriticism of that kind might be directed against a great deal in every style, on which its particular character and expression more or less depend. It is enough for us that the application of the pediment form to such purpose is so fully established that no idea of incongruity attends it, and that, considered with regard to its artistical effect, it contributes to variety in various ways. At the same time we cannot admit as legitimate more than two distinct varieties of it, namely, the *angular*, and the curved or *segmental;* for as soon as we begin to disturb the outline, we violate the principles of the style from which such decorative feature is derived. Broken pediments, scrolled-shaped ones, &c. are therefore to be put into the same category with twisted columns and other extravagances of that kind, which, so far from displaying invention, rather betray sterility of ideas, and the inability to attain originality otherwise than by adopting what the least educated taste rejects as vicious. Even segmental pediments ought to be very sparingly introduced—perhaps only for the sake of variety, in alternation with angular ones, they being in themselves rather heavy in appearance. One great value of the pediment as a decorative feature of windows is, that its sloping lines contrast with those of horizontal mouldings, and occasion variety of outline in the general form of windows; and that such addition serves to distinguish and give due importance to the windows of the principal floor of a building, to which, in good composition, they are generally confined. In the Palazzo Farnese both the upper rows of windows have pediments; the first alternately angular and segmental, the other only angular ones; and there, owing to the very great space over the windows, the numerous pediments do not seem to overload the design, as would be the case if the upper ones were to come nearly immediately beneath the superior cornice.

Window pediments are almost invariably supported on consoles, which, besides admitting of very great variety as to detail, give rise to a mode of extending the dressings on the sides of the aperture by an external border, termed by the French a *contre-chambranle*, and by us a console-pilaster or console-jamb, the console being affixed to it; and which is either quite plain, or panelled and otherwise enriched, according to the degree of decoration aimed at. The annexed cut serves to illustrate both modes; one-half of the window having merely a console, the other a

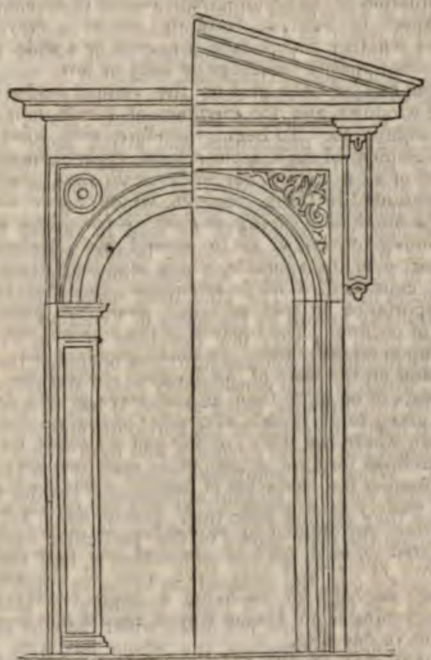
lled console-jamb in addition. In Goldsmiths' Hall,
on, and also in the new Gresham Hall, the windows
only panelled console-jambs, without architrave or
dings of any kind between them and the aperture.



now come to another mode, quite distinct from any
preceding, namely, that which consists in applying
ll order either in columns or pilasters, with a regular
ature, sometimes with the usual architrave also sur-
ing the aperture of the window, at others not. And
h some object to such *microstyle* compositions, as
inconsistent with the original purpose of columns,
impropriety is at least redeemed by richness and
. At all events, the impropriety is not so great as
applying small orders successively to the different
of a building, thereby rendering diminutive, parts
, if introduced, ought to be proportioned to the entire
; whereas, in the case of columns to windows, they
hemselves to be intended only as decorations, and
really small, yet being distinct and independent
es, instead of giving an air of littleness to the entire
sition, they rather give greater dignity and import-
o the windows. As to the actual effect produced by
that depends upon the judgment and taste with
such decoration is applied. Windows of this kind
rtainly not suited for any except astylar composition,
there be also a large general order to the façade,
the columns to the windows look rather insignificant
nparison, there is too much of repetition and mono-
and the whole decoration seems to consist only of
ns of different sizes. Still worse is the effect when,
he case with the Atlas Office, Cheapside, London,
ilding consists of more than one order, because then,
windows must be large in proportion to those
the columns to the windows cause the others to
etty, and the whole to appear both crowded and
ed—a defect most strikingly exemplified in the
re alluded to, nor is it at all decreased by the win-
both the upper floors being columniated. On the
y, Barry's two clubhouses in Pall-Mall are truly
ul examples in regard to windows thus decorated;
re they are treated in a most masterly manner, and
with the happiest effect, and so as to produce a
us union of sobriety and simplicity with a very high
of decoration. Instead of being mere copies, those
ws are original and admirably studied compositions,
fully and even elaborately finished, whereas in the
other instance just mentioned, and also in the front of the Clubhouse Chambers, Regent-street, though there are columns to the windows, there is a very sorry entablature to them—neither architrave nor frieze, but merely a plain lintel in lieu of them, without mouldings of any kind, which, besides being offensively lumpish and heavy, look mean in what professes to be decoration of a superior kind.

That caryatides may be substituted for columns as decorations to windows, especially where an extraordinary degree of magnificence is aimed at, follows as matter of course. Indeed hardly can figures of that kind be introduced so well in any other way into exterior architecture; and though a front might be overdone by too much of such decoration, there is little need for cautioning against excess in that respect, there being no danger whatever of its being committed: on the contrary, we have hardly an instance of it.

When windows are round-headed, or arched, they are usually treated like arcades, with imposts and archivolt mouldings, either with or without keystones, plain or enriched; and they also admit of loftier proportions, since the arched head may be in addition to what would else be the height of the entire aperture: consequently so far from the form of the head in any degree diminishing the quantity of light admitted into a room, it increases it by being an extension of what the opening would otherwise be:—which, however, depends greatly upon circumstances, and whether the line of the impost or the crown of the arch would else be the top of the opening. Arch-headed windows are sometimes enclosed within a square-headed dressing, a mode of composition frequently practised by Bramante and others of his period, and of late again brought into use in Germany. It is one that admits of very great variety of design, and of much enrichment also, accordingly as the spandrels of the arch are left plain or filled up with foliage or other ornament. The ground-floor windows of the Pinakothek at Munich are of this description; and where it is desirable to keep up a degree of general uniformity between square-headed and arched windows in the same design, it may be done by giving square-headed dressings to the latter. (*Fig.* 2.) It is, in fact, not unfrequently done in the case of niches, if any external decoration at all is bestowed upon them. There is, besides, another, but exceedingly vicious mode of putting an arched window between columns and beneath a pediment, cutting away the entablature, and sometimes even cornice, so as carry the arch quite into the pediment.



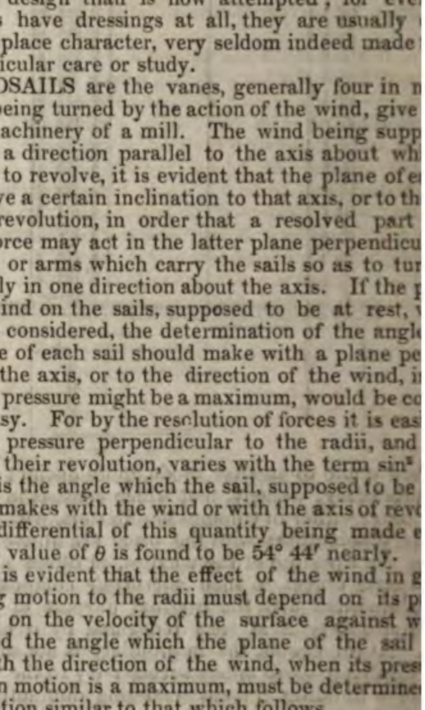
Directly contrary to the preceding is that of enclosing a square-headed window within an arch, as has been done by Mr. Barry in the south front of the Travellers' Club-house, where the archivolt of the arch springs immediately from the capitals of fluted Corinthian pilasters, and the tympanum of the arch, or space between that and the horizontal lintel beneath it, is filled up with a sort of concave fanwork fluting. Hitherto nothing has been said by us in regard to one very material point connected with the general decoration of windows, namely, the *window-sill* and part beneath it. The principal-floor windows generally rest upon a distinct parapet or podium with projecting breaks beneath the windows, forming either a single pedestal, either plain or panelled, or a balustrade between lesser pedestals immediately beneath the dressings of the aperture. Ground-floor windows, when not on a rusticated surface, but with architrave dressings, have bold moulded sills supported on large consoles or tresses. Windows above the principal floor are usually made to rest immediately upon a string-course, or, if there be none, the architrave is continued beneath the aperture; or else the bottom of the window has a distinct sill, either plain or moulded, and sometimes supported on blocks or small consoles. Though balustrades to windows were very seldom employed by the architects of the Roman school—not a single instance of them occurs in Percier and Fontaine's collection—they are almost invariably made use of by Palladio, and also by ourselves for the principal-floor windows. In the Strand front of Somerset House, balusters are applied to excess, and even unmeaningly, being put not only beneath the windows, but on each side of them, between their pedestals and those of their order; whereby confusion rather than richness is produced. Neither is it at all advisable to put balusters, as Palladio has frequently done, beneath windows without any dressings, since it causes them to appear still more unfinished than they else would. Still worse is it to apply them to mezzanine or square windows; for in such case the balusters and the windows become quite out of proportion to each other, and the former have a most ungainly and heavy look: this is one of the blemishes of Holkham, where it is accompanied with another offensive solecism, namely, the putting a cornice above the window, leaving a space between the two, as if the other dressings had been cut away—a very strange sort of economy, and quite contrary to the natural principles of decoration which have been here pointed out, and which teach us that embellishment ought to commence by finishing up the aperture itself, before any additional, much less extraneous, ornament is thought of. Circular windows, or oval ones, either oblong, as at Somerset House, or upright, as at Buckingham Palace, are to be avoided even for mezzanines and attics, since however beautiful such forms may be considered in themselves, they are altogether so unfitted for the purpose as to appear both fanciful and uncouth when applied to it.

Something yet remains to be said in regard to compound or triple windows, which, besides contributing to variety in external design, are sometimes required by circumstances of plan. The kind most usually practised is that familiarly known by the name of Venetian windows—although there are very few instances of it in Venice itself—and divided by columns into three openings, the centre one of which is both considerably wider and loftier than the other two, because, being arched, it has, in addition to the arch itself, the depth of the horizontal entablature over the columns and lateral openings, and from which the arch springs. When well composed, windows of this kind have a particular rich and elegant appearance, besides the importance they acquire from their greater size; but all depends upon the taste shown in the particular design. If the lateral openings are too wide—that is, half the width of the centre one, the composition becomes sprawling and poor: on the contrary, if those openings or side intercolumns be kept narrow, not much wider than the diameter of the columns themselves, the whole has with greater compactness greater richness also. Kent has given us some good examples of this kind, as in the Park front of the Horse-Guards; and so also has Sir Robert Taylor in a court within the Bank of England, where he introduced an entire series of such windows—a very unusual circumstance, and one which has in that instance a pleasing effect; but in general, windows of the kind require to be placed singly, and in a break either in the centre or ends of a façade. They are, besides, fitted only for astylar composition, as they require greater space than accords with the proper intercolumniation of an order. When triple windows are introduced in elevations professing to b in the Grecian than Italian style, it is now the pra omit the arch and continue the entablature over three openings, at the same time making the latte alike as to width, and substituting pilasters for c But nearly all examples of the kind have hithert either very poor in themselves or unfortunately app

Grouped Windows, that is, such as consist distinct windows put closely together for the pur combining them into an extended feature in the composition, and also obtaining more light than triple window of the usual kind, are of rare occu nevertheless we have one very charming specimen grouping in the south front of the Travellers' Clu where it contributes in no small degree to the pecu no less happy expression of that singularly beauti vation. Though much more might have been poin by us, enough has been said to give an idea of th cipal varieties in regard to windows and their deco and to show that far more may be made of them tures of design than is now attempted; for eve windows have dressings at all, they are usually commonplace character, very seldom indeed made any particular care or study.

WINDSAILS are the vanes, generally four in n which, being turned by the action of the wind, give to the machinery of a mill. The wind being supp blow in a direction parallel to the axis about wh sails are to revolve, it is evident that the plane of e must have a certain inclination to that axis, or to th of the revolution, in order that a resolved part wind's force may act in the latter plane perpendicu the radii or arms which carry the sails so as to tur constantly in one direction about the axis. If the of the wind on the sails, supposed to be at rest, be alone considered, the determination of the angl the plane of each sail should make with a plane pe cular to the axis, or to the direction of the wind, i that the pressure might be a maximum, would be co tively easy. For by the resolution of forces it is eas that the pressure perpendicular to the radii, and plane of their revolution, varies with the term $\sin^2$ where θ is the angle which the sail, supposed to be surface, makes with the wind or with the axis of rev and the differential of this quantity being made zero, the value of θ is found to be 54° 44′ nearly.

But it is evident that the effect of the wind in revolving motion to the radii must depend on its p and also on the velocity of the surface against w acts; and the angle which the plane of the sail make with the direction of the wind, when its pres the sail in motion is a maximum, must be determine investigation similar to that which follows.



Let AB, A′B′, parallel to one another, represent rection of the wind; WBX, W′B′X′, also parallel another, be two positions of a section of the sail, wh the pressure of the wind is made to move so that B, in a line perpendicular to AB. Now, if it be suppos A′B′ is the space described by a particle of air would move to b (or b' to B′) in the same direction, B to B′ in a direction perpendicular to AB; the lin and b'B′ will, respectively, represent the velocitie wind and sail in directions parallel to A′B′, while B be the velocity of the sail in the direction of this la Draw A′C′ perpendicularly to WX or W′X′, pr and meeting the former line in C; then A′C′ and C be respectively the velocities of the wind and sail p dicularly to the line WX or W′X′, and consequently A be what is called the velocity of the wind in th

fore, the pressure of a fluid being proportional to the
of the velocity, the pressure of the wind in the di-
A'C' will vary with A'C²; and this being resolved
direction A'D or BB', will be expressed by A'C² cos
or A'C² sin B'Bb'. But A'B being constant, A'C
with sin A'BC; therefore the effective pressure of
nd will vary with $\sin^2$ A'BC sin B'Bb.
the angle A'BB' be represented by a, B'Bb' by θ;
A'BC $= a - \theta$, and the expression for the pressure
es

$$\sin^2(a-\theta)\sin\theta.$$

g the differential of this expression equal to zero, and
ng, we have

$$\tan(a-\theta) = 2\tan\theta,$$

he pressure is a maximum.
w B'XY perpendicular to BC, so that B'X and XY
espectively represent $\tan(a-\theta)$ and $\tan\theta$; and let
BB' be respectively represented by v and by v';

$= v'\cos\theta$, $B'X = v'\sin\theta$,
$(= 2B'X) = 2v'\sin\theta$, and $B'Y\ (= 3B'X) = 3v'\sin\theta$.
draw YZ perpendicular to BB', or parallel to A'B';

$(= B'Y \cos BB'Y) = 3v'\sin^2\theta$,
$= B'Y \sin BB'Y) = 3v'\sin\theta\cos\theta$, and
$= v' - B'Z) \quad = v' - 3v'\sin^2\theta$.
similar triangles, BZ : ZY :: BB' : B'A', that is
$3v'\sin^2\theta : 3v'\sin\theta\cos\theta :: v' : v$;
$v - 3v\sin^2\theta = 3v'\sin\theta\cos\theta$.
iplying each term by v, and for v^2, the first term,
ting its equivalent $v^2\sin^2\theta + v^2\cos^2\theta$, we have
$^2\theta + v^2\cos^2\theta - 3v^2\sin^2\theta = 3vv'\sin\theta\cos\theta$;
lifying, and dividing by $\sin^2\theta$, we get
$+ v^2\cot^2\theta = 3vv'\cot\theta$.
reduced as a quadratic equation, with respect to θ

$$\theta\ (= \tan ABX) = \frac{3v'}{2v} + \left(2 + \frac{9v'^2}{4v^2}\right)^{\frac{1}{2}}.$$

gle ABX will evidently depend upon the relation
n v', the velocity of the sail, and v the velocity of
d: if $v' = 0$, or the sail is at rest, we should have
X $= \sqrt{2}$, that is, the angle ABX would, as above, be
54° 44′ nearly; and when $v' = v$ the formula gives
74° 19′ nearly. It follows that as the velocity of the
ion increases, the inclination of the section WX to
d, or to the axis of rotation, should be increased.
therefore, the velocity of the sail continually in-
from the axis to the extremity of the radius or arm
carries it, it is evident that the sail, instead of being
, ought to have a curved surface such that the incli-
of the section to the direction of the wind may in-
with its distance from the axis conformably to the
which would be given by the above formula, the
tween the velocity of the wind and sail at any given
from the axis of rotation being known or assumed.
observed by Mr. Smeaton that the velocities of the
their extremities are often more than twice as great
of the wind. From several experiments which were
a great scale by the same engineer, it was found
effect is very advantageous when the inclinations
xis, or the direction of the wind, with a section of
taken perpendicularly to the revolving arm at dif-
distances from the axis, were as in the following

At one-sixth of the length of the arm	72°
At one-third	71°
At one-half	72°
At two-thirds	74°
At five-sixths	77½°
And at the extremity	83°

meaton found also that when each sail is broader
urther extremity than near the centre, the effect is
than when it has the form of a parallelogram; and
most advantageous breadth at the extremity is one-
the length of the arm.
is a certain limit to the quantity of sail which a
ll can carry with advantage; and from Mr. Smea-
periments it results that, when the surfaces of all
exceed seven-eighths of the area of the circle de-
by each arm in one revolution, the velocity is
ed; probably from the want of sufficient openings
h the wind, after impact, may escape. Mr. Smeaton also found that the ratio between the velocities of windmill sails when unconnected with the machinery, and when loaded so as to produce the maximum effect, is variable; but, in general, that ratio is as 3 to 2. The velocity of the sails when the effect is a maximum varies nearly with the velocity of the wind.

The form and position of the sails remaining the same, the load or resistance when a maximum, varies nearly with the square of the velocity of the wind; and the maximum of resistance which sails of similar figures, and in similar positions, will overcome at a given distance from the centre of motion, will vary with the cube of the radius or arm of the sail.

WINDSOR, properly called New Windsor, a parliamentary and municipal borough, on the banks of the Thames, in Berkshire, 22 miles from London. It derives its importance, and perhaps its origin, from having been a favourite residence of many of the kings of England since the Conquest. The Saxon kings had a palace at Old Windsor, called Windles-ofra, or Windleshora, from the winding course of the Thames in this part, and Edward the Confessor occasionally kept his court there; but it is a distinct parish, about two miles south-east of New Windsor. In the reigns of William the Conqueror and William Rufus Windsor Castle was a military fortress, and it is doubtful whether they used it as a residence. Henry I. enlarged and improved the Castle, and held his court there, and from this time it was the frequent residence of the king, in consequence of which New Windsor received many marks of royal favour. From having been a chapelry in the parish of Clewer, it was constituted a separate parish. Edward I. made it a free borough, and in his reign it first returned two members to parliament: probably through the indulgence of the king, it was allowed for above a century to omit making returns; but from the 25th Henry VI. (1447) it has regularly returned two members. Edward IV. granted the burgesses a charter of incorporation. The limits of the municipal and parliamentary boroughs are identical, and comprise the whole of the parish of New Windsor, with the exception of the small hamlet of Dedworth, which is separated from the town by an intervening agricultural district. A part of the parish of Clewer, into which the town of Windsor has extended, is comprised within the borough; and on the passing of the Reform Act an extra-parochial division, called the Lower Ward of the Castle, containing the residences of the provosts and fellows of St. George's chapel and those of the Military Knights of Windsor, was made part of the borough. Though situated on opposite banks of the Thames, Windsor and Eton form in appearance but one town, the line of houses being interrupted only by the bridge, a neat structure of iron, erected in 1824, 200 feet long and 26 wide, and consisting of three arches. Windsor is pleasantly situated on rising ground, and consists of six principal streets, well paved, and lighted with gas, besides a number of smaller ones of rather mean appearance. The drainage of the town is very defective. The population of the parish, in 1841, was 7528, including 101 in the hamlet of Dedworth. The borough contained 1072 inhabited houses, and the population was 7786, but this included 789 males and 124 females in the infantry barracks, soldiers on guard, 11 persons in the gaol, and 150 strangers. The number of persons in the Castle ('Windsor Castle, Upper Ward,' extra-parochial) was 30 males and 55 females; in 'Windsor Castle, Lower Ward,' also extra-parochial, 274, including 44 soldiers at the guard-house. The number returned in the borough as born in the county was 3076, and elsewhere 4710, including 512 born in Scotland and 900 in Ireland.

Prior to the passing of the Municipal Reform Act in 1835, the corporation was governed by a charter granted in 16 Charles II., under which it consisted of the mayor and nine other chief benchers, or aldermen, three benchers, and fifteen or seventeen younger brethren, who were elected by the upper class in the council. As remodelled, there are six aldermen, one of whom acts as mayor, and eighteen councillors. The borough is divided into two wards, and the number of burgesses on the borough register was 569 in 1835, and 515 in 1837. There is a separate commission of the peace and separate sessions for the borough, and offenders are committed to the borough gaol. In 1840-41 the ordinary municipal expenses were—for police and constables, 680*l.*; administration of justice, 170*l.*; gaol, maintenance of prisoners, &c. 100*l.*; allowances to municipal officers, 374*l.* In the same year the receipts under the head of rents, fines, or leases, &c. was 542*l.*; tolls and dues, 201*l.*; borough and gaol rates, 671*l.*; miscellaneous, 241*l.*: making, with other items, a total of rather less than 2000*l.* in the year. Before 1690 the corporation usurped the exclusive right of voting in the election of members of parliament, but it was afterwards extended to all the inhabitants paying scot and lot. The greatest number of electors polled at any election during the thirty years before the passing of the Reform Act was 363: in 1839-40 the number of parliamentary electors for the borough was 667.

The public buildings of Windsor (exclusive of those pertaining to the Castle) are not in any way remarkable. A notice of the Castle will be found in the next article. [WINDSOR CASTLE.] The Lower Castle Ward is divided into two parts by the Collegiate Chapel of St. George, which stands in the centre. A chapel dedicated to St. George, for the service of the Order of the Garter, was erected at Windsor by Edward III. (1327-77); but the present edifice was begun by Edward IV. (1461-83), and was not completed until after the commencement of the sixteenth century. It is one of the most beautiful specimens of ornamental pointed architecture in this country. The exquisite proportions of the interior, the richly decorated roof, the painted windows, the banners and escutcheons of the Knights of the Garter overhanging their carved stalls, within which are fixed the armorial bearings of each Knight Commander from the time of the founder, Edward III., alike impress the mind with a sense of beauty and powerfully seize upon the imagination. The great east window is painted after the designs of West; and over the altar is one of West's best productions, representing the Last Supper. The cenotaph of the Princess Charlotte is in St. George's Chapel. Edward IV. is buried here, beneath the steel tomb executed by Quintin Matsys. Henry VI. lies under a plain marble in the opposite aisle. Henry VIII. and Charles I. are entombed under the choir. At the foot of the altar is a subterranean passage communicating with the tomb-house, in which George III., George IV., William IV., and others of the present royal family are interred. St. George's Chapel is a collegiate establishment. The chapter consists of a dean, eight canons, and six minor canons; and its gross annual revenue, for the three years ending 1831, averaged 22,475*l.*, net income 19,380*l.* The old church was pulled down in 1818, and the present edifice was completed, in 1822, in the later pointed style. The living is a vicarage, in the gift of the crown, valued at 400*l.* a year. There are places of worship for several denominations of Dissenters. The guildhall or townhouse, erected in 1686, is rather a handsome building, supported by pillars and arches of Portland stone. There are a number of portraits of kings of England and personages of rank in the hall or court-room; and externally, at each end, there is a statue of Queen Anne and one of her consort Prince George of Denmark. A free-school was erected in 1706, and is partly supported by endowments. The charitable institutions comprise Brotherton's hospital, founded in 1503, for eight poor persons; Reeves's almshouses, founded in 1676; besides a dispensary, lying-in charity, &c. There are barracks for infantry and cavalry, the latter in Clewer parish. A weekly newspaper is published in the town.

The Castle is surrounded on two sides by the Little Park, a very antient and beautiful domain, which at one time formed part of Windsor Forest. Within its precincts is Frogmore Lodge, now occupied by the Duchess of Kent: the grounds comprise about thirteen acres, laid out with great taste. In the reign of Queen Anne that part of Windsor Forest which remained the property of the crown, under the name of the Great Park, was cut off from the Castle by the intervening private property; and it was therefore determined to buy as much land as might be required to complete an avenue from the Castle to the Forest. This is the present Long Walk, generally considered the finest thing of the kind in Europe. It is a perfectly straight line, above three miles in length, running from the principal entrance to the Castle to the top of a commanding hill in the Great Park called Snow Hill. On each side of the road, which is slightly raised, there is a double row of stately elms, now in their maturity. The view from Snow Hill is very fine. In 1832 a colossal equestrian statue of George III. was erected on the highe part of this hill. The total elevation of the statue an pedestal exceeds 50 feet, and the statue (man and horse) 26 feet in height. The walks and drives in the Great Par present scenes of great beauty and variety. At the souther extremity of the Park is Virginia Water, the largest art ficial lake in the kingdom. The eastern side of the Gre Park is chiefly in Surrey.

(*Journey-Book of England*, 'Berkshire;' *Winds Guides; Population Returns for* 1841.)

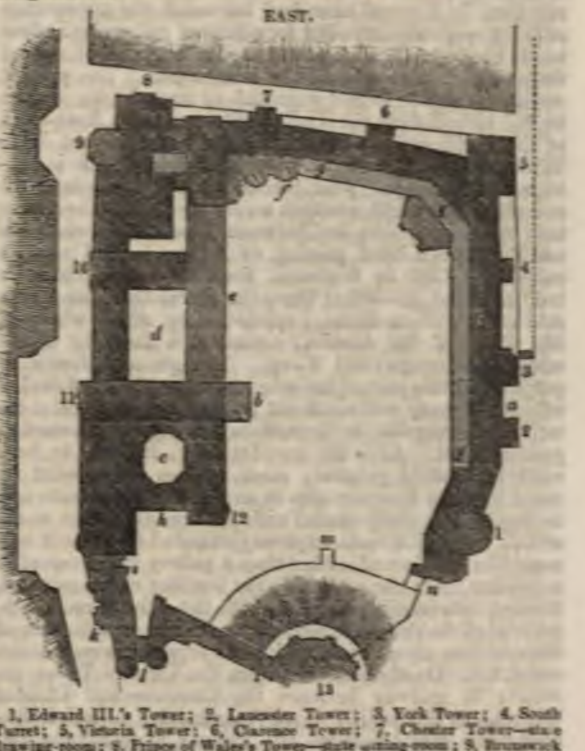
WINDSOR CASTLE. Among the royal and palati edifices of Europe, that of Windsor holds a very hi rank, and is in a manner to England what Versailles is France, and the Escurial to Spain; and while it is in nitely superior to both in point of situation, it far excee them, and indeed every other pile of building of its cla in antiquity. From having been the residence of so ma of our kings, its history is to a certain extent identifi with that of the kingdom itself from the time of the Co quest. In its present state, however, the antiquity of t Castle is little more than nominal, the whole of the habi able part having been remodelled and rebuilt, in cons quence of which it has at least recovered the appearan of antiquity, after nearly every trace of it had been obl terated, and the greater part of the whole pile had bee rendered a motley assemblage of mongrel architectu which of itself, independently of the charms of situatio and prospect, and apart from historical associations, would never have obtained for the 'Castle,' at least not for the exterior, any admiration, there being neither character nor grandeur to recommend it to the eye. This circumstance must be the excuse for the proposition made by a writer signing himself Mela Britannicus, who, when the late alterations were first contemplated, strongly recommended that the whole of the existing buildings should be cleared away, and the site be made one uniform level or terrace, on the centre of which should be erected a compact Grecian edifice of moderate extent!

Relative to the early history of the Castle, only a few of the more prominent dates and epochs of the building can here be noticed; and indeed what is actually recorded amounts to little more than a series of dates interspersed with conjectures. Of the Conqueror's structure on this site so little is known, that it is doubtful whether it was a mere hunting-lodge or a military post; nor have we more positive information in regard to what it became when entirely rebuilt by Henry I., who there took up his residence; or as to the extensive additions, including a chapel, afterwards made by Henry III. In fact it was not until the fourteenth century that the plan of the whole began to assume its present extent and arrangement, when Edward III. first erected the buildings forming the third Upper Ward, to the east of the Keep, whose enclos then became the middle one; and the same king found the 'College or Free Chapel of St. George' in the Low Ward. These works were carried on from about 1350 1374, and were chiefly conducted by William of Wyk ham, who was appointed surveyor in 1356, with a salary one shilling a day. From this period comparatively litt was done until a century afterwards, when Edward I began to re-erect St. George's Chapel nearly as we no behold it, thereby adding, if not immediately to the Cas itself, to the buildings within its precincts, one of extra dinary beauty and interest, as being in some respects t very finest specimen of the perpendicular style and ecclesiastical architecture in the kingdom. What adds some degree to the interest of this edifice, is that the arc tects' names are preserved to us, it being known to be t work, first of Richard Beauchamp, bishop of Salisbu and, after his death in 1481, completed by Sir Regin Bray, who was also the architect of Henry VII.'s Chap Henry VII. intended to erect a mausoleum for himself Windsor, and had begun to do so on the site of the o ginal chapel built by Henry III., but he abandoned t idea in favour of that at Westminster. Henry VII. howe added to the Castle that building which is still called af him, and which is situated near the public entrance to t state apartments, at the western extremity of the ran forming the north side of the great quadrangle. For nately this has been preserved, owing perhaps partly to situation, for, although a mere 'bit,' it is a singularly f one, and a noble specimen of palatial architecture in t particular style.

During the three following reigns no additions were made. The reign of Elizabeth, on the contrary, forms almost an epoch in the architectural history of the Castle, because, though she did not do much to it in the way of building, except annexing to the portion added by Henry VII. that which is distinguished by the name of Queen Elizabeth's Gallery, she first caused the terraces to be formed, thereby giving to the royal abode of Windsor what is not the least striking or least attractive of its characteristics. Under the Stuarts nothing material was done until the Restoration, when the Castle began to be modernized, and in such a tasteless and insipid manner as to have no quality of style of any kind, and nothing of grandeur but what was derived from mere size. The principal addition made by Charles II. was the Star-Building (containing the state apartments, shown to the public); and no doubt this was a very great improvement as regarded the accommodation required for courtly parade. The rooms were sufficiently spacious and lofty, with large arched windows, commanding an enchanting prospect, but in themselves they had little of architectural character and embellishment, except what they derived from the pencil of Verrio. In saying this, we are aware that we have what may seem very strong authority against us, a very different opinion being expressed by the author of the interesting and valuable description which accompanies the 'Illustrations of Windsor Castle,' edited by H. Ashton, Esq. After observing of the rooms generally that they were 'in a style of architecture which may atone by its grandeur and magnificence for what is called its want of purity,' he adds, 'the ceilings especially were decorated in the noblest style art has ever devised.' Without reference however to execution and the degree of talent, or the want of it, so manifested, we cannot help being of opinion that such system of decoration is decidedly unarchitectural in itself. What precise share Sir C. Wren had in the improvements of this period is not stated; but when further additions were afterwards contemplated by William III., he recommended that all the buildings on the south side of the Upper Ward, as far as midway of the Keep, should be replaced by an entirely new and uniform range to be erected, forming a regular façade externally composed of a projecting centre and wings. This scheme however was dropped; nor is it perhaps to be regretted that such was the case, for we might have had another Hampton Court, or else what was then done might have stood greatly in the way of further improvement.

The first two Georges did nothing for Windsor; George III., on the contrary, much, if only by restoring the interior of St. George's Chapel (1787-90), which, little as the execution of Gothic was then understood, was done in so judicious a manner, by scrupulously following the original details, that it requires an experienced eye to detect inaccuracies. Sad mischief however was done by removing the mullions and tracery of the east window and those at the west end of the aisles, in order to fill them up with pictures on glass, after designs by West. In 1796 James Wyatt was first employed at Windsor, and Gothicized the Star-Building and the corresponding portion on the north side of the inner quadrangle as far as St. George's Hall. He also fitted up the state staircase in the same style, and did something to better the domestic arrangements of the interior; but there improvement, such as it had been, stopped, while what had been done produced little other effect than that of making the rest of the Upper Ward and buildings towards the terraces appear meaner than before. Still it was fortunate that the works were interrupted, for had they been carried on till the whole exterior of the residence portion of the Castle had been completed in the same style and on the same scale as then begun, Windsor Castle would have been greatly inferior to what it now is.

Excepting beauty of situation, the Castle had nothing whatever to recommend it as a residence. The whole of the east and south sides, the portions actually inhabited, were singularly inconvenient in every respect,—rambling and also exceedingly confined in plan, with very small rooms, and those for the most part thoroughfare ones, there being no other communication than some narrow passages got out from them on the sides towards the quadrangle, so that in point of accommodation the whole was a mere 'makeshift,' inadequate to that required for a private gentleman's establishment. Hence it was found indispensably necessary to erect (1778-82) a separate building for the actual occupation of the royal family. This, which was called the Queen's Lodge, was merely a large plain house on the south side of the Castle, near the site occupied by the present stables, and was taken down in 1823. About the same time George IV. announced his intention of taking up his abode within the Castle, and converting it into a suitable residence for himself and his successors. Accordingly a grant of 300,000*l*. was readily voted by parliament, in April, 1824, for the projected improvements, since, so far from being thought extravagant, the scheme was a popular one. In the meanwhile four architects had been called upon to furnish designs for the intended works—Soane, Nash, Smirke, and Jeffry Wyatt. The first declined the affair altogether, although there was a fine field opened to his ability in general arrangement and contrivance; and in regard to architectural character he had not much to fear from competition with two at least of his rivals. With regard to the designs produced by these last, nothing whatever has transpired, so that it is impossible to say to what degree or in what respect they were inferior to the one adopted, or whether they may not have had some good points to recommend them. What is not least of all singular is, that no mention nor even allusion to any competition of the kind should be made in the 'Illustrations' and account of the edifice, published by Sir Jeffry's executors: for in consequence of such silence there seems to be a degree of mystery hanging over that part of the business, and doubts are raised as to the correctness of other statements. However, no time was lost in carrying Mr. J. Wyatt's plans into execution, the first stone of 'King George IV.'s Gateway' (forming the principal entrance into the quadrangle on the south side, in a direct line with the Long Walk) being laid by the king himself, August 12th, 1824; on which occasion the architect received the royal authority for altering his name to that of Wyatville [WYATVILLE]; and on the king's taking possession of the private apartments, which were completed by the end of 1828, he received the further distinction of knighthood.



1, Edward III.'s Tower; 2, Lancaster Tower; 3, York Tower; 4, South Turret; 5, Victoria Tower; 6, Clarence Tower; 7, Chester Tower—state drawing-room; 8, Prince of Wales's Tower—state dining-room; 9, Brunswick Tower, octagon, 38 feet diameter externally, height 100 feet; 10, Cornwall Tower—ball-room, 90×32 feet; 11, George IV.'s Tower; 12, King John's Tower; 13, Keep—not a perfect circle, 102 feet in greatest diameter, 93 in smallest; height, 80 feet from the top of the mound; Watch-tower, 25 more; entire height from level of Quadrangle, 148 feet.

a, George IV.'s Gateway, directly facing the Long Walk; *b*, state entrance, with vestibule continued through to North Terrace; *c*, state staircase, occupying site of Brick Court, 50×36 feet; *d*, Waterloo Gallery, on site of Horn Court, 95×46 feet; *e*, St. George's Hall, 190×32 feet; *f*, visitors' entrance; *g*, *g*, *g*, grand corridor; *h*, entrance for public to state apartments; *i*, Henry VII.'s Building; *k*, Queen Elizabeth's Gallery; *l*, Norman towers and gateway; *m*, statue of Charles II.; *n*, St. George's Gateway.

delicious wine, has scarcely a quality, except durability, like that of the original.

Some local influences produce effects which are alike inexplicable and inimitable. These, though generally attributed to the soil, are not always or solely owing to its composition and qualities. In some instances the soil is the main cause of difference, as seen in the Constantia of the Cape. The climate there is most favourable to the growth of the vine, yet in one small space only is a tolerable wine produced, the two contiguous farms of the Great and Little Constantia yielding, the former the red sweet wine, the latter the white Constantia: the soil on which they grow is decomposed sandstone. Where no appreciable difference of soil can be pointed out, differences arise from the cultivation of a different kind of grape. Under the article VITIS (vol. xxvi., p. 398) it is stated, on the authority of Meyen (*Pflanzen-Geographie*, p. 432) that there are instances 'of the same variety of vine being planted on the side of a hill or mountain, and the wine which is the produce of the grapes from the highest parts of the mountain will differ essentially from the wine which is the produce of the grapes of the lower part of the mountain. The wines known by the name of Johannisberger and Rudesheimer in Germany are the produce of vines growing close together, and resembling each other in external characters. The vineyards also that produce the Leistenwein, Würzburger, and Steinwein are very near to each other. It is probable that this difference is owing to the composition of the soil.' This is not altogether correct. Johannisberg is only 150 feet above the level of the Rhine, and it is quite certain that the produce of the summit, close to the castle or Schloss of Johannisberg, is of a quality vastly superior to the produce of the place called Johannesbergerhöhl, not from any peculiar or insurmountable cause, but because the former, belonging to Prince Metternich (and the adjacent parts to some other large proprietors), can receive an amount of careful and skilful treatment, which the other, being divided among a number of small proprietors, never does. This subdivision is the cause of an annual loss of many thousands of pounds. (Bronner, *Weinbau in Süd Deutschland*, Dritte Heft, p. 113.) The grape cultivated in both places is the little Riesling (*Der Kleine riesling* of some, *Weisser riesling* of others; the *Vitis vinifera pusilla* of Babo and Metzger's *Wein und Tafeltrauben der Deutschen Weinberge und Gärten*, Heft viii., t. 46); but in the vineyard of Prince Metternich and the other great proprietors three gatherings of the grapes are made as they reach maturity, and other measures are adopted to ensure a produce of the highest excellence. Besides the protection of the castle wall, the whole has since 1824 been surrounded with a stone wall ten feet high (which occupied ten years in building). This greatly promotes the steady progress to maturity of the grapes by securing a quiescent state of the air, which is known to be extremely beneficial, and which, when imitated on a small scale in this country by surrounding a bunch of grapes with a muslin bag, forwards its ripening very much. The wine of Luginsland and the Liebfrauenmilch owe their superiority over that of the neighbouring vineyards to the protection of the town-wall of Worms. (Bronner, Heft ii., pp. 18-20.) The advantage of protection against agitation of the air is so well understood in the Rheingau, that the belts of vineyards which clothe the height of Hochheim bring very different wines, according to their position. One morgen, close to the bed of the river Main, brings in the market two thousand florins; a higher morgen brings one thousand florins; and one at the summit only five hundred. (Bronner, iii., p. 14.) The geognostic character of the soil of Johannisberg is argillaceous schist, with a very moderate proportion of mica, and in one place passes into a reddish quartz, which is very hard, and undergoes but slowly any decomposition. This is overlaid with diluvial and alluvial deposits in most places except the south-west side. From these and other circumstances it follows that the soil is of a very diversified character. (Bronner, iii., p. 116.) The exposure is south-west, with a slope of from ten to fifteen degrees. Rudesheim is well protected by its natural position and a lofty forest called Niederwald: it is much steeper, so that the earth can be kept from being washed down only by numerous terraces, between which the air is as hot as in a conservatory. The soil is composed of stones of a dark colour, which radiate heat during the night to such a degree, that the grapes are surrounded by almost a southern climate. The grape most common, at least in the old vineyards, is the Orleans (*Vitis v. aureliana*, B. u. M., Heft x., t. 60), which has the property, in this stony and hot ground, of continuing productive till the age of fifty or more, which is not the case with any other grape. But as it only gives a good wine in very favourable years, and as the wine from the Riesling grape brings so high a price, the new vineyards are mostly planted with the Riesling: the propriety of this substitution is very doubtful. (Bronner, iii. 136.) These facts are sufficient to account for the differences between the Johannisberger and Rudesheimer wines.

The differences between Leistenwein and Steinwein are still more easily accounted for. The Leiste is on the left side of the river Main, the Stein on the right, the Stein being close to the river. The soil of both is argillaceous with calcareous portions, especially fragments of lime, and this is the soil commonly met with in Wirtemberg and in all Franconia. Why these two wines should differ from all others of the district is unintelligible; but the differences between themselves is owing to the grapes. The vineyards of the Leiste (*i.e.* the best portion, *gute Leiste*) are planted in a great measure with the Riesling and Traminer (V. v. tyrolensis, B. u. M., Heft xii., t. 72), with about a third of the Elbling grape (V. v. albuelis, B. und M., Heft iii., t. 14); and in the other vineyards is the white Traminer, called *franken*, by some *gutedel* (V. v. aminea, B. u. M., Heft ii., t. 9), *i.e.* both white and black. Besides these there occurs in considerable proportion the Hermitage grape, brought from France, which here succeeds well, retaining its fine aroma, though its natural soil is granitic. The selection of the grapes, when ripe, is attended to with extraordinary care. (Bronner, vi., p. 82.)

The predominant grape of the Stein vineyard is the Elbling, mixed with a few of the Riesling and other sorts. The Leistenwein is with justice regarded as the second finest wine of the south of Germany, but as the whole of the produce of the small space known as the gute Leiste (containing only 2 morgens towards the south-east and 11 quite to the south) is secured for the table of the king of Bavaria, it is scarcely known, and is seldom to be purchased. The Steinwein must not be confounded with the Steinberger wine of the Rhine.

The Montillado of Spain is the produce of a white soil (called albariza, containing 70 per cent. of carbonate of lime, with alumina, silica, and a little magnesia), while the Manzanilla is the produce of the terrains rouges et sablonneux. Yet the wines do not greatly differ in taste or flavour. More importance is attached to the soil than it deserves; its physical properties are of more importance than its chemical; Chaptal was clearly of this opinion, for he maintains that, provided it is porous, free, and light, its component parts are of little consequence. Perhaps calcareous is on the whole the best, simply because it readily imbibes the rain, and allows a clear atmosphere to surround the vines. Even Mr. Busby (see his 'Visit to the Principal Vineyards of France and Spain,' p. 131), who so strenuously maintains the superiority of a calcareous soil, when remarking on the reputation and limited extent of some of the first-rate vineyards, repudiates the idea of the soil being the cause. 'In all those districts which produce wines of high reputation, some few individuals have seen the advantage of selecting a particular variety of grape, and of managing its culture so as to bring it to the highest state of perfection of which it is capable. The same care has been extended to the making and subsequent managememt of their wine, by seizing the most favourable moment for the vintage—by the rapidity with which the grapes are gathered and pressed, so that the whole contents of each vat may be in exactly the same state, and a simultaneous and equal fermentation be secured throughout—by exercising equal discrimination and care in the time and manner of drawing off the wine, and in its subsequent treatment in the vats or casks where it is kept; and lastly, by not selling the wine till it should have acquired all the perfection which it could acquire from age, and by selling, as the produce of their own vineyards, only such vintages as were calculated to acquire or maintain its celebrity. By these means have the vineyards of a few individuals acquired a reputation which has enabled the proprietors to command almost their own prices for their wines; and it was evidently the interest of

persons that the excellence of their wines should be
ted to a peculiarity in the soil, rather than to a system
nagement which others might imitate' (p. 133).

s greatly to be wished that the truth of this impor-
tatement were impressed on all persons having the
e of vineyards, as it is certain that by attention to
and other circumstances quite within their control,
antity of good wine might be much increased and
ice lessened. Bronner distinctly states that in the
trasse near Heidelberg, by obstinate adherence to
d indolent practices, the produce is annually one-
less than it might be (heft vii., p. 20).

ere some peculiar strong-smelling substance exists in
il, an odour is communicated to the wine which ren-
t unpleasant. This is the case when stinkstein (a
variety of subcarbonate of lime, called *pierre*
e) is present. Even wine tainted with this, though
t repulsive, is ultimately relished. The vine-growers
ance and Portugal have so strong an aversion to
ing the vines, from the notion that it deteriorates the
r of the wine, that in the latter country, at least in
ort-yielding district of the Alto Douro, the use of
e is forbidden by law. This seems to be a prejudice,
e German cultivators manure the vines very freely,
wines are more esteemed for *bouquet* than those of
hine; and Bronner justifies the practice (heft iii.
ot only with fresh cow-dung, which is used at Jo-
berg, but with fragments of woollen cloth pre-
steeped in liquid manure and dried, which is
greatly to augment the produce. Professor Rau
testimony to its utility. The practice is adopted
with the red than white grapes; the former every
or fourth year, the latter only every tenth. Even
oprietors of the vineyards near Bordeaux, which
e the highly-prized clarets, employ manure 'once
four or five years.' (Paguierre, *Wines of Bordeaux*,

But perhaps the best manure for vines is the cut-
of the vines themselves when pruned, as recom-
d in Liebig's 'Chemistry in its application to Agri-
e,' 2nd edit., p. 250:—'The vines are pruned in the
July or beginning of August, whilst still fresh and
If they are then cut into small pieces and mixed
he earth, they undergo putrefaction so completely,
the end of four weeks not the smallest trace of them
found.' These restore to the soil the alkalies ab-
d by the grapes, which are so necessary for the per-
of this fruit. Probably ferns, so rich in alkalies,
answer well. But the same vines will yield a wine
very different qualities, at least as to flavour and
e, in different seasons. 'These qualities are, in
of so delicate and inconstant a nature, that they may
to vary from year to year; there being perhaps no
ntages, though collected from the same spot and
ed in the same manner, that will be found com-
identical in flavour and perfume.' (Henderson's
y of Antient and Modern Wines, p. 135.) The cor-
s of this statement is proved by the varying cha-
of the vintages in different years, as seen in the fol-
table, in which it may be observed that the season
was favourable to the vintage in one place, was fre-
y unfavourable to it in another. Hence it rarely
s that the good Port years coincide with the good
years, as a heat which ripens well the grapes in the
ratively cold climate of Medoc scorches the grapes
Alto Douro, and *vice versâ*. The year 1811, com-
called the comet year, was remarkable for the ex-
e of the vintage in almost all the wine-yielding
ies of Europe.

exposure most proper for a vineyard must depend
nany circumstances; above all, on the latitude and
ongitude of the district. At Bordeaux a south-east
re is preferred; at Johannisberg and in Germany
lly, a south-west is deemed best. In the northern
ces of France a northern aspect is thought best, as
es do not stir so soon in spring, and are thus more
from the frosts of early spring, the injurious effects
ch are much dreaded; and as the ripening depends
amount of summer heat—above all, on the length
summer—the circumstance of the start in spring
a little later is of no ultimate detriment.

locality proper for a vineyard is more easily deter-
. A gentle acclivity is the best, especially if it
from the bed of a river, the vapour arising from which, when not excessive, is of great utility to the grapes, keeping the skin soft and distensible, as well as thin, and allowing thereby the solar ray to penetrate to the juices in the interior. Mountains of great height are not suitable, both from the cold and fogs which are common on their summits; but even to this there are exceptions, as the wine called Malaga, or, from its source, Mountain, in Spain, is produced many thousand feet above the level of the sea. Vines do not bear wet, least of all that of land-springs, which chills their roots.

Tabular View of the Vintages of Four of the most different and celebrated Wine-countries, extending from almost the most western to the most eastern points where famous Wines are produced in Europe. In the column of Clarets only the most noted years are given, the intermediate ones being either 'null,' 'bad,' *or only* 'middling.' *The expression* 'good' *refers only to the quality: some years being good, with an abundant produce; others good, while the quantity was small.*

YEAR.	PORT.	CLARET.	RHENISH.	TOKAY.
1775	very fine	...	good	...
1776	light	...	middling	...
1777	very bad	...	bad	...
1778	middling	...	middling	...
1779	middling	...	good	...
1780	middling	...	inferior	...
1781	very good	...	middling	...
1782	good	...	bad	...
1783	middling	...	very good	middling
1784	middling	...	good	middling
1785	middling	...	bad	bad
1786	good	...	bad	bad
1787	middling	...	bad	bad
1788	middling	...	middling	good
1789	middling	...	inferior	middling
1790	good	...	bad	middling
1791	various	very good	bad	bad
1792	middling	...	bad	good
1793	good	...	bad	good
1794	middling	...	good	good
1795	middling	very good	inferior	bad
1796	good	...	inferior	middling
1797	very bad	...	bad	good
1798	very bad	first-rate	middling	middling
1799	bad	...	bad	bad
1800	bad	...	good	bad
1801	bad	...	middling	middling
1802	good	very good	good	middling
1803	good	...	middling	middling
1804	good	...	good	middling
1805	middling	...	bad	bad
1806	very good	...	good	good
1807	middling	...	middling	middling
1808	middling	...	inferior	middling
1809	middling	...	bad	bad
1810	good	...	bad	middling
1811	good	first rate	very good	very good
1812	fine	...	middling	good
1813	middling	...	bad	bad
1814	middling	...	bad	bad
1815	very fine	first-rate	middling	bad
1816	middling	...	very bad	bad
1817	middling	...	very bad	middling
1818	very bad	...	middling	middling
1819	bad	good	good	middling
1820	very fine	...	inferior	bad
1821	fine	...	inferior	middling
1822	fine	...	very good	good
1823	fairish	...	inferior	good
1824	inferior	...	inferior	middling
1825	bad	very good	middling	bad
1826	middling	...	good	middling
1827	fine	...	good	good
1828	middling	...	inferior	bad
1829	bad	...	bad	bad
1830	fine	...	bad	good
1831	inferior	...	good	middling
1832	inferior	...	inferior	...
1833	middling	...	inferior	...
1834	very fine	good	very good	...
1835	middling	...	inferior	...
1836	inferior	...	inferior	...
1837	inferior	...	bad	...
1838	inferior	...	bad	...
1839	bad	...	bad	...
1840	very fine	...	bad	...
1841	bad	...	bad	...
1842	fine	...	middling	...

The mode of planting, propping, training, pruning, and renewing the vines has a very great influence on the quantity and quality of the produce. Allowing the vines to grow unrestrained is a sure method of deteriorating the quality; and although the picturesque appearance of the vines spreading in graceful festoons, a sight only to be seen in Italy and a very few places in the south of France, corresponds to the idea formed of a vineyard, yet all skilful cultivators keep them low. This method is followed in France, Germany, and Portugal; in the very sandy parts of Spain, they are even allowed to trail along the ground.

Elsewhere they are supported by props or trellises. The nearer to the ground the grapes are kept, the more potent is the wine; moreover the vines flower earlier and the grapes are sooner ripe, thus rendering the vintage more certain. Along the Moselle, at least in the old vineyards, where the vines are allowed to grow six or nine feet high, the wine of these vineyards is much lighter than that of the Rhine or Nahethal. At Oppenheim, on the Rhine, a very peculiar mode of training the vines is followed; and the wine there is also very light, destitute of the fiery character of those of the neighbourhood, and, being less esteemed, sells for one-half less; it is however a very wholesome wine.

If the soil be stony and of a black colour, there is great advantage in having the grapes near it, as they not only get the benefit of the reflected light during the day, which, coming on the lower and under parts of the branches, conduces much to their ripening, but the heat radiated from the earth during the night keeps the lower branches surrounded by a steady mild atmosphere, which is highly favourable to them. Thus the grapes on the lower branches are often ripe first, and many which, owing to their position under the leaves, never receive the direct sun-beams, ripen perfectly. Bocking is of opinion that it is the bunches from beneath the leaves which chiefly give the bouquet to wine, and not those which are exposed to the sun. The utility of a black soil of argillaceous schist in forwarding the maturity of the grapes was long ago pointed out by Humboldt (*Mineralogische Beobachtungen über einige Basalte am Rhein*, 1790, p. 81). This is imitated in this country by painting the surface of walls for wall-fruit of a black colour.

The vine is very apt to be injured by the frosts of early spring or by the hail-storms which are liable to happen at a later period. These casualties are in some degree guarded against by the ingenious device called *paragelée*, against the frosts, and *paragrêle*, against hail. Numerous insects infest the vine, some of which are very destructive. (See a very complete account of them by Baron Walckenaer, in Taylor's *Scientific Memoirs*, vol. i.; and in the work of Köllar; also Victor Audouin, *Histoire des Insectes nuisibles à la Vigne, et particulièrement de la Pyrale*, 4to., 1842.) The crop is also apt to be ruined by excessive wet, either early in spring or when the grapes are approaching maturity; the rains which fell in September, 1842, completely ruined the claret vintage of that year, which was in a very promising state down to that period.

The vine exhibits such numerous varieties, that it is impossible to notice them. Under Napoleon, Chaptal collected in the garden of the Luxembourg fourteen hundred varieties; but this fine collection is now greatly neglected, and scarcely one vine has its name attached. A list of 570 varieties may be found in Mr. Busby's 'Visit to the Vineyards of Spain and France,' p. 149. No rule can be laid down as to the proper kind of grape to cultivate in any particular locality: that grape is the best which ripens soonest. The red grapes generally ripen ten or twelve days before the white. It is of importance to use one kind only, or, where several are used, to be careful that they reach maturity at the same time. Upon the careful selection of the grapes when in perfection depends much of the superiority of the Johannisberger and other of the more famous Rhine wines, three successive gatherings being often made, at considerable intervals. The removal of every unsound grape from each bunch is also carefully performed in these well-ordered vineyards. The stage at which the grape is fit for gathering depends upon the kind of wine intended to be made. When a brisk wine is wished, such as Champagne, the grapes are gathered before they are fully ripe; and they may be collected even in foggy weather, or before the dew is dissipated from the vines; though for all other kinds dry clear weather is proper. (Henderson, p. 15.) This author (in general so accurate) states that 'if the object be to obtain a dry full-flavoured wine, the grapes should be gathered as soon as they have acquired their proper maturity, and before they begin to shrink or wither on the stalk.' But in the case of the most esteemed German wines, which are the *driest* of all, the gathering of the grape is postponed as late as possible, by which many free acids are got rid of, and the wine at a much earlier period of keeping is so soft and delicate, that the new wines are preferred to the extremely old wines, *which were in great* request previous to the adoption of the plan of late-gathering. Thus at Johannisberg the vintage of 1811 was very late; that of 1831 did not commence till the 17th October, nor did it conclude till the 5th November; and in 1834 the grapes were all hanging on the vines, but perfectly sound, so late as November. Yet these are among the most renowned vintages of the present century.

In the warmer parts of the south of Spain and of France, and also at Tokay, where vins de liqueurs are made, the grapes are allowed to remain very long on the vines; the stalks are twisted, so as to prevent the influx of any recent sap; the thinner or watery portion evaporates, and the dry or shrivelled grape almost resembles a raisin, and contains much sugar. On the Rhône 'a small quantity of sweet wine is made from the ripest grapes, which are hung up on hurdles, or spread on straw, for six or eight weeks, or until they become half dried. The liquor obtained from them, from the mode of preparation, receives the name of *straw wine* (*vin de paille*).' In some cases the must is boiled; this is often done with the sherries of Spain: when the boiling is carried far, a very sweet luscious wine is produced, such as the wine of Cyprus, the *vino cotto* of the Italians (*vinum coctum* of the antients), the original Malmseys of Candia, and the other rich wines of the Grecian Archipelago.

The process pursued with other wines, though subject to modifications in different places, may be best learnt from the practice pursued in the Claret country, where it is universally allowed that the highest degree of skill, attention, and experience is exhibited. But before giving the details, it is necessary to take a view of the chemical composition of the grape and of its juice, both in the unripe and ripe states.

The grape itself has not been made the subject of strict chemical analysis, but the juice (called *verjuice*) of the unripe grape, and that of the ripe (termed *must*), have been analyzed by the following chemists:—

Juice of the Unripe Grape.			Ripe Grape.
PROUST.	GEIGER.		PROUST.
Extractive Malic acid, a little Citric acid, much Bi-tartrate of potash Sulphate of potash Sulphate of lime	1. Deposit from the juice.	Wax Chlorophylle Tannin Glutinous matter	Extractive Sugar (granular and crystallizable) Gum Glutinous matter Malic acid (a little) Citric acid, a little tartaric acid, [illegible] Bi-tartrate of potash
	2. Filtered juice.	Tannin Extractive Sugar (uncrystallizable) Gallic acid Tartaric acid (free, about 1·12 per cent.) Malic acid (free, about 2·19 per cent.) Bi-tartrate of potash Malate, phosphate, sulphate, and muriate of lime	
	Juice of white grape of good quality.		Ripe grape juice.

Bérard also found an odorous matter (to be afterwards spoken of), also malate of lime and super-tartrate of lime.

The seeds of the grape yield the purest tannin; fixed oil exists also in the seeds and kernels of the grape, and is especially abundant in the south of France. The colouring principle resides entirely in the skin, except in the grape called Tintilla (from which the wine called *tent* of Spain is made), and which is entirely penetrated by the colouring principle. It is used in dyeing, hence called by the French *teinturier*, or l'Alicante.

The colour of any wine is not dependent on the colour of the grape from which it is prepared. Champagne is the produce of a red grape: red and white grapes are used indiscriminately for Sherry; but white Port is made only from a white grape.

The stalks promote the fermentation, and if they, as well as the hulls or skins, are withdrawn before the fermentation has proceeded far, as it is not till some alcohol is generated that the colouring principle is dissolved, those even of red grapes neither communicate colour nor taste to the wine. They are early withdrawn from the delicate red wines of Bordeaux; but retained longer in the red wines of Portugal; hence the greater austerity and astringency of the latter. The wine of Cahors, prepared from a grape called *Auxerrois*, or *pied de perdrix*, yields a wine almost black, the colour being deepened by an admixture of a preparation called *raugome*, which is merely a portion of the must of this grape, boiled for a few minutes with the strongest spirit of wine, in the proportion of one part of spirit to four of must, added to it. This extracts the colouring principle most thoroughly; and communicates not only to the wine of Cahors, but also to many of the Bordeaux wines, to which raugome is frequently added, a deep hue. 'The more this preparation is required and added, the less the wine will bear keeping.' (Paguierre, p. 112.)

The wines of the Moselle may be distinguished from those of the Rhine by having a greenish colour, while the latter have a yellowish colour. At Cotnar, in Moldavia, a wine is prepared which is green, and which becomes deeper by time, while the strength increases so much, that if the wine be kept in a deep and well-vaulted cellar, in three or four years it almost resembles brandy, but without so readily affecting the head. 'On exposing red wines in bottles to the action of the sun's rays the colouring-matter is separated in large flakes, without altering the flavour of the wine.' (Henderson.) Sulphurous acid ought not to be used for fuming the casks into which red wine is to be put, as it destroys their colour. Spirit of wine should be used to rinse such casks.

The colour of wine is judged of by placing some of it in a small silver tray or saucer (called in Portuguese *tambuladeira*) slightly raised in the centre; the colour it exhibits as it passes over the convex centre when agitated, is that which guides the broker.

To proceed with the steps towards the conversion of the must into wine. 'Before beginning the vintage it is necessary to be assured that the fruit which is to be gathered has attained the proper and necessary maturity, for on this almost always depends, in a great measure, the quality of the wine. The cultivator is liable to fall into one of two errors, which, though very different and opposite to each other, are not less hurtful to the wine, especially to the red, which is more delicate and susceptible of injury in making than the white. If gathered too soon, and before the grape has attained to the fit degree of maturity, the wine is likely to be raw (*vert*), which is the greatest fault it can have, and the most difficult to correct; the wines having this defect becoming generally hard when old. The other error, though of less consequence, is leaving the grapes till they are too ripe, which may then rot before gathered.' (In the north of France this is more liable to occur; in the south, less so: at Langoe, between Bordeaux and Toulouse, a white sweet wine is prepared from spoiled grapes.) 'The wine made from grapes too ripe acquires a sweetish taste, which causes it to work a long while in the barrels, and renders it sour and difficult to keep. The wine attacked by this vice requires greater care than any other; for if neglected ever so little, either in racking or filling, it easily becomes sour. However, it is better to gather late than too soon.' (Paguierre, p. 47.) At Tokay, where the grapes are allowed to hang on the vines till some of them lose their globular shape and transparency (*trockenbeeren*), the gatherers put these into a separate basket; and the juice which exudes from them simply by the pressure of one above the other is carefully collected, and known under the name of *Tokayer-essenz*. This thick syrupy liquid does not ferment, and always remains thick and muddy. It is not an article of commerce, as the cultivators keep it to add to the finest wine (called *Ausbruch*) either at the beginning of the fermentation or at the termination. The former is the preferable mode.

In the Claret country the mode of proceeding is this, in the words of Paguierre ('Wines of Bordeaux,' p. 49):—'The proprietors of the vineyards, and especially of the first growths (for it is of them we principally speak), after having prepared the wine-vessels, and cleaned and rinsed them with spirits of wine of the highest proof, or brandy, gather the grapes together and pick them, that is, set aside all the bunches which are rotten, those which do not seem quite ripe, or which are withered, and, finally all which might hurt the quality of the wine. Their first care then is to make a principal vat of the best fruit, which is called the mother-cask (*cuve-mère*), into which, after picking, they put the first and best grapes which arrive, without their stalks, and without treading them, till they are from fifteen to twenty inches deep; after which they throw about two gallons of old Cognac or Armagnac upon them, and then another bed of picked grapes, followed by two gallons more of brandy, and so on till the vat is full. When full they throw two or four gallons of spirit of wine, according to the size of the vat, taking for proportion about four gallons of spirits of wine for a wine-vat of from thirty to thirty-six tuns. It must be observed that the quantity of brandy or spirits of wine depends on the quality of the vintage; for if bad, more must be put, in order to excite fermentation, and replace what it wants by defect of maturity. (Of late it has become customary to add starch-sugar when the grapes are deficient in saccharine principles.) In the very bad years, such as 1816, 1817, or 1826, the crop not being able to ripen, and the juice unable to enter into fermentation, it was necessary to excite it by artificial heat from chafing-dishes, &c.; but this seldom happens.

'The *cuve-mère* being filled, it is shut hermetically, and is well covered with blankets, in order that the air may not penetrate. This vat is left in this state for three weeks or a month without being touched, taking care to visit it from time to time in case of accident. A small brass cock is put into the side of the vat, at about the height of the third of its depth from the bottom, in order to be able to judge at will of the progress of the fermentation, and to know the moment when, the ebullition having subsided, it may be racked off and put into casks, prepared beforehand by scalding and rinsing with a little spirits of wine.

'It is known that the liquor is fit to be drawn off when it has become cool and is sufficiently clear.

'While the *mère-cuve* is at work, the vintage is continued in the usual manner, *i.e.* as the grapes are brought in and picked, they are trodden in the press, and put with their stalks into the vats, where the fermentation takes place naturally. These vessels are not entirely filled; about one foot or fifteen inches are left for the fermentation, which sometimes overflows, especially when the vintage has attained perfect maturity.

'They call *chapeau* the stalks, seeds, and skins, &c., which float on the surface of the wine.

'The vintage being finished, and the vats lightly covered, they are left to ferment, taking care to visit them twice a day. To rack them it is necessary to wait till they are quite cold, which is from eight to twelve days, depending on the greater or lesser fermentation, according to the quality or goodness of the vintage; for the better the vintage succeeds the stronger is the fermentation. From the moment that the cask has become sufficiently cool, it is necessary to draw it off; for if you leave the wine upon the lees (*marre*), or with its crust (*chapeau*), it would take the taste of the stalks, which is very disagreeable and difficult to get rid of, and is a great defect. If the cask be racked off too soon, the fermentation would not be complete, and the wine would run the risk of working too much in the barrel, and of not keeping.

'When the vats are found to be in a proper state for racking, the wine is drawn off into barrels prepared for the purpose, which are filled about two-thirds or three-fourths; after which the *cuve-mère* is emptied, and the wine is poured in equal portions into these casks so as to fill them; and the remainder is employed to fill up, every six or eight days, what is consumed by evaporation, or what the casks have ullaged.

'All proprietors have not the means or localities to make a *mère-cuve* by means of old brandy or spirits of wine, either because their vintage is not sufficiently extensive, or because they do not possess the things necessary for its execution. But it is well known that the fermentation succeeds much better in large vessels, especially when prepared as above, than in the lesser ones used by small proprietors. The casks, being full, are left about eight days without being bunged; care however is taken for the time to cover the bung-hole with a stone, brick, or piece of wood. They are filled up every two days, and when bunged, every eight days at least, till the wine is in a state to allow the cask to be kept with the bung-hole at the side, which is not till after eighteen months.

'*Manner of making White Wine.*—To make the white wine it is not, like the red, put into the vat to ferment, but the grapes are trod, and when taken from the press, the juice, skins, and seeds are put into casks (the stalks having been separated); here it ferments and becomes wine of itself. When the fermentation in the barrels has entirely ceased, it is racked off, and care is taken to fill up what has been consumed by evaporation, as often as possible, and this operation ought to take place at least once or twice a week.

'The wine, if it has succeeded, ought to be clear, transparent, of a fine soft colour, a lively smell, and a balsamic taste, slightly piquant, but agreeable, inclining to that of the raspberry, violet, or mignonette, filling the mouth, and passing without irritating the throat, giving a gentle heat to the stomach, and not getting too quickly into the head.'

It is necessary to know what is meant by the 'flavour' of wine, and what is meant by 'bouquet,' terms often confounded. The flavour of wine, called by the French *sève*, indicates the vinous power and aromatic savour which are felt in the act of swallowing the wine, embalming the mouth, and continuing to be felt after the passage of the liquor. It seems to consist of the impression made by the alcohol and the aromatic particles which are liberated and volatilized as soon as the wine receives the warmth of the mouth and stomach. The *sève* differs from the *bouquet*, inasmuch as the latter declares itself the moment the wine is exposed to the air; it is no criterion of the vinous force or quantity of alcohol present (being in fact greatest in the weak wines), and influences the organ of smell rather than of taste. (Jullien, p. 30.) In the red wines of Medoc and the Graves, the *sève* and *bouquet* exist only in the old wines: these qualities cannot be known, but only conjectured in the new wines; and experience has alone taught the brokers, that when wines of particular growths present themselves without harshness (*verdeur*), with colour, body, and vinosity, they will, when old, acquire a balsamic flavour (*sève*) and mellowness (*moëlleux*), besides the colour and body; they will also keep well, which constitutes the perfection of wine.

To give bouquet to the wine, two drachms of orris (the rhizoma of the Iris florentina) in powder are put into a fine bag of muslin, and hung for about fifteen days in the cask. Many persons, to make the wine appear older and higher flavoured, and at the same time to prevent injuring its quality, employ raspberry brandy. The bouquet which by these means is given to the common or ordinary wines never replaces perfectly the natural flavour of the choice wines of Medoc and Graves. It is very easy to distinguish the fictitious bouquet by even moderate experience in tasting wine.

The bouquet of wine is altogether a new product, and is in no way dependent on the perfume of the grape from which the wine is made. Red wines scarcely ever retain a trace of the odour of the grapes; the white muscadine wines do in some degree, especially Frontignan. It has been recommended to suspend some of the ripest and most odoriferous bunches of the grapes in the cask after the first fermentation has subsided, in order to heighten the perfume of the wine, a practice long pursued in the *vini raspati* of the Italians, and *vins rapés* of the French. But if the *œnanthic acid* and *œnanthic æther*, on which the bouquet depends, be the consequence of a true process of putrefaction (somewhat similar to what occurs in musk, by which the odour is evolved), by a mutual interchange of the elements of gluten and sugar, this process cannot accomplish the object, and only runs the risk of exciting a hurtful fermentation. The best account of the bouquet of wine is given by Liebig, who, with Pélouze, discovered œnanthic æther:—'It is well known that wine and fermented liquors generally contain, in addition to alcohol, other substances which could not be detected before their fermentation, and which must have been formed, therefore, during that process. The smell and taste which distinguish wine from all other fermented liquids are known to depend upon an ether of a volatile and highly combustible acid, which is of an oily nature, and to which the name of œnanthic æther has been given. Œnanthic acid contains an equal number of equivalents of carbon and hydrogen—exactly the same proportions of these elements, therefore, as sugar; but by no means the same proportion of oxygen.

'The substances in wine to which its taste and smell are owing, are generated during the fermentation of the juice of such grapes as contain a certain quantity of tartaric acid; they are not found in wines which are free from all acid, or which contain a different organic acid, such as acetic acid.

'The wines of warm climates possess no odour; wines grown in France have it in a marked degree, but in the wines from the Rhine the perfume is most intense. The kinds of grapes on the Rhine which ripen very late, and scarcely ever completely, such as the *Riesling* and *Orleans*, have the strongest perfume or bouquet, and contain proportionally a larger quantity of tartaric acid. Th
grapes, such as the *Ruländer* and others, contain
proportion of alcohol, and are similar to Spanish
their flavour, but they possess no bouquet.

'The grapes grown at the Cape from Riesling
planted from the Rhine, produce an excellent win
does not however possess the aroma which distin
Rhenish wine. It is evident from these facts, that
of wines, and their characteristic perfumes, ha
connection, for they are always found together, a
scarcely be doubted that the presence of the form
cises a certain influence on the formation of th
Whatever opinion may be held regarding the orig
volatile odoriferous substances obtained in the
tion of wine, it is quite certain that the char
smell of wine is owing to an æther of an organic
sembling one of the fatty acids.

'It is only in liquids which contain other ver
acids, that the fatty acids and œnanthic acid are
of entering into combination with the æther of alc
of thus producing compounds of a peculiar sme
æther is found in all wines which contain a free
is absent from those in which no acids are prese
acid, therefore, is the means by which the smell
duced; since without its presence œnanthic æth
not be formed.

'On the Rhine also an artificial bouquet is often
wine for fraudulent purposes, by the addition of
species of the sage and rue to the fermenting liqu
the perfume thus obtained differs from the genuine
by its inferior durability, it being gradually dis
(Liebig's *Organic Chemistry in its application t*
culture, 2nd ed., p. 315.)

The fermentation is more prompt and lively
portion to the quantity of must; hence the best
made when a large quantity of must is operated
is only when a very small quantity of some
grape is to be fermented that small vats are ev
In some cases, when the season is cold and th
imperfectly ripened, it is necessary to promote
mentation by artificial means; either adding so
ing must, or withdrawing some of the excess
by adding baked gypsum. This last uneconom
ceeding is now laid aside in France, being super
the practice of adding starch-sugar. The fermen
best carried on in covered vats, since in open ones
the carbonic acid gas escapes, by which the win
dered flatter, but much of the alcohol and aroma
and the wine rendered weak. The length of time
fermentation is continued in the large vats depen
kind of wine intended to be made. The tempera
influences its progress and the results. In the Ch
country, the grapes which are to fill one *cuv*
pressed within the space of two hours, and
allowed to remain in the *cuve* for a period vary
six or twelve to eighteen hours, according to the
ture, during which it undergoes a process of spo
purification, becoming as clear as water. The
when this is complete is watched for with the utm
it is then drawn off into small casks, which are
phured (a process which is hereafter explained),
into cellars below ground, the bunghole being
but covered with a flint stone. The overflowing
yeast, is removed from time to time till Dece
January, when the chief purchases are made, as
wine can be tasted and proved. It is then also s
to the process of *fining*.

At Tokay the must is allowed to remain in the
twenty-four to thirty-six hours, till the first sign
mentation are manifested; it is then drawn off in
casks (which are never sulphured) and placed in a
of the cellar. The effervescence lasts two or three

The fermentation spoken of hitherto is called the
or active fermentation; but there is a subsequ
called the secondary or insensible, which, though
a continuation of the former, is less attended to, b
great importance as relates to the ripening, keep
acidity of the wine. A knowledge of the cause
mentation, and the conditions under which it
place, is essential to the comprehension of the
necessary for ripening the wine and preserving it
fection. The subject has been fully explained in
'Chemistry of Agriculture,' and a summary only

given here. The cause may be expressed in the following law of La Place and Berthollet:—‘A molecule set in motion by any power can impart its own motion to another molecule with which it may be in contact.’ Fermented yeast is a body in a state of decomposition, the atoms of which consequently are in a state of motion or transposition. Yeast placed in contact with sugar communicates to the elements of that compound the same state; in consequence of which the constituents of the sugar arrange themselves into new and simpler forms, namely, into alcohol and carbonic acid. In these new compounds the elements are united together by stronger affinities than they were in the sugar, and therefore under the conditions in which they were produced further decomposition is arrested.

In the juice of the grape fermentation is excited by the access of air, alcohol and carbonic acid being formed by the decomposition of the sugar contained in the fluid. But the process once commenced, continues till all the sugar is completely decomposed, quite independently of any further influence of the air. In addition to the alcohol and carbonic acid formed by the fermentation of the juice, there is also produced a yellow or grey insoluble substance, containing a large quantity of nitrogen. It is this body which possesses the power of inducing fermentation in a new solution of sugar, and which has in consequence received the name of *ferment*. The alcohol and carbonic acid are produced from the elements of the sugar, and the ferment from those azotized constituents of the grape-juice which have been termed gluten or vegetable albumen. Gluten dissolved in pure water undergoes a process of decomposition; but the decomposition which it suffers in an isolated state, and that which it undergoes when dissolved in a vegetable juice, belong to two different kinds of transformations. There is reason to believe that its change to the insoluble state depends on an absorption of oxygen, for its separation in this state may be effected under certain conditions by free exposure to the air without the presence of fermenting sugar. It is known also that the juice of grapes or vegetable juices in general become turbid when in contact with air before fermentation commences; and this turbidity is owing to the formation of an insoluble precipitate of the same nature as ferment. The oxygen consumed in the fermentation of wine or beer is not taken from the atmosphere, though the access of this is necessary to excite it in the first instance. Gluten seems to act towards sugar as diastase does towards starch, namely, imparts that impetus to it which enables it to alter its condition. When both gluten and sugar are present in a liquid, fermentation will go on till the decomposition of one or other be complete. When the quantity of ferment is too small in proportion to that of the sugar, its putrefaction will be completed before the transformation of all the sugar is effected. Some sugar here remains undecomposed, as the cause of its transformation is absent, viz. contact with a body in a state of decomposition, as happens in the *vins de liqueurs*, or sweet wines. But when the quantity of ferment predominates, a certain quantity of it remains after all the sugar has fermented, its decomposition proceeding very slowly on account of its insolubility in water. This residue is still able to induce fermentation when introduced into a fresh solution of sugar, and retains the same power until it has passed through all the stages of its own transformation. Hence a certain quantity of yeast is necessary in order to effect the transformation of a certain portion of sugar; not because it acts by its quantity in increasing any affinity, but because its influence depends solely on its presence, and its presence is necessary until the last atom of sugar is decomposed.

‘The juice of grapes grown in different climates differs not only in the proportion of free acid which it contains, but also in respect of the quantity of sugar dissolved in it.

‘The quantity of azotized matter in the juice seems to be the same in whatever part the grapes may grow; at least no difference has been observed in the amount of yeast formed during fermentation in the south of France and on the Rhine.

‘The grapes grown in hot climates, as well as the boiled juice obtained from them, are proportionally rich in sugar. Hence during the fermentation of the juice the complete decomposition of its azotized matters, and their separation in the insoluble state, are effected before all the sugar has been converted into alcohol and carbonic acid. A certain quantity of the sugar consequently remains mixed with the wine in an undecomposed state, the condition necessary for its further decomposition being absent.

‘The azotized matters in the juice of grapes of the temperate zones, on the contrary, are not completely separated in the insoluble state, when the entire transformation of the sugar is effected. The wine of these grapes therefore does not contain sugar, but variable quantities of undecomposed gluten in solution. This gluten gives the wine the property of becoming spontaneously converted into vinegar when the access of air is not prevented. For it absorbs oxygen and becomes insoluble; and its oxidation is communicated to the alcohol, which is converted into acetic acid.

‘By allowing the wine to remain at rest in casks with a very limited access of air, and at the lowest possible temperature, the oxidation of this azotized matter is effected without the alcohol undergoing the same change, a higher temperature being necessary to enable alcohol to combine with oxygen. As long as the wine in the stilling-casks deposits yeast, it can still be caused to ferment by the addition of sugar; but old well-layed wine has lost this property, because the condition necessary for fermentation, namely, a substance in the act of decomposition or putrefaction, is no longer present in it. In hotels and other places, where wine is drawn gradually from a cask, and a proportional quantity of air necessarily introduced, its eremacausis, that is, its conversion into acetic acid, is prevented by the addition of a small quantity of sulphurous acid. This acid, by entering into combination with the oxygen of the air contained in the cask or dissolved in the wine, prevents the oxidation of the organic matter.’ (Liebig, 2nd ed., p. 321.)

It appears from the experiments of Schwann, that vinous fermentation is constantly connected with the development of a peculiar fungus, which he proposes to call *Saccharomyces*. Different species of it seem to be present in different fermenting fluids; hence the names S. vini, cerevisiæ, and pomorum, according as it exists in wine, beer, or cider. (Schwann, *Vorläufige Mittheilungen betreffend Versuche über die Weingährung und Fäulniss*; Poggendorff's *Ann. der Phys. und Chem.*, xli., p. 184; Cogniard-Latour, *L'Institut*, 18th Feb., 1837, No. 199, p. 73; Meyen, *Report on the Progress of Vegetable Physiology during the Year* 1837, p. 83; Meyen, *Jahresbericht von dem Jahre* 1838, p. 56; Meyen, *Pflanzen-Physiologie*, vol. ii., p. 455, tab. x., f. 22; Quevenne, *Journ. de Pharmacie*, Juin, 1838, p. 265; and *British and Foreign Med. Review*, vol. ix., p. 579.)

Quevenne has found that, though the development of the fungus and fermentation are two distinct actions, whatever represses the growth of the former hinders the latter. Certain free organic acids must be present, and alkalies, which combine with them, stop completely the process of fermentation.

A knowledge of these facts will enable us to comprehend the nature and object of the practices adopted empirically for the preservation of wine; above all, of those which are requisite to prevent it passing into the state of acetic acid, to which the wines of northern countries, or poor weak wines, are most prone.

The whole process may be simply expressed thus. Grape-sugar is a compound of carbon, hydrogen, and oxygen. In the action of fermentation the relative proportion of the atoms is disturbed, owing to the presence of an exciter (ferment), by which carbonic acid and alcohol are produced (the former in a great measure flying off in the form of gas), the result being a diminution of the atoms of carbon and oxygen:—

Three atoms of sugar = 3 atoms hydrogen, 3 atoms carbon, 3 atoms oxygen, decomposed;
One atom of alcohol = 3 atoms hydrogen, 2 atoms carbon, 1 atom oxygen, formed;
One atom of carbonic acid = 1 atom carbon, 2 atoms oxygen, formed. [ALCOHOL.]

So long as any sugar is present, the power of the gluten (exciter) is exerted in converting it into alcohol; but no sugar remaining, its energy is directed to the alcohol, which is changed into vinegar by acquiring one atom of oxygen; yet not immediately, as is frequently stated, but through the influence of *aldehyde*, which is alcohol deprived of two atoms of hydrogen, the hydrogen being oxidized at the expense of the oxygen in contact with it, and forming water, heat being evolved at the same time: the aldehyde, having a great affinity for oxygen, combines therefore directly with it, producing acetic acid. The formula for these is as follows:—

Grape-sugar . .	$C_{12} H_{14} O_{14}$
This contains exactly the elements of four atoms of carbonic acid *gas* .	C_8 .. O_2 *disappears.*
and two atoms of alcohol .	$C_4 H_6 O_2$
The formation of acetic acid from alcohol consists of two stages: 1st, the abstraction of hydrogen, by which aldehyde is formed; and, 2ndly, the addition of oxygen, by which acetic acid is produced. Alcohol . .	$C_4 H_6 O_2$
gives by .	$-H_2$
Aldehyde . . .	$C_4 H_4 O_2$
and this gives by . .	$+O_2$
Hydrated acetic acid. .	$C_4 H_4 O_4$
Or hypothetic dry acetic acid	$C_4 H_3 O_3$

(Kane's *Elements of Chemistry*, p. 896, &c.)

The one atom of hydrogen taken from the aldehyde has combined with one atom of oxygen to form water, which also results from the process. Hence the necessity of excluding the atmospheric air, as the chief source of oxygen; or introducing some other element which will combine with the oxygen more readily than the aldehyde can do; or keeping the alcohol at a low temperature, which is adverse to this combination. These various objects are attempted to be accomplished by *racking*, *sulphuring*, *fining*, *mixing*, *bottling*, and *keeping the wine in cellars the temperature of which is low.*

It must be obvious that the employment of these means is directed against the occurrence of the *acetous* fermentation, as they are mostly inadequate to check the *vinous* fermentation, and altogether unnecessary, since, so long as the vinous fermentation is going on, *i. e.* as long [illegible] alcohol continues to be generated, the wine is gaining in quality. Once begun, the presence of atmospheric air is nowise necessary for the continuation of the vinous fermentation; the more thoroughly it is excluded therefore, while the vinous (insensible) fermentation, by which the wine is ameliorated, goes on, the acetous fermentation cannot commence.

From the above extract from Liebig, it appears that while the azotized matter (gluten) in grapes, wherever grown, is a fixed quantity, the acids and saccharine matter are variable. When there is more saccharine matter, as in Rivesaltes, Frontignan, and Tokay, than there is gluten to transform into alcohol, a portion of undecomposed sugar remains, sufficient not only to give that taste which has acquired for them the name of *sweet* wines, but also to exert the usual preservative power of sugar, when present in large quantities, and resist decomposition. Thus Muscadine wine has been kept two hundred years; Mountain, buried at the time of the fire of London, and disinterred in 1811, was excellent; and old Tokay, called *vino vitrawno*, is in perfection at the end of a century. This wine needs neither sulphuring nor fining (Schams, *Ungarns Weinbau*, erster band, p. 75); the casks are hermetically bunged. And the reason is obvious. To the juice of grapes grown in colder climates or cold seasons, sugar, especially starch-sugar, is added at the beginning of the fermentation, in order to consume all the leaven. Also to wine which it is apprehended is about to become sour, or *pricked*, as the first sign of its becoming acetified is termed, sugar is also added; but if vinegar has really been formed, this introduction of sugar, so far from hindering, only hastens the further transformation, as the presence of vinegar is the most powerfully disposing agent to this change.

When a *dry* wine is wished, it is necessary that all the sugar should be transformed into alcohol. To do this the fermentation is excited from time to time, by *rolling* the wine, or returning it to the lees to *feed*. As the wine contains variable quantities of undecomposed gluten in solution or thrown down to the bottom of the cask, it is only necessary to stir up the lees to re-excite the
tation.

But lest the point should be passed when th
fermentation is nearly complete, and the aceto
begin, all the undecomposed ferment is removed
of it remains in the vat in which the first an
fermentation takes place; when the fermenting
put in casks, these are generally kept nearly ful
quent additions of fresh juice, so that much of the
works out at the bung-hole, which is seldom
closed for two or three months. Racking is
for valuable wines, as often as three times the
This consists in transferring the wine to a fresh
is in doing this that the practice of *sulphuring*
adopted. It consists in burning sulphur-ma
linen steeped in sulphur in the cask, previou
rinsed, by which all the oxygen of the atmosphe
consumed, and a quantity of sulphurous acid
duced. This must be carefully done, as, if in ex
wine acquires the taste of sulphur, which it would
some time. White wines require most sulphur, e
when very *dry*. It is proper to transfer the
mediately to the exhausted cask, otherwise
speedily get filled again with common atmosph
Dr. M'Culloch recommends the following meth
remarks that by the common method of tapp
scarcely possible to draw the wine without
portion of the lees with it:—'To effect it, a cock
duced into the full cask at the usual place of
three or four inches above its bottom, from which
hose (a flexible caoutchouc tube would be bet
passes into the bung-hole of the empty one. A
pair of bellows may then be so fitted to the bun
the full cask as to force by its action the wh
clear liquor through the hose into the empty ve
this means the least possible disturbance is cre
the wine is at the same time preserved from the
contact of atmospheric air' (p. 129).

The whole of the wine should not be drawn
cap frequently contains principles which woul
re-excite fermentation. What is left may be em
form either brandy or vinegar, according to it
value. Another means may be used, instead of su
to preventing the acetous fermentation, viz. t
sulphite of potash. A drachm is in general suf
a pipe of wine, and it communicates no taste.
of both agents consists in absorbing any trace
and preventing it acting on the organic substanc
volatile oils have the power of checking the
mentation, but their odour is a practical obstacl
employment. They probably act by hindering the
ment of the fungus (Saccharomyces vini) forme
of. Alkalies, combining with the free acids, the
of which is essential to the process of fermenta
hinder it, but as they are destructive of the
the wine, they are inadmissible. Black oxide
ganese, though recommended by Dr. M'Culloc
never be used for wine where sulphuring has
ployed, as it would most readily give off oxygen.

It must be obvious that racking can only free
from matters which are insoluble, and either
among the lees or floating on the surface.
to get rid of some other matters held in s
different practice is adopted. This consti
process of *fining*. Isinglass in solution in
white of eggs, is commonly employed for thi
The quantity of the wine-fining must be in pro
the quantity and quality of the wine, as also
The common and new wines require more isin
the fine and old ones. If the wines have been
of the tannin extracted from the seeds of the g
glass has no influence in purifying them. If k
casks however, as is always the rule in France,
tract tannin from their sides. Numerous pow
compounds, as well as other expedients for k
improving wines, are detailed in Jullien, *Manu*
melier. The process of fining is always rep
vious to bottling the wine.

At Bordeaux the white wines are generally ra
first racking in December, the red not till March;
racking is to prevent the working which the gre
July and August might occasion in them; and
in October, before the cold comes on. A favou

her must be chosen for these processes; that is,
fine and clear, and when the winds are in the
h-east, or east, because the wine is finer and
n than in the rainy weather. (Paguierre, p. 59.)
cking takes place in eighteen months after the
March; it is then that the casks may be stowed
ng at the side. After this it only requires to
twice a year, in March and October. When it
d the age of five or six years, it requires racking
a year, which is always done in March, the
en the wines are always finer and clearer than
r season of the year.

e qualities of a good wine is firmness or dura-
in this respect there is great difference among
one possessing every other requisite may be
n this essential. This may be imparted to it,
y adding some other stronger wine, or one
ed to undergo any deleterious change. Hence
he practice of *mixing* wines, or, as it may be
eir medication, vulgarly called *doctoring*,
g a judicious and honourable proceeding,
nly articles employed are the real produce of
is not to be confounded with unwholesome
and dishonest practices, which deserve to be

ne of the *first growths* of the Claret country
e supported by the addition of Hermitage. It
hat no fraud is here contemplated, since the
is, perhaps, the more expensive wine of the
e maker can afford to add it only to the *first*
It in no degree impairs the fine characteris-
hoicest claret, nor diminishes the lightness for
rate claret is remarkable. Where *working* the
ctised to fit them for the depraved taste of the
consumers in England, who are accustomed to
r wines of Spain and Portugal, the case is very
and to the second and third growths the red
ussillon, Bene Carlo from Spain, and brandy
-to the detriment of the character of Claret.
ddition is made under the pretext that it is ne-
nable the wine to bear the voyage. This, ex-
s a very small quantity of brandy is concerned,
r erroneous, not only as relates to Claret, but
and Sherry. The wines of Basseins and St.-
mbares, two parishes near Bordeaux, furnish a
is generally purchased for the French navy,
eeps well, and improves greatly at sea. The
e-brokers at Bordeaux, familiar with the quali-
first growths, and jealous for the reputation of
y, deplore the deterioration which much of their
rgo to fit them for the English market. Still
no other addition than Hermitage may be ob-
provided a proper price is given, by resorting
chants of high repute. Two Sherries come to
void of brandy, *Amontillado* and *Manzanilla*;
w the wish of Port-wine merchants, of the high-
r for science and probity, to introduce Port-
s small an admixture of brandy as possible,
sulting the health as well as palate of their cus-
randy added after the early stages of fermenta-
y mingled, not incorporated with, the wine—
s spirituosity, but not its vinosity, and produc-
human stomach, liver, and other organs the
as brandy merely diluted with an equivalent
water. The extension therefore of a taste for the
sophisticated wines in this country would be a
efit. Sometimes the object in mixing wines is
a compound having a different or more agree-
than either of the wines singly possesses; hence
of the Rhine-wines almost constitutes a science.
Sherry is the most mixed with the vintages of
rs. 'The wine-merchants of Xeres never ex-
stock of finest and oldest wine. According to
t which the wine expedited to the market is
be sold, it contains a larger or smaller propor-
wine. But it is only in wines of a very high
even a small portion of their finest wines is
hat is withdrawn from the oldest and finest
de up from the casks which approach them
ge and quality, and these are again replenished
nt in age and quality to them. Thus a cask of
o be fifty years old, may contain a portion of
s of thirty or forty seasons.' (Busby, p. 3.)
A Sherry, the unmixed produce of one vintage, may now and then, by a rare chance, be obtained.

'It is difficult to give any rules for the mixing of wines, as the taste and experience of the maker are the only guides to be depended upon. It generally happens that when two distinct wines are mixed, the process of fermentation is partially renewed, or the mixture, in technical language, *frets*. This observation has led to a valuable practice in this manipulation, namely, *fretting-in*, technically so called. It is found by experience that mixed wines unite into one durable and homogeneous liquor only in consequence of this fermentation. A season and circumstances are therefore chosen, in which one or both of the wines to be thus mixed are either in a state of renewed fermentation or show a tendency to it. The wines being then proportioned according to the fancy or experience of the operator, a strong fermentation is excited, which is still further assisted by agitation. When this process, which is conducted with the precautions formerly laid down for the treatment of close fermentation, is completed, the wine has become uniform, and is converted into a homogeneous liquor, with no further tendency to change than if it had originally been produced by one operation. A repetition of the processes of fining and racking suffices to perfect it, by disengaging such superfluous leaven, lee, or colour as would spoil its appearance or endanger its durability.' (Dr. M‘Culloch, p. 135.)

These processes having been completed, the wine is left in the cask, or, as it is termed, in the *wood*, to mature. The length of time required for this differs much in the different wines, and among dishonest dealers every expedient is used to hasten it, so as to give new wine the appearance of age. Heat has a considerable influence, and the antients often put their wines into stoves, called *fumaria*. It is the modern practice to send several wines either on voyages to warm climates or even leave them there for years. This is particularly the case with Sherry and Madeira; the fine qualities of the latter wine are very greatly developed by a few years' sojourn at Madras. Considerable evaporation, as well as ullage, occurs during this time; but it is remarkable that during the first years that the wine remains in the cask the watery particles chiefly evaporate, so that the wine gains in alcoholic strength, as well as flavour. Afterwards the alcohol begins to evaporate; and it is probable that at the period when the wines begin to lose alcohol they cease to improve in flavour. They are then fit to be bottled. The amount of evaporation varies with the climate, and kind of wood of which the cask consists. In some cases it is as much as one-twelfth per cent. per annum—especially if the cask is of Spanish chestnut, which is a most objectionable wood from the taste it imparts. Memel or Dantzig oak is exclusively used for the finer Port wines; American oak is cheaper, but not so good. The presence of two staves of chestnut in each cask has been known to impart a taste, slight at first, but at last so marked as to lead to the rejection of the wine. The ullage is greatest in new casks; and hence old ones, when clean and sound, are preferred.

During the stay of the wine in the wood a deposit of tartar (*i.e.* impure bi-tartrate of potash) and other substances occurs. The colour undergoes a change, especially of the red wines; which is not similar in all. Thus while the Port wines become lighter, those of Medoc become deeper; hence, to give the appearance of age to Port wines, *white* Port is added; but to Clarets the black wine of Cahors is added. The wine is thought to ripen better in large than small casks: this led to the construction of the enormous tuns of Heidelberg. Where any of the wine is drawn off, it is necessary to fill up the void as speedily as possible with wine nearly of the same quality, otherwise the air causes the remainder to become sour. Where wine is not to be had, the introduction of a quantity of olive oil protects the wine. A fungus is very apt to stretch across the surface of the wine, if one or other of these precautions is neglected. While in the vaults or cellars, the casks are very apt to become affected with the *dry-rot*, by which much fine wine may be lost, especially if the cellars be damp. To guard against this, the casks should be carefully inspected from time to time. This must not be confounded with the fungus called Racodium cellare, or mouse-skin Byssus (Greville's *Scottish Cryptogamic Flora*, pl. 259; the *Fibrillaria vinaria* of Sowerby's *Fungi*, t. 432, 387, f. 3): as this occurs only in dry cellars, it is a proof of their sound condition.

Cellars and vaults should be as remote as possible from streets and other ways by which waggons pass, the vibrations caused by these often disturbing the more delicate wines.

When wines have been kept in the wood for the period which experience has fixed as that proper for attaining maturity, they are generally put into bottles or flasks. In these some further change goes on, by which they are still further ameliorated. In many red wines a deposit occurs, forming a crust on the lower side of the bottle.

The operation of bottling should take place in fine weather, if possible in March or October. Before this is done the wine must be fined, either with white of eggs, very fresh, or isinglass; after which the cask must be left to repose ten or fifteen days, according to the weather. The bottles must be perfectly clean, and if not new, care must be taken that no lead-drops remain in them, as these spoil the wine and render it deleterious.

The corks should be perfectly sound, and as elastic as possible, so that when driven home they may expand beyond the contracted part of the neck of the bottle, and thoroughly exclude the air. To assist in this object, as well as to protect the corks from insects, the mouth of the bottle is often dipped in melted wax. If gum elemi be an ingredient in the wax, insects are less prone to attack the corks. But the wine within often corrodes the cork; this is particularly the case with Madeira and all sweet wines. Such also are most liable to the aggressions of insects, and must frequently be recorked. All these inconveniences, as well as the serious loss of wine resulting from them, are likely to be got entirely rid of by the use of the patent caoutchouc stoppers, which, besides being in the first instance cheaper than corks, can be often used a second time; they seal hermetically the wine, to which they are incapable of communicating either taste or colour, and are not subject to the attacks of insects. For Champagne, which has always to be corked twice, they offer great advantages. As Champagne is bottled after remaining at longest only three years in the cask, considerable deposit takes place in the bottle. When recorked this is got rid of by the process of *dégorgement*. The bottle is inclined, the mouth downwards, till all the sediment is lodged in the neck; the cork is withdrawn, some of the wine rushes out, carrying before it the lees; the escape of the rest is hindered by an adroit adaptation of the fore-finger. To fill up the void caused by the wine which has escaped, a solution of sugar-candy in any of the common red wines of the country is added: the permanent cork (or the caoutchouc stopper) is now introduced; when the latter, a simple but convenient piece of mechanism is used: it is then wired down, and occasionally covered with tin-foil. If preserved in a cool cellar, good Champagne may be kept in perfection ten or twenty years. In the great stores at Rheims the breakage amounts, on an average, to ten per cent. The Italian wines often have only olive-oil poured into the neck of the bottle, without using a cork.

When ready for the consumer wine presents a combination of qualities which has always recommended it as one of the most agreeable beverages known. Yet wines differ much, not only in those nicer points which elude the research of the chemist, but also in those matters which are within his reach, and the quantitative analysis of which he can easily furnish. To give a full differential account of even the more common wines is impossible: a general view is all that can be attempted. Most wines contain the following principles, in greater or less proportion; the chief differences being the circumstance of the wine being a white or red one:—

Water. Alcohol. Bouquet (*volatile oil? an æther?*). Sugar. Gum. Extractive matter. Gluten (*except when tannin is present*). Acetic acid. Malic acid? Citric acid? Bi-tartrate of potash. Tartrate of alumina and potash (*in German wines*). Sulphate of potash. Chlorides of sodium and potassium. Tannin. Colouring-matter of husk (*in red wines*). Carbonic acid (*in Champagne and other effervescing wines, and probably in small proportion in many other wines.*)

Wines are classified according to the predominance of certain of these ingredients. When much alcohol is present, they are termed *strong* or *generous;* when otherwise, *light* or *weak;* when much sugar undecomposed, *sweet* or *luscious* (vins de liqueur); when little, *dry;* if a free acid in considerable proportion be present, they are called *acid* or *acescent;* when much carbonic acid is p then *sparkling* or *effervescing* (*mousseux* of the *schaumweine*, German). Water is more abundant i made in wet seasons, and in the wine from new vi or young vines. These are also most prone to sour. With the antients it was a great object to ge the watery portion, and for this purpose they em various expedients, and often rendered them as t tar. The plan now adopted by the French is best, starch-sugar to the must. The cheapness of this is only recommendation, as it really is of the same n grape-sugar. [SUGAR.]

Alcohol.—The amount of this principle present i has engaged the attention of chemists, who are now rally agreed that it exists from an early stage of mentation, and is not a product of distillation, as R Fabbroni, and others maintained. But in addition naturally present, much brandy is too often introduc wines intended for the English market. The table Brande, of the quantity in different wines, is g quoted; but recent analyses show that the amoun are much too high, probably from his having ope wines largely adulterated. The following tables Fontenelle and Professor Christison are more to on, and agree better with that of Dr. Henderson.

M. Julia-Fontenelle's Table.

	Alcohol by Volume, per cent.	
Bamyulls	21·96	Mèze
Rivesaltes	21·80	Bezières
Colliouvre	21·62	Lunel
Lapalme	20·93	Montpellier
Mirepeissel	20·45	Carcassone
Salces	20·43	Frontignan
Narbonne	19·90	Bourgogne
Lerignan	19·46	Bordeaux
Leucate de Fiton	19·70	Champagne
Montagnac	19·30	Toulouse
Nissan	18·80	

Dr. Christison's Table, from Experiments in 18

	Alc. by weight, per cent.
Port, weakest	14·97
„ mean of 7 wines	16·20
„ strongest	17·10
White Port	14·97
Sherry, weakest	13·98
„ mean of 13 wines not long in cask	15·37
„ strongest	16·17
„ mean of 9 long in cask in East Indies	14·72
„ Madre da Xeres	16·90
Madeira, long in cask in East Indies	14·09
„ strongest	16·90
Teneriffe, long in cask in Calcutta	13·84
Sercial	15·45
Dry Lisbon	16·14
Shiraz	12·95
Amontillado	12·63
Claret, first growth, 1811	7·72
Château-Latour, first growth, 1825	7·78
Rosan, second growth, 1825	7·61
Vin Ordinaire, Bordeaux	8·99
Rivesaltes	9·31
Malmsey	12·86
Rudesheimer, first quality	8·40
„ inferior ditto	6·90
Hambacher, first quality	7·35
Edinburgh Ale, unbottled	5·70
„ two years bottled	6·06
London Porter, four months in bottle	5·36

The condition in which alcohol exists as the product of the primary and secondary fermentatio grape is very different from that in which it is foun obtained by distillation, even of wine, as in the cas finest French brandy. The addition of any distille to wine is always to be reprobated, as it destroys t qualities of the wine, making it flat and mawkish. much alcohol is not necessary to the keeping of clear, since the Rhine wines keep for a century.

e quantity of alcohol is seldom more than eight or
r cent. Dr. M'Culloch has forcibly pointed out
s of adding brandy to wine in his 'Remarks,' p. 140:
actice, universal in the wines of Spain, Portugal,
ly which are intended for the English market, has
en introduced into our domestic wines, under the
n notion of preventing them turning sour, and
idea that it enabled them to keep a longer time.'
om assisting in preserving the wine, it decomposes
wever slow the effects of this decomposition may
they are not the less certain. The first and most
nous effect is the loss of that undefinable lively or
vour which all those who possess accuracy of taste
cover in French wines or in natural wines; and a
which must be sensible, by the principle of con-
the dullest palate which shall compare the taste
et with that of Port, or that of Hock or Grave with
or Bucellas. It tends equally, although in a greater
of time, to destroy the union of the colouring prin-
which is well known to be deposited in Port wines,
parently in a great measure from the action of this
substance. This fact explains why dishonest wine-
ants add brandy to their Port wines, to give them
the appearance of age, by producing the *crust*, a
ion by which no experienced or intelligent wine-
ker allows himself to be misled. Moreover no quan-
of brandy can hinder the process of acetification,
the circumstances favourable to it are present. The
y effect of adding brandy is to make the vinegar
onger, not to prevent its formation. This is sufficiently
oved in the process of making vinegar in Germany, by
at is termed the *quick* vinegar-work, viz. by which
cohol is directly transformed into vinegar in a few hours.
re's *Dictionary of Arts*, 'Acetic Acid.') I have dwelt
more on this subject because this view is opposed to
popular opinions and practices, opinions most assuredly
nded on erroneous and vague analogies drawn from
ne supposed preservative power residing in spirits. I
the more particular in calling to this subject the atten-
n of those who may engage in the manufacture of
nestic wines, because a notion is prevalent that these
nes are above all others deficient in durability, and can-
exist without this admixture. The effect, on the con-
ry, is to destroy the briskness of these wines, often the
y meritorious quality they possess, while it increases
ir expense and diminishes their salubrity' (p. 156).

The alcohol thus uncombined acts on the organs of the
dy in the same way as alcohol only diluted with an
uivalent quantity of water. This is manifest even in the
ference of the moral effects of unadulterated wine, in
ich the spirit is an integral element, and those of the
oured liquids which serve merely as a vehicle for a
ge portion of alcohol. The pure light wines of France
d Germany produce an agreeable exhilaration of mind,
ry unlike the mere physical excitement, almost amount-
g to ferocity, which results from the largely brandied
nes, which are too much in vogue in England.

The diseases also which attend spirit-drinkers, chiefly
sorders of the liver, are commonly met with among the
nsumers of wines to which brandy or whiskey has been
dventitiously added, though such disorders rarely if ever
llow even the intemperate use of pure wine. Much
erefore of the ill-health supposed to follow the habitual
e of wine must be attributed to the alcohol with which
ey are adulterated, not to the wine itself. Certain it is
at intoxication is a very rare occurrence among the in-
bitants of the wine-producing countries. It has been
ld to be inexplicable why a quantity of alcohol form-
g an integral portion of some good sound wine will not
ect the head to the extent or with the rapidity that
lf the quantity will do when taken pure, or still more
pidly when diluted with water. If the power which all
getable acids possess of counteracting intoxication be
led to mind, it seems natural that the free acids pre-
t in wine should hinder the spirit from acting preju-
ially. Tartaric acid, that one most common in good
ne, has the greatest power in this respect. [TARTARIC
ID.] As the domestic wines, whether obtained from
makers of sweets, or prepared at home, have the
gest quantity of alcohol adventitiously mixed with
m, often to the amount of a fourth or even a third, it is
st important that the facts above stated should be
own to the consumers of them, more particularly to females, who frequently imagine that they are taking something less objectionable in preferring these to the wines used by men. The light wines of France, of the Rhine, the Moselle, or the Amontillado and Manzanilla of Spain, to which brandy is not added, are much to be commended, as more wholesome and not very much more expensive: at all events the health would gain where the purse suffers.

This is a subject of great importance, as it is to be feared that habits, at once discreditable and difficult to be relinquished, are contracted by women by the use of these highly stimulating mixtures:

> 'If once induced these cordial sips to try,
> All feel the ease, and few the danger fly;
> For while obtained of drams they 've all the force,
> And when denied, then drams are the resource.'—*Crabbe.*

Sugar is the characteristic of the *sweet* wines. It diminishes with age, so that old wines of this sort are less pernicious than the new. Some, such as those of Bergerac, lose their sweetness in six months, and become *dry*. They are mostly taken in small quantity as liqueurs; but still even in small quantity they are hurtful to persons disposed to the oxalic acid calculus, or to diabetes, and must be avoided. Bilious persons should abstain from them as from saccharine fluids.

They are more easily imitated than the dry and light wines; and at Cette in Languedoc there exists an establishment for the manufacture of wines in imitation of all the known *vins de liqueurs*. The Rivesaltes, Lunel, and Frontignan of France, the Paxarete, Tent, and Malaga of Spain, the original Malmsey of the Grecian Archipelago, that of Madeira, the Constantias, the Tokay, and Lachryma Christi, with Lissa of Sicily, are the most famous of this class of wines. Bitters, such as wormwood, are often used along with them, which renders them less cloying and diminishes their tendency to derange the stomach.

Acids.—It has been shown above that a free acid is necessary for the development of the fungus (Saccharomyces) with which the progress of fermentation seems closely connected, for the evolution of the bouquet, for the agreeableness of the wine, and probably for its wholesomeness. It is therefore a popular error to denounce the acidity of wine. The kind of acid present is however a very important point. Tartaric acid is the best. Whether malic acid be ever present in good pure wine is doubtful. It is said to prevail in wines made in wet seasons. Citric acid is perhaps found in wine made from unripe grapes. It is not certain that oxalic acid is ever found in wine. It may be formed in some rare instances. It is very likely however to exist in considerable quantity in the spurious wine now largely made from the garden rhubarb. On many persons it must have a very hurtful effect. Acetic acid, or vinegar, is that however which mostly abounds in low poor wines, especially of northern countries, and in good wines which have been mismanaged and allowed to spoil. The flat taste of the fluid and a smell of vinegar declare its presence. When wine is drunk on draught or from the tap, it is most apt to form acid, unless the consumption be rapid. It is to disguise its presence that one of the most dangerous practices is adopted by vintners, namely, adding sugar of lead to the tainted liquid. When this is suspected to have been used, sulphuretted hydrogen will reveal its presence. Sometimes it is present in bottled wine from a leaden shot being left in the bottle. A small iron chain is safest and best for cleaning bottles. Carbonic acid not only renders the wine sparkling, but increases its exhilarating action, as felt in Champagne. Tannic acid is present in Port and Tent, to the former of which it imparts both roughness and astringency. The sweetness of Tent hinders the roughness being felt so perceptibly, but it is undoubtedly astringent, and may be beneficially used as such when Port disagrees. White Port is less rough, and is not much used, except to lighten the colour and give the appearance of age to red Port. In the German wines Berzelius states that there exists tartrate of alumina and potass. Bi-tartrate of potass is more common. It is precipitated along with the colouring matter, and termed argol, found in wine-casks.

Respecting the relative amount of acidity in different wines much error prevails, not only in the popular mind, but among medical men. Dr. Prout (*On Stomach and Renal Diseases*, 4th edit., p. 8) affirms that sound Sherry contains less acid and sugar than any other wine. But several very careful experiments on different wines by no means confirm this statement. If applied to Manzanilla, which is the favourite wine of the Spaniards, it is true; but that wine is scarcely known in this country, however well it deserves to be so, as its freedom from adventitious brandy and from much acidity, with its slight degree of bitterness, a quality always to be prized in wine, strongly recommend it as a summer wine. It will be found that Port wine, both red and white, has less free acid than even some of the finest Sherries. Madeira has long laboured under a most unjust opprobrium in this respect. That bad Madeira, and the wine which, though produced elsewhere, was sold for it, contain much acid, and readily disagreed with the stomach, may be perfectly true; but genuine first-rate Madeira has certainly very little, especially after a voyage to the East Indies. 'The Madeira wines had fallen off in quality from over-shipment, and thereby gave further effect to this taste for Sherry. In this a useful lesson was given to all wine-growing countries, as Madeira, although now as good, or rather, we should say better than ever, has not yet regained its former favour in this country.' The observations of Dr. Paris are too just to be omitted:—'What, for instance, is the acid contained in Madeira, and against which so many mighty objections have been urged?—An atom merely of tartar! And yet the person who fancies that his digestion can be deranged by its action, will swallow twenty times the quantity of the same ingredient in some other shape, with perfect indifference and impunity.' 'Before we quit,' says the same author, 'the subject of vinous acidity, I shall beg to say a few words upon its supposed influence in exciting paroxysms of gout. That such attacks have followed particular potations, I do not mean to deny; but a slight excess of any kind, whether in diet or exercise, will excite the disease in those predisposed to it. Where the train is laid, an additional glass of Claret may have acted as the match; but in all such cases the explosion would have equally taken place had, instead of Claret, some other exciting cause fired it' (*On Diet*, p. 198). Liebig unhesitatingly affirms that, while to the free acid the exquisite *bouquet* of the Rhine wines is owing, to the tartar present in them some of their most salutary properties belong. To this he attributes the immunity enjoyed by those on the Rhine and Moselle, indeed of all who use the German wines, from the uric acid diathesis. This statement of the utility of these wines might be suspected to originate in national partiality; but it is abundantly confirmed by Dr. Prout and many others who have attended to the subject, and who have investigated it free from prejudice or favour. An occasional use of them is objectionable, but the habitual use is most salutary. (See Prout, 4th edit., p. 210.) Being light, they can be drunk without dilution, which is preferable to reducing a strong wine by adding water, which is much more prone to produce acidity in the stomach. (Prout, p. 9.) The water, furnishing the oxygen and hydrogen necessary to convert the alcohol into acetic acid, probably favours the production of the acid. Moreover wine diluted with water more readily produces intoxication than the pure wine would do; perhaps, as Dr. Paris has suggested, by thus applying the stimulus to a larger surface of the stomach (*On Diet*, p. 191).

The classification of wines has engaged the attention of almost all writers who have treated of them; but no satisfactory one can be presented. Jullien, in his very valuable *Topographie de tous les Vignobles connus*, has given a geographical one, followed by an arrangement of the wines of each country into five or fewer classes, distinguishing the wines, simply so called, from the vins de liqueurs, and subdividing each into the red and white. This for all commercial purposes is sufficient, but for dietetical, or as a guide to individuals desirous of procuring wine for their own consumption, is futile. The greater number of the different kinds mentioned are never heard of beyond the district where they are produced, either from being entirely consumed by the inhabitants, or from the difficulty or expense of transport, or from deficiency in those qualities which ensure their preservation or recommend them to distant lands. This is especially the case with what are termed the fourth or fifth growths, which are seldom, even in good years, worth the expense of transport, if sold under their real names and at their just value. The first, second, and even third growths in good years, bring a price on the spot which puts it out of the power of persons not pos-
sessed of large capitals to obtain even a small sto
them. The principal English shipping-houses at Bord
and the first-rate houses in this country make their
chases only in the good vintages; and it is their com
tion which then raises the price, and the absence of
demand which makes it sink again in the unfavou
seasons. Those who desire good and sound wine
seek the first growths, and to obtain them they must
with merchants of established character, and give a
nerating price, otherwise they will be exposed to fra
their purse and injury to their health. It must be o
to any one that first-rate wine must always be high
if it be borne in mind that the market-value of a re
vineyard is very great; that the territorial extent of
in general very limited; that the expense of cultiv
very high (see numerous estimates of these ch
Bronner's *Weinbau in Süd-Deutschland*, passim;
Weinbereitung in der Champagne, p. 111); th
expenses are as great in the bad years, when they
return, as in the good years; that the recurrence o
able vintages are rare and distant; and that consta
intendence and expense are necessary till the win
perfection; not to mention the loss from evaporatio
breakage, and other accidents, and to say nothin
accumulating interest of the original purchase-
twenty or thirty years. Besides all these, the dut
paid in the first instance by the merchant, is reco
a charge on the consumer. It is better to abstain
from wine, than take that which is bad.

From what has been previously said it may be
that domestic wines are most unwholesome, and ext
apt to disagree with the stomach. Their employme
rapidly decreasing, and will be nearly superseded by
cheap wines of the Rhine and Moselle.

The question whether wine should be taken at all
individuals in health need not be discussed here.
universal consent of mankind has settled the question,
none but one-sided individuals would aim at depriv
their fellow-creatures of one of the best gifts of Pro
dence, which lightens the toil of civilized life and height
its enjoyments, because a few abuse it. The action
wine on the human system is widely different from that
spirits or of beer.

To attempt to give rules for the employment of wine,
to fix the kind proper for different invalids, is impossib
the observation of Van Swieten being as applicable to
as to food: 'To say what kind is suitable, without know
for whom, is as absurd as to assert that the wind is favo
able, without knowing to what port the ship intends to
For young children wine is generally very improper: th
circulation is already rapid, and their nervous system
susceptible. All invalids, and indeed others, should av
mixing wines; the reason for this rule is obvious—
two wines are mixed more or less fermentation occ
which a weak stomach is unable to control. New win
hurtful from the large quantity of undecomposed leave
saccharine matter which it contains. Some wines how
reach perfection long before others. Many of the R
wines are excellent in ten years, the Moselle in six,
some of the clarets in four. Of sherries, Manzanilla is
fit for use in four years, so that the interest of capit
thirty or forty years does not tend to increase its pric

A wholesome beverage is not the only produce o
grape. 'Brandy may be extracted from all kinds of
but more is drawn from some species than others.
strongest wines are not those which give the most
It is more advantageous to distil wines which beg
decline, than those which are perfect in flavour; no
because they are cheaper, but because the spirit is
more developed state in them. The wines which ar
and rough produce brandy with difficulty. The
wines, if distilled, give little brandy.

'The tartar and dregs are not lost, being much u
commerce: the tartar is used in medicine and dyeing
the dregs are dried, and serve the hatter in the dyein
the fabrication of hats.' (Paguierre.) Vinegar is also
cured in large quantity from wine or its lees, espe
at Orleans. Wine is sometimes used as a solvent o
dicinal substances; but as these are apt to spoil, pure
or vinegar is preferred in many cases.

(Henderson, *History of Antient and Modern W*
M'Culloch, *On Wine*; Paguierre, *Wines of Bord*
Busby, *Visit to the Vineyards of Spain and Fra*

n the Culture of the Grape and Orange in Aus-
ullien, *Topographie de tous les Vignobles connus;*
Weinbau in Süd-Deutschland, and also *Weinbau*
reich; Schams, *Ungarns Weinbau*; Graff, *Der*
n als Getrank und Heilmittel; Bronner, *Die*
Schaumweine; and *Communications from the*
ntries.)

AND SPIRIT TRADE. The consumption of
spirits in the United Kingdom amounts in round
o about 28 million gallons, the duty on which,
0,000*l*., is equal to above one-sixth of the whole
The average consumption of wine of all kinds is
aillion gallons, though during the last three or
in consequence of the depressed state of the
has fallen very much below this quantity, and
e quantity which paid duty was little more than
gallons. Of foreign and colonial spirits the
nsumption is about 3½ million gallons; and of
rits about 20 million gallons, though in 1842 it
this quantity from various causes. The stock of
ond is usually equal to two years' consumption:
, 1843, the quantity under bond in the port of
as 7,004,347 gallons, and there were 4,440,246
the outports. At the same date there were
gallons of foreign and colonial spirits in bond,
3,589,672 gallons were in London, and 2,491,533
ports.

e of duty on wines and spirits has had great in-
the public taste. In 1700 the average consump-
ne in England was nearly one gallon per head,
is now less than a fourth of a gallon. Prior to
en Treaty the wines consumed in this country were
tirely the produce of France, but although the
ench wines was equalised in 1831, the annual con-
only amounts to one gallon amongst sixty people.
the consumption of wine is 19 gallons per head;
lland, with moderate duties, the consumption of
ne is one gallon per head. Mr. Porter states in
ess of the Nation,' that there are wines produced
better adapted to the English taste than the
nes usually drunk here, and that they could be
at sixpence a bottle without duty. If, as he
ines of fair quality and flavour could be sold by
e shilling the bottle, the consumption would no
ery large; but the duty alone is at present not
shilling a bottle, and the consequence is that
nption of French wines is chiefly confined to
e first class. As another illustration of the effect
ties in checking consumption, it may be stated
esent duty of 22*s*. 10*d*. on foreign spirits is less
than the duty of 11*s*. 1*d*. in 1801; though if the
sumption had followed the increase of popula-
duty would have been 2,465,767*l*. more than
actually received. The present rates of duty
and Geneva are from 300 to 1000 per cent.,
o the quality; on rum from 200 to 400 per cent.;
spirits from 500 to 600 per cent.; on Irish and
spirits (whiskey) about 200 per cent.; and on
cotch malt spirits (whiskey) 300 per cent. and

y years the number of distillers in England has
ed twelve. In 1835 six distillers in London and
paid 1,030,202*l*. duty out of 1,420,525*l*., the
nt of duty paid by distillers in England. The
distillers in Scotland in the above year was 260,
vere 87 in Ireland; but the number of rectifiers
Scotland, and Ireland is a proof of the different
e people in each country. In England, in 1835,
108 rectifiers, in Scotland 11, and in Ireland 19.
brandy or rum is consumed either in Scotland
the pure home spirit without any artificial
being preferred. Nearly the whole of the spirit
England passes through the hands of the recti-
y the addition of various ingredients, gives it
sembling Geneva [GIN]; and above 500,000
nglish spirit are flavoured in imitation of French
he simple spirit drunk in England under the
hiskey is imported from Scotland, and a small
m Ireland. The number of gallons imported
nd from Scotland in 1842 was 1,652,979, and
n Ireland.

unmalted grain together are used in the English
six-sevenths of the Scotch spirits are made from malt, and the remainder from malt and unmalted grain; in Ireland about a tenth is from malt, and, with the exception of a few hundred gallons from potatoes, the remainder is from malt and unmalted grain. The number of gallons of spirits distilled in England, in 1842, was 6,008,456, in Scotland 7,658,985 gallons, in Ireland 5,315,090 gallons. In that year the duty was 7*s*. 10*d*. per gallon in England, 3*s*. 8*d*. in Scotland, and after March 11th, 1842, the duty in Ireland was increased from 2*s*. 8*d*. to 3*s*. 8*d*.

The number of persons engaged in the various trades of distilling, compounding, and retailing spirits, in 1840, was as follows:—

	England.	Scotland.	Ireland.
Distillers and rectifiers . .	106	215	112
Dealers not retailers . . .	2,922	452	364
Retailers—premises rated			
Under 10*l*.	15,431	10,364	11,054
10*l*. and under 20*l*.. . .	19,692	4,112	3,078
20 " 25 . . .	3,303	321	287
25 " 30 . . .	2,199	178	189
30 " 40 . . .	3,684	207	271
40 " 50 . . .	2,349	85	148
50 and upwards . . .	6,022	246	296

The dealers in foreign wine in the same year were as follows:—

	England.	Scotland.	Ireland.
Not being dealers in spirits or beer	1,793	28	173
Dealers in beer but not in spirits .	44	31	252
Dealers in wine, spirits, and beer .	22,113	2,800	1,964
Passage vessels with retail licences	254	93	25

The following table, showing the consumption of British spirits in different years during the present century, is abridged from vol. iii. of Porter's 'Progress of the Nation:'—

	England. galls.	Scotland. galls.	Ireland. galls.	United Kingdom. galls.
1802	3,464,380	1,158,558	4,715,098	9,338,036
1812	3,622,970	581,524	4,009,301	9,213,795
1821	4,125,616	2,385,495	3,311,462	9,822,573
1831	7,434,047	5,700,689	8,710,672	21,845,408
1838	7,938,490	6,259,711	12,296,342	26,486,543
1841	8,166,985	5,989,905	6,485,443	20,642,333

In 1841 the consumption of British spirits was at the rate of 0·51 gallons per head in England, 2·28 gallons in Scotland, and 0·80 gallons in Ireland. Before the commencement of the temperance movement in Ireland, the rate of consumption in that country was 1·52 gallons per head. The quantity of spirits charged with duty in Ireland fell from 12,296,342 gallons, in 1838, to 6,485,443, in 1841, the only change of duty being an addition of 5 per cent. The further diminished consumption in 1842-3 is partly apparent, as the increase of duty from 2*s*. 8*d*. to 3*s*. 8*d*. a gallon led to illicit distillation. By this addition of a shilling a gallon duty, the minister anticipated an increased revenue of 250,000*l*.; instead of which, in the year ending 5th April, 1843, there was a positive decrease of 7361*l*., the quantity of spirits brought to charge having fallen to 4,813,045 gallons, or 1,715,901 gallons less than in the previous year. On the 5th of April, 1841, the number of persons in gaol for illicit distillation was 48'; on the same day in 1843 the number was 368. The financial mistake was so obvious that, in the session of 1843, an act was passed (6 & 7 Vict., c. 49) for returning to the old scale of duty.

The consumption of rum has been declining for many years in England, and is quite insignificant in Scotland and Ireland. [RUM.] With the same duty in each country the contribution per head to the revenue, in 1841, was 1*s*. 3½*d*. in England, 2¼*d*. in Scotland, and 0¼*d*. in Ireland. In 1831, with nearly the same duty as in 1841 (9*s*. instead of 9*s*. 4*d*.), it was 2*s*. 3*d*. in England, 5¼*d*. in Scotland, and ¼*d*. in Ireland. The same rate of duty on foreign spirits, in 1841, yielded 1*s*. 7½*d*. per head in England, 5*d*. in Scotland, and 0½*d*. in Ireland. The quantity of all descriptions of wine consumed in the United Kingdom was less in 1841 than in 1801. In 1840, out of 100 gallons, there were consumed —of Portugal wines, 26·7 gallons; Spanish, 46·9; Madeira, 1·3; Teneriffe, 0·4; Sicilian, 8·1; Cape, 7·7; French, 7·4; Rhenish, 1·1. The consumption of the wines of Portugal was 75 per cent. of the total quantity half a century ago. [PORT.]

(Porter's *Progress of the Nation*, vol. iii.; *Report of Commissioners of Excise Inquiry on British Spirits; Parliamentary Papers.*)

WING. [BIRD.]

WING, VINCENT, an English astronomer of the seventeenth century, enjoyed some reputation during his life; and his writings, at the time they were published, possessed a certain value. Neither the year of his birth nor of his death is known.

He is principally distinguished by his work (in Latin) entitled 'Astronomia Britannica,' which was published in London in 1669. This is divided into five parts, of which the first is designated 'Logistica Astronomica;' the second, 'Trigonometria;' the third, 'Doctrina Sphærica;' the fourth, 'Theoria Planetarum;' and the fifth, 'Tabulæ Astronomicæ:' to these is added a collection of astronomical observations. His theory of the planets is founded on the systems of Copernicus and Kepler, for he supposes the orbits of the planets to be ellipses, and the sun to be placed in a common focus; but, like Bullialdus and Dr. Seth Ward, he considers the other focus of each orbit to be the centre of the planet's mean or uniform motion.

The transit of Venus, which had been observed by Horrox and Crabtree in 1639, indicated that the sun's parallax did not exceed a few seconds, but the evidence which it afforded was not, by some astronomers, at that time considered conclusive; and Wing, who supposed that the parallax was equal to one minute (more than seven times as great as it is in reality), endeavoured to account, from the effects of refraction, for the smallness of that which was obtained from the observation alluded to. The astronomical observations in the work consist of several longitudes of the sun at the times of the equinox, transits of Mercury over the sun, and eclipses of the sun and moon, antient and modern: among those of the sun there is mentioned one which was observed in 1652; and it is stated that at the time when the eclipse should have been total, the moon was surrounded by a luminous crown *within which it appeared to turn on its centre like a millstone.*

The 'Logistica Astronomica' contains a table of logistic logarithms, with precepts for their use; and in the 'Trigonometria' are rather complicated demonstrations of the theorems for plane and spherical triangles.

In the year 1651 Wing published (in English) a work entitled 'Harmonicon Cœleste, or the Harmony of the Visible World, containing an absolute and entire piece of Astronomie.' It is similar in its arrangement to the 'Astronomia Britannica' above mentioned, but it contains some subjects which are not in the latter; and among these may be cited his refutation of the antient opinion that the planets are attached to solid and transparent spheres. He objects to the opinion on the ground that if it were just the comets could not pass without impediment from one part of the solar system to another, and that the spheres would produce great refractions in the light which is transmitted to the earth from the fixed stars. The work contains a table of the logarithms of the ten thousand first numbers, and also of the sines and tangents of angles for every minute of the quadrant.

He appears to have criticised the 'Astronomia Carolina,' which was published by Street in 1661, for the latter replied in 1667 to his animadversions in a work containing, as appears in the title, 'a castigation of the envy and ignorance of Vincent Wing;' the points in dispute between the two astronomers are however in the present age quite destitute of interest.

Wing was the author of a series of Ephemerides for thirteen years, viz. from 1659 to 1671 inclusive; and he published annually for the Stationers' Company a *book* and a *sheet* almanac, the latter of which is still continued under his name.

WINGATE, EDMUND, a younger son of Roger Wingate, a landed proprietor in Yorkshire and Bedfordshire, was born in the former county in 1593, entered of Queen's College, Oxford, in 1610, from whence, after his degree, he removed to Gray's Inn. Here he mixed mathematical studies with his legal ones, and became well known in the former sciences. In 1724 he removed to France, where he spent some years, and seems to have been about the court: he taught English to the Princess Henrietta Maria and her ladies. By the time the troubles broke out, he had inherited some property in Bedfordshire; he took the Covenant, was justice of the peace, recorder of Bedford, and held other offices. In 1650, or thereabouts, he took the oath called the Engagement, became known to the Protector, and served in parliament for the county of Bedford: he was also one of the commissioners in that county for the detection and ejection of those ministers and schoolmasters who were called loyal by one party and ignorant and scandalous by the other. He was buried at St. Andrew's in Holborn, December 13, 1656.

Wingate's writings have generally only the initials E. W., with the description 'of Gray's Inn' sometimes appended. Hence several works which have only initials have been attributed to him: thus Wood makes him the author of Wyberd's 'Tactometria.' There are several legal writings, of no note whatever, by E. W. of Gray's Inn, who is supposed to be Wingate.

It has been said that Wingate was the first who carried logarithms into France, which is not correct [TABLE, p. 497]; and some of those who have amended the error state it was the sliding-rule which he took there, which is equally incorrect [SLIDING-RULE, p. 132]. He did, in 1624, introduce into that country Gunter's scale, in his 'Construction, Description, et Usage de la Règle de Proportion,' Paris, 1624, dedicated to the Duke of Anjou. He did intend to publish a table of logarithms, to which the preceding was to have been an appendix, and he obtained the 'privilège du roi' for both works in one, dated November 4, 1624. But an advocate of Dijon, to whom he had communicated the account of Gunter's rule, broke confidence, and either published or was going to publish an account of it; whereupon Wingate altered his first intention, published the account of the scale in 1624, as above noticed, and followed at leisure with the 'Arithmétique Logarithmique,' Paris, 1626, which last work, described in TABLE, p. 497, is, by an easily explicable mistake, often set down as of 1624. Besides the English table of 1632 and 1635 attributed to Wingate [TABLE, p. 4[illegible], he published on the same subject 'Ludus Mathematicus,' London, 1654, a kind of logarithmic game; also a translation of his earlier French work, 'The Use of the Rule of Proportion,' London, 1645; also a translation (probably) of the descriptive part of his second French work, 'Construction and Use of the Logarithmeticall Tables,' London, 1635.

The work by which Wingate is best known is his 'Arithmetic,' of which the first edition (according to Wood) was in 1630. Of this work Kersey published an edition during Wingate's lifetime, at his request: the sixth edition of the works, which is also Kersey's, was in 1673. Shelley published another edition in 1720, and Dodson another in 1760. Wood attributes to Wingate a work on surveying; we suspect he is here confounded with Wing.

WINGS OF INSECTS.—The isolated study of the most important and typical organs of animated beings, though not to be recommended if regarded only in an organographical point of view, is of no small importance when made the means of illustrating the general principles of natural history or its more philosophical inquiries, which can be alluded to but briefly in articles on tribes, genera, and species. In this way a value may be given to the dried technicalities of the science, which, when philosophically understood, render the strictest descriptive diagnosis suggestive of important and interesting views. Such a subject is that of the wings of insects.

The air is the appointed habitat of the insect tribes, and flight their chief means of motion. The mechanism by which it is effected is not, as in birds, dependent on the modification of certain of the extremities, but on a transformation of the machinery of that organism which has most relation with the air itself—the respiratory system. The wings are metamorphosed gills. The branchiæ of the Nereids are their prototypes. These again are processes of the integument. The tegumentary system is characteristic of articulate animals. Among their highest genera it becomes their skeleton—an *exo-skeleton*—which contrasts with the *endo-skeleton* of the vertebrata. The former is the skeleton of the respiratory system; the latter, of the nervous system. The former in its most perfect form appertains to creatures which present the highest development of intelligence; whilst the latter perfects itself in motion, and the accompanying instincts. According to the relation of their organization to one or the other of these points, animals are arranged in two parallel ies, which in themselves are not simple, but again subvided into similar and representative groups. The two eat series themselves may be regarded as representing e two kingdoms of organized nature—the animal and getative *spheres*, as they have been designated: in the mer of which the forms of beings are mainly determined the influence of their organs of sensation and intelli- nce; in the latter, by those of respiration and reproduc- n. If such analogy be true, we should see evidences of truth on a comparison of the characteristic structures in alogous groups. Such evidence we preceive on com- ing the characteristic organs of the members of the getable kingdom with those of the members of the getative (or articulate) sphere in the animal king- n, of the leaf with the wing. There is no finer stration of the relation of *analogy* in natural history, n that between the leaf of a plant and the wing of an ect. In both we have a double sheet of cells held ether and strengthened by a framework of vessels, the ictures of the respiratory system and the processes of the mato-skeleton supplying the materials in each. Hence en has well applied to the wings of insects the name of *ial gills*.

Their anatomical structure has been well explained by . Newport:—'They are expanded portions of the com- n tegument of the sides of the meso- and meta-thorax, asioned by the enlargement and extension of numerous cheæ and the accompanying passages for the circula- y fluids, and their motions are intimately connected with function of respiration. These tracheæ ramify through- t every part of the wing, and, immediately after the as- nption by the insect of the imago state, become solidified, e the rest of the skeleton. They are hollow, for the ception of air, like the proper respiratory organs within e body. They afford strength and lightness to the ings, with which they are in direct communication, like e bones in the wings of birds, although the organs them- lves in these classes are not analogous.' The history of eir development from their first appearance to their full pansion, confirms this view. Oken, Cuvier, and New- rt have examined them in their most rudimentary con- tion, as seen in the earlier periods of the larva state. They are distinctly seen,' says the last-mentioned admi- ble observer, 'on the second or third day after the insect s assumed its last larva covering, before changing to the ipa. They are then scarcely so large as the head of a oderate-sized pin, and appear like newly-formed folded rtions of delicate tegument, extensively supplied with mifications of minute air-vessels derived directly from e principal tracheæ. They are at that time situated im- ediately beneath the external covering, at the inferior art of the sides of the meso- and meta-thoracic segments, nd continue to increase in size during the growth of the arva. When the insect has discontinued to feed, about a ay before changing into a pupa state, and the new skin of he future pupa is nearly completed beneath that of the arva, those rudiments of wings have become so much enlarged that their existence is distinctly indicated by the swollen appearance of the segments. It is at this period of the larva state that they were formerly discovered by Swammerdam. At the moment of fissuring the skin of the arva, they are suddenly somewhat enlarged; and when the kin has been cast off, and the delicate parts of the newly exposed naked pupa are beginning to be agglutinated ogether and folded upon each other, previously to becom- ng solidified to form the strong pupa case, they again equire a considerable increase of size, owing to the exten- on and enlargement of the tracheal vessels within them, gether with a corresponding increase in the quantity of e fluids in the circulatory canals by which they are every- here accompanied. The wings are then expanded so as cover the whole under-surface of the thorax and limbs; d when the insect subsequently bursts from the pupa- se and is assuming the perfect state, they are again sud- nly enlarged, and acquire their full expansion through e recurrence of similar phenomena.'

The normal number of wings in insects is four, their sition on the second and third segments of the thorax, d united to it by means of joints or of an articulating embrane. In some insects, as in the *Dyticidæ*, certain tterflies, some *Hymenoptera* and *Diptera*, we find ces of a third pair of wings. In others the number is parently reduced to a single pair, but this is rather from a change in the form and character of the posterior wings than from their abrogation. As the habits of insects vary much, equal powers of flight are not required in all the species, and as many are frequenters of situations in which the delicate textures of their wings are liable to injury, we find various modifications of their forms and structure, all admirably adapted to the circumstances under which the species is destined to pass its life. In a great number, such as the beetle tribes (*Coleoptera*), which live mostly on the ground and burrow in the earth or in wood, the anterior pair are hardened by the solidification of their tissues, the cells being filled up by depositions of corneous matter, and thus converted into cases for the protection of the posterior wings, which retain their membranous structure and serve as organs of flight. Such hardened wings are called *elytra*, the real nature of which is seen to be essentially the same with that of the membranous posterior wings, by an examination of the corresponding organs in *Orthoptera* and *Hemiptera*, in which tribes we find numerous insects which have a portion of their anterior wing solidified and elytrous, whilst the remainder retains its normal membranous structure. In some genera we find the anterior wings entirely converted into a substance like parchment, when they are said to be *pergamentaceous*. In two-winged flies (*Diptera*), instead of the anterior, it is the posterior pair of wings which becomes changed, though for a different purpose; for in them they are reduced in size and shape, forming bodies called *halteres*, or poisers, shaped like a club, or presenting the appearance of a round ball on the extremity of a footstalk. These poisers have been shown, by Schelver, to be necessary to the insect during flight; for when he cut them away, the mutilated insects could fly but short distances. Burmeister has verified Schelver's experiments. Every fly which he deprived of its poisers lost the faculty of flight; it flew a distance of from one to two feet, but then rolled over and fell to the ground. If then it was urged, it made a fresh endeavour to fly, but failed in the same way.

The distribution and arrangement of the air-tubes, or nervures, in the wings is very various in the several families of insects, but so constant in each, that naturalists found important characters upon them. There are two principal varieties of neuration in wings, reticulate and simple. An example of the first we see in the wing of the dragon-fly, where the principal nervures are connected together by others which are transverse, and often proceed at right angles from the larger ones, thus producing a very beautiful netted aspect. Of the second kind the wing of the bee is an instance, where the nervures are simply anastomosing without reticulating branches. In the bees and flies the arrangement of the nervures has been made use of by Jurine, St. Fargeau, and Shuckard as a valuable aid in classification. The last-named entomologist has given terms, now generally adopted, to their various branches, so that the description of a wing is invested with a rigorous precision, of great consequence in the correct determination of species. Bowerbank has observed and described the circulation of the blood within the nervures.

In the Orthoptera the production of sounds by certain of the species depends on the distribution of the nervures. At the inner angle of the base of each superior wing in the male Acrida there is a round, transparent, flat, nerveless space formed of tense membranes framed by strong nervures. This drum-like organ has long been known to be instrumental in producing the sounds for which that insect is remarkable. Burmeister explains its operation thus:—'By means of the violent volatile motions which agitate the whole body, but during which the wings are not expanded, the air is driven out of the spiracles, and especially out of the central ones of the thorax, and thus bounds against the inflected external margin of the superior wing, which is pressed closely to the thorax. It must necessarily therefore, to find an exit, rise beneath the wing in order to escape from it beneath the posterior margin. Pursuing this path, it precisely strikes upon the just-described elastic field of the superior wing, which vibrates through the pressure of the air, and consequently emits the sound.' This explanation does not seem sufficient; and in fact an important part of the structure is overlooked. M. Goureau has shown that, besides the drum on the right elytron, there is a file or bow on the left. 'On the top of the left elytron, viewed from below, a dilatation is seen, analogous to that of the right, but not so transparent. Its consistence appears to resemble that of the other portion of the elytron. What is most remarkable about it is a thick nervure striated like a file, which crosses it in a nearly parallel direction to its upper border, which I have named the bow.' (*Essay on the Stridulation of Insects*, translated in 'Entomological Magazine,' vol. v.) It is the action of this bow on the nervures and the tense drum which causes the sound. 'The males,' says M. Goureau, 'sing to call the females, and to please them. Three or four are sometimes seen collected together on the branches of some shrub, where they perform concerts in company, which, although they may not seem very harmonious to us, doubtless do so to the grasshoppers themselves. They appear to take great delight in this music, and to emulate each other in singing. In these concerts it has been observed that the musical instruments are not all equally perfect; that some give out acute and clear sounds, whilst others produce dull and harsh ones; this may be caused by some injury which the membrane of the drum has received, or from some defect in the bow, the teeth of which would be worn by long and frequent use.' The chirping of the cricket is produced by a similar apparatus to that just described, one of the elytra being furnished with a bow and the other with a treble string, so that when they are crossed and rubbed against each other vibrations are excited and sounds are produced. The nervures which cross the elytra divide their surfaces into a great number of variously formed compartments, which have each a particular vibration and a separate sound; the combination of all these little sounds produces the general sound or stridulation. When the insect crosses his wings rapidly, and passes the whole length of the bow over the treble string, he makes that loud and lively stridulation which we hear so frequently; and this is the very song with which he calls the female: but when he rubs the brush against the internal border of the elytron by a slight vibratory movement, he produces that sweet and soft sound by which he expresses his satisfaction. The sound may be artificially produced by rubbing the elytra together in a dead insect. A good account, with excellent figures of the sound-producing structures in *Acrida* and *Acheta*, may be found in Mr. Newport's excellent articles on the anatomy of insects, in the *Cyclopædia of Anatomy and Physiology*.

Whilst many species of insects have their wings smooth and naked, others have the surface more or less covered with hairs, spines, or scales, which in all cases are either projecting cells or layers of minute epidermal cells imbricated on each other. In certain species the hairs are converted into strong hooks or curved bristles, which lock the wings together, and thus aid the insect's powers of flight. The fine powder on the wings of butterflies consists of scales of very beautiful forms and structure. The minuteness of these bodies may be conceived from the curious observations of Mr. Bowerbank, who found, upon carefully measuring one of the dark-brown scales from the wing of *Papilio varis*, that its greatest breadth was but $\frac{1}{343}$ of an inch. The quill by which it had been attached to the wing was $\frac{1}{3000}$ of an inch in diameter; the distance of the striæ upon its surface from each other $\frac{1}{13131}$ of an inch; and the diameter of the longitudinal striæ themselves $\frac{1}{37177}$ of an inch. He found the scales of *Morphs Menelaus* to consist of at least two distinct layers; the uppermost formed of numerous longitudinal and cross striæ, covered or connected by a thin membrane more or less coloured, and the under one composed of a somewhat thicker and stronger membrane, of uniform texture and without striæ.

The following table exhibits the relation of the forms and modifications of the wings of insects to the various orders into which they are grouped:—

Wings similar	Nervures reticulate		*Neuroptera* *Dictyoloptera*
	Nervures simple		*Homoptera, pars* *Hymenoptera* *Lepidoptera*
Wings dissimilar	Anterior wings transformed	corneous	*Coleoptera* *Strepsiptera*
		semi-corneous	*Hemiptera*
		pergamentaceous	*Orthoptera* *Homoptera, pars*
	Posterior wings transformed		*Diptera*

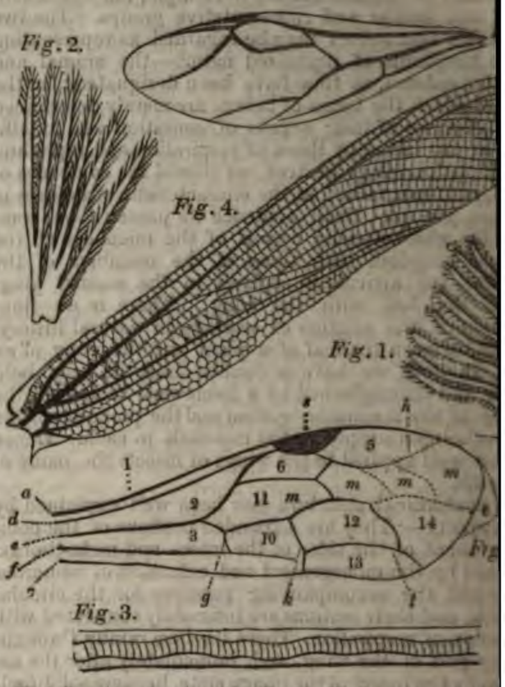


Fig. 1. Branchiæ of an Annelide (*Nereis*): *Fig.* 2, anterior wing of *Fig.* 3, trachea in canal of wing of *Chrysopa* (from Bowerbank): culate nerved wing: *Fig.* 5, simple nerved wing: *Fig.* 6, wing of hy rous insect (from Shuckard); *a*, costal nervure; *d*, post-costal; medial: *f*, anal; *g*, transverso-medial; *h*, radial; *k*, discoidal; coidal; *m m m m*, transverso-cubital; *s*, stigma; 1, costal cell; 2, m 3, interno-medial; 4, anal; 5, marginal; 6, cubital nervure; 10, 1 coidal cells; 13, 14, apical cells.

WINNIPEG, LITTLE, LAKE. [MISSISSIPPI R

WINRAM, JOHN, an ecclesiastic, whose name very frequently in connection with the history of the mation in Scotland, but whose real influence struggle was not so great as to entitle him to mo a brief notice. He took the degree of B.A. at St. A in 1515. In 1536 he was subprior of the monaster Andrews. His first public appearance was at the George Wishart [WISHART], where he preached bef judges, a singular duty for one who is said to ha braced the doctrines of the Reformation, and as sin performed by his preaching, as appropriate to a t heresy, from the parable of the wheat and the tare both grow together until the harvest.' He co ostensibly to hold office in the Roman Catholic chu the parliament of 1560, where, though sitting as Portmoak, he appears to have voted for the 'Co of Faith' which was then passed. On the establi of the new polity in 1561, he was appointed superin of the eastern districts. His influence in the new was very considerable, but it appears to have been that of a dexterous intriguer, who knew when and the best effect to remove his support from a par could not sufficiently reward his services. Knox, accepting his aid, seems always to have distruste He died on 28th September, 1582.

(Wodrow, *Biographical Collections printed for th land Club*, pp. 119-130, 448-471.)

WINSLOW, JACQUES-BE'NIGNE, was born at see, a town in Denmark, in the island of Fünen, on of April, 1669. He was the nephew of the cele Stenon, and his father was a Lutheran minister parish of Odensee. Winslow was destined for the and early commenced his studies in Lutheran th He however changed his mind and took to the st medicine, and obtained a pension from the king mark for the purpose of enabling him to study principal universities of Europe. He first went land, where he studied for some time, and in 1698 rived in Paris. Here he became a pupil of the cele Duverney, who encouraged his taste for the st anatomy. He pursued his medical studies witho other interruption than an occasional discussion subject of religion with a young Dane. Winslow sake of argument assumed the principles of Rom and, to render himself more skilled, purchased Bossuet's Exposition of the Doctrine of the Church.' This work ed him seriously to question his own principles as a Pro-estant, and as a consequence he had recourse to Bossuet, vho was then bishop of Meaux, to solve his difficulties. This happened at a time when Louis XIV. was doing all hat he could to bring back the Protestants into the bosom f the Church; Bossuet left no argument unused, and the oung student of anatomy was induced publicly to recant nd enter the Roman church. It ought to be stated that his appears to have been an act of sincere conviction on he part of Winslow, and that he did not appear to have ny suspicion of the advantages that might be the result. Whatever he expected in Paris, he forfeited all in Den-mark, and from thenceforth was expatriated. The bishop f Meaux however became his patron, and he accordingly roceeded to take his degree from the Faculty of Medicine n Paris, which he did in 1705, not however until after the death of his benefactor, who died in 1704. He had by this time rendered himself favourably known by his exertions. In 1707 he was admitted a student of the Royal Academy of Sciences of Paris, and afterwards an associate. About this time he also assisted Duverney in his lectures on anatomy and surgery in the Jardin du Roi. He did not however succeed to this position till after the death of Hunault, who was successor to Duverney, and which occurred in 1743. Eleven years previous to this, Winslow had published his great work on human anatomy, with the title 'Exposition Anatomique de la Structure du Corps Humain,' Paris, 1732, 4to. This work obtained for him at once a great reputation, and placed him among the best anatomists of his day. This work is not more remarkable for its embracing the labours of others, and the clear manner in which the matter is arranged, than it is for the amount of original observation which it contains. In the introductory chapters to the description of each system of organs, he gives a general view of their functions, and in this department of science his judicious observations did much to prepare for subsequent discoveries, especially with regard to the functions of the muscular system. The 'Exposition' has been often republished. It was translated into English, and published in London as early after its publication as 1733. It was also translated into Latin, German, and Italian; and is the model on which most of our text-books on human anatomy have since been constructed.

Some of Winslow's biographers state that he was twice nearly buried alive, by falling into a state of only apparent death. This induced him to take up the subject of the signs of certain and uncertain death, and the result of his researches he published in 1740, in an answer to the question 'An mortis incertæ signa minus incerta à chirurgicis quàm ab aliis experimentis?' This treatise was translated into French, and published in two volumes, 12mo. at Paris, in 1742. In this work the author has brought forward a number of cases of persons buried, opened, and therwise treated as dead, who were only apparently so, nd arrives at the conclusion that nothing but the indication of decomposition of the body going on is sufficient vidence of death.

In addition to his other appointments Winslow was made xpounder of the Teutonic languages at the Royal Library f Paris. He was an active member of the Royal Academy, and published several papers on various subects in their Memoirs. He practised medicine in Paris, ut was remarkable for the timidity with which he precribed, and is said never to have ordered a powerful dose f medicine without trembling. It has often happened in he history of medicine that those who have studied the uman frame in detail have been afraid to treat it as a hole, and some of the best anatomists have been the orst practitioners. Winslow lived to the age of ninetyne, having died on the 3rd of April, 1760. He married n 1711, and left behind him a son and a daughter. *Biog. Med.*; Eloy, *Dict. Hist. de la Méd.*; *Biog. Univ.*)

WINSLOW. [Buckinghamshire.]

WINSTON, THOMAS, was born in 1575. He received is education at Clare Hall, Cambridge, of which he beame a Fellow. He took his degree of Master of Arts in 602. Having determined on studying medicine, he isited the Continent, and attended the lectures of the ost celebrated men of the day. He became a pupil of abricius ab Aquapendente, also of Caspar Bauhin of asle, and of Prosper Alpinus at Padua. He took his degree of Doctor of Medicine at Padua, and returned to London to practise his profession in 1607. He was then admitted a Licentiate of the College of Physicians, and became a Fellow in 1613. On the death of Dr. Mounsell, in 1615, he was appointed professor of anatomy at Gresham College. It was here he delivered those lectures on anatomy which after his death were published, and were for a long time considered the best text-book for students of anatomy. He obtained permission from the House of Lords to leave the country during the troubles of 1642, and returned after an absence of ten years. He died on the 24th of October, 1655. (Ward's *Lives of the Gresham Professors*; Chalmers, *Biog. Dict.*)

WINTER, SPRING, SUMMER, AUTUMN. The astronomical meaning of these words is derived from the considerations in Seasons, and we are told and taught that winter begins at the winter solstice, spring at the vernal equinox, summer at the summer solstice, and autumn at the autumnal equinox. That is, according to the best authorities, it is spring from the middle of March to the middle of June, summer from thence to the middle of September, autumn from thence to the middle of December, and winter from thence to the middle of March again. At the same time the poets and the farmers, who have a much better right than the astronomers to settle the meaning of these terms for common use, agree in placing the rise of vegetation, the pairing of birds, and the first appearance of flowers in the spring; the hay harvest and the ripening of all the earlier fruits in summer; the grain harvest, the later fruits, and the fall of the leaves in autumn; and the heavier frosts, snow, and ice, in winter. The two descriptions of the seasons do not agree; we write this on the 21st of September (1843), when, according to the astronomers, two days of summer are yet left: but the harvest is almost completely finished throughout the country.

It is impossible to fix a common commencement of the seasons even for the parts of the earth which lie between the Arctic circle and the tropic, which are all that need be considered; for the polar and intertropical regions have each a set of seasons of their own. But this we may safely say, that the agricultural and poetical seasons are earlier than the astronomical ones. All that distinguishes spring from winter begins to take place before the vernal equinox, all that distinguishes summer from spring before the summer solstice, and so on. Most certainly it will be found that the greatest intensity of the several seasons happens, one year with another, at a period not long after the astronomical phenomenon at which the season is said to commence.

In the naturalist's calendar appended to White's 'Natural History of Selborne,' the result of twenty-five years of observation (1768-1793), we find, taking the astronomical designations of the seasons, that many birds sit, and many plants are in leaf before the beginning of spring; that the raven and blackbird hatch their young in winter; that the hay harvest generally begins in spring; that the crops of wheat, barley, and hops are got in during summer, and various other contradictions of common phraseology; and in many years there is more snow and ice in the astronomical autumn than in the winter of the same division. The fact is, as we have above stated, that though the commencements of the seasons are very variable in our climate, it is nevertheless the most common rule that the astronomical commencement is, one year with another, nearer to the middle of each than to the beginning.

When the year is divided only into summer and winter without further subdivision, it is then an exact division to say that the two halves begin and end with the equinoxes. But here the principal phenomena, the solstices, on approach to which heat and cold depend, are in the *middle* of the halves. If we were to divide the year into four seasons, during which the earth should receive from the sun the greatest and least portion of heat in two of them, and intermediate portions in the other two, the four astronomical commencements should be made the middle points of these seasons. The consideration in Seasons (p. 172) will easily make it appear why, for the same reason as the greatest heat is after the longest day, the middle of the agricultural seasons should fall after the astronomical point of separation.

WINTER, JAN WILLEM VAN, was born at the Texel in 1750. He entered the naval service of Holland in 1762, and, even at the early age he had then attained, distinguished himself by his zeal and courage.

Van Winter was still only a lieutenant in 1787, when the Revolution broke out in Holland. He attached himself to the popular party, and the adherents of the Stadthouder having gained the ascendency, he was obliged to fly to France. He entered the French army; served with distinction under Dumourier and Pichegru, in the campaigns of 1792 and 1793; and was promoted to the rank of General of Brigade.

Van Winter returned to Holland in 1795, when the republican army under Pichegru invaded that country. The States-General invited him to re-enter their navy, and offered him the rank of rear-admiral. Next year he was promoted to be vice-admiral, and placed in command of the Texel fleet.

After being kept in port for a considerable time by a superior blockading force, he evaded its vigilance, and put to sea, intending to join the French armament at Brest, on the 7th of October, 1797, at the head of twenty-seven armed vessels, fourteen of which were ships of the line. At nine o'clock on the morning of the 11th, he found himself in presence of the English fleet under Admiral Duncan, which consisted of sixteen ships of the line and a number of smaller vessels. The action commenced about twelve o'clock, and continued for three hours and a half. The Vryheid (74 guns), Van Winter's ship, engaged with three English vessels, and struck to Vice-Admiral Onslow, after losing all its masts and the half of its crew. The Dutch lost in this action nine ships of the line, taken or sunk, 600 men killed, and about 800 wounded. The loss on the side of the victorious English was scarcely less severe.

Van Winter was received in England with the respect due to a brave man. He was liberated by exchange in a few months, and, on the 11th of October, the court-martial commissioned to examine into his conduct declared that he had maintained the honour of the flag of the Batavian republic. The despatch in which Admiral Duncan gave an account of the action bears testimony to the obstinate valour with which both Van Winter and his second in command (Vice-Admiral Reyntjes) fought their ships:—'The carnage on board the two ships which bore the admirals' flags has been beyond all description.'

He was sent in the capacity of minister-plenipotentiary to the French government in 1798, and retained the appointment till 1802, when he was recalled to take the command of the Dutch fleet. The only memorable event that marked his period of command was the termination of the differences between Holland and Tripoli by his management.

Louis Bonaparte, when king of Holland, reposed entire confidence in Van Winter, whom he created count of Huesca, marshal of the kingdom, and commander-in-chief both of the sea and land forces. Napoleon, after he incorporated Holland into the empire, treated him with equal favour, made him grand-officer of the Legion of Honour and inspector-general of the shores of the North Sea. In July, 1811, Van Winter was appointed to command the naval force assembled at the Texel. A severe attack of sickness forced him to leave the fleet for Paris, where he died on the 2nd of June, 1812. He was buried in the Pantheon, with all the ceremonies usually observed at the obsequies of the great dignitaries of the empire; M. Marren delivered the funeral oration.

(*Biographie Universelle; London Gazette Extraordinary*, 10th October, 1797.)

WINTER, PETER VON, chapel-master to the king of Bavaria and knight of the Order of Merit, was born at Mannheim, in the year 1755. His father, a brigadier in the Palatine guards, observing his son's genius for music, placed him with the court musician, Mair, from whom he learned the rudiments of the art. His instrument being the violin, he completed his studies as a performer under William Cramer (the father of J. B. and F. Cramer), who was first violin at the court of Mannheim from 1750 to 1770. With this excellent master he made such progress, that he became a performer in the elector's orchestra at the age of ten, and speedily distinguished himself on other instruments.

It has been generally supposed, but erroneously it appears (*Harmonicon*, iv. 176), that Winter studied composition under the Abbé Vogler. He always denied this, and
in a manner which indicated a strong dislike o
He certainly had an opportunity of acquiring i
from Salieri of Vienna; but it is probable th
more indebted to his own penetrating mind, di
careful examination of the scores of the great
rary masters, to which he devoted much time, fo
ledge, than to the instruction of any individu
In 1776, when Lessing carried into effect the est
of a German opera at Mannheim, Winter v
director of the orchestra. He now first atten
position, and all his early efforts so decidedly
he wisely communicated them to only a few intin
and destroyed them nearly as soon as they were
example of wisdom which might have been
ficially followed by nineteen out of every twent
composers, whose ill success may be, in man
imputed to a want of that modesty and discern
Winter displayed. In 1780 appeared his fir
opera, 'Helena und Paris,' and this was f
'Bellerophon.' He had brought out three ba
Vienna stage: but now Salieri, by a signific
hint, induced him to listen and study more,
less. We therefore do not hear of his havin
anything worthy of notice till the year 1791, w
ceeded to Italy, and at Naples composed 'An
the 'Fratelli Rivali,' as well as the 'Sacrifizi
for Venice. From 1794 to 1796 he resided
where he produced some of his most effective
among these 'Das Unterbrochene Opferfest' ('
rupted Sacrifice'), the *libretto*, or text, of whi
nished by Huber. From 1796 to 1800 Prag
place of residence, where he brought out 'Il
Bel Sesso,' and 'Maometto.' He was then in
dertake the direction of the opera at Munich, f
wrote his 'Maria von Montalban.' Between th
and 1805 he was in London, and gave at the Kin
his three finest works—'Calypso,' 'Il Ratto di
and 'Zaira,' the chief characters in which wer
by Mrs. Billington and Madame Grassini. H
brought forth the music of the grand ballet o
composed in a style then new to the stage,
energy and vivacity of pantomimic music with
tened regularity of that of the drama. From
proceeded to Paris, and gave his 'Tamerlan'
démie Royale de Musique with great success.
was persuaded to reset Quinault's 'Castor et Po
nally composed by Rameau. Gluck long befo
clined this dangerous task, and Winter by und
drew down on himself a storm from the admi
antient master which induced him to quit Fr
same work was afterwards performed in Lond
success.

In 1814, the fiftieth year of Winter's service
of Bavaria, the king bestowed on him the honou
hood. In the same year he produced his Battle
with a chorus, in celebration of the general
this had only patriotic motives to recommend it
retired into privacy; but in 1818 he unexpect
peared, and made a journey into the north o
accompanied by the celebrated singer Madam
mann, giving concerts in most of the principal t
then proceeded to Milan, where he directed th
ance of his 'Maometto,' recently retouched b
which he breathed all his youthful spirit. In
this, he, the following year, got up in the sam
other operas. His last work for the stage wa
piece, 'Der Sänger und der Schneider' ('The
the Tailor'), which long continued a favourite
man lyric theatres. He however continued
for the church up to the very period of his dec
took place at Munich in 1825.

Winter's muse was very prolific. His Germ
pher gives a list of nine masses and other sa
forty-one operas for the theatre, twelve for th
twelve symphonies and other instrumental pi
sets of cantatas, canzonets, together with nu
tached compositions, all of which he produced
before his death; and to them are to be ad
written subsequently to those enumerated.
works do not exhibit much genius; but as he a
life his mind became gradually more vigoro
length developed a power which entitles him to
very high as a composer for the stage and for

Zaira,' 'Calypso,' 'Opferfest,' 'Maometto,' and, nis 'Proserpina,' can never be forgotten, and ill often be revived; while his overtures to Montalban,' 'Colmal,' 'Tamerlan,' 'Calypso,' are now regularly found in the programs of nonic and other concerts where good music is ecuted and well understood.

of Gerber and Lipowsky; *Harmonicon*, vol.

-ACONITE. [ERANTHIS.]

-BERRY, the name of the plants belonging a genus in the natural order Aquifoliaceæ. Prinos consists of shrubs with deciduous or per- ves, and solitary flowers. The flowers are ious or polygamous. The calyx and corolla left. The stamens are 6, and are inserted into the corolla. The fruit includes 6 nuts. All are American, and many of them have been in- ornamental cultivation into this country. The ecies are found in British nursery-gardens.

us, Deciduous Winter-berry, has deciduous, ceolate leaves, tapering to the petiole, the us beneath; the peduncles axillary—those of owers several together, those of the female berries red. This shrub attains a height of d is a native of North America from Virginia on the banks of rivers. It was introduced into in 1736, and produces white flowers, which ne and July, and are succeeded by crimson

uus has deciduous oval leaves, acuminate at nd glabrous in every part. It is found in sandy rom New Jersey to the Carolinas. It grows to f 4 or 5 feet, and produces white flowers from gust. The fruit consists of small, round, smooth, ies. It was introduced in 1812, and is of easy

, Glabrous Winter-berry, has lanceolate leaves shaped bases, coriaceous, and somewhat toothed The flowers, mostly three, on a solitary axillary The fruit is black. This is an evergreen shrub, igh. It is a native of damp woods from Canada It has small white flowers, which are followed rries, which in Jersey are called ink-berries. dsome shrub, and worthy of cultivation. Se- species of Prinos have been introduced into n, as *P. dubius*, *P. lævigatus*, and *P. lanceo-* are all natives of North America. Some of from the West India Islands would probably open air here, as they are mostly found in cool s districts. Some of these, according to Schwarz, ight of 20 or 30 feet. All the species are ated, and will grow in any light soil, although peat. They may be propagated by laying oots or by seeds, which however do not vege- second year.

Arb. et Frut. Brit.; Don's Miller.)

-CHERRY, the common name of the species , a genus of plants belonging to the natural aceæ. The species consist of annual or per- s with angular stems, and entire or lobed scat- s, and white, yellow, blue, or greenish flowers. 5-toothed; the corolla rotate, plicate, 5-lobed; dehiscing longitudinally, connivent; the tate; the berry 2-celled, many seeded, covered branous angular calyx. Above thirty species s have been described. The majority of them of the temperate districts of North and South ut several of the species are also found in a, and Africa.

ngi, the Alkekengi, or Common Winter-cherry, eous downy plant with an almost simple stem, d acuminated leaves; spotless flowers; an ovate lyx, with subulate segments. This plant is a any parts of Europe, in mountainous districts, yards, and by the way-sides. It has a dirty a, and a reddish-yellow calyx. The fruit is a rry, which has an acidulous not unpleasant he berries were known to the antients, and the ribed by Dioscorides under the name of Στρύχ- ος. The juice of the fruit was at one time in as a medicine, and was administered in dropsi- nd also in calculous disorders. In Germany, Spain, and Italy the berries are eaten by the peasantry, and in some parts are made into pies.

P. pubescens, Downy Winter-cherry, is a branched herbaceous plant, clothed with tomentum; the leaves are cordate, acuminate, toothed above, but entire and unequal at the base; the corolla spotted; the anthers violet coloured; the calyx permanent, ovate, acuminate, angular, and retuse at the base. It is a native of North America, in Virginia, the Carolinas, and Pennsylvania. The berries are of a yellowish colour when ripe, and are about the size of a cherry. Like the last, they have an acidulous flavour, and in some parts of America are called gooseberries, and are used for making tarts.

P. somnifera is a shrubby plant with quite entire leaves, and nearly sessile, sub-verticillate, crowded flowers. This plant is a native of the East Indies, also of the south of Europe, in the Grecian Islands and in Spain. It has a yellowish-green corolla, and a small red berry. It appears to be the Στρύχνος ὑπνωτικός of Dioscorides. Its name would lead to the supposition that it possessed active narcotic properties; but of these little appears to be known, although it is not an uncommon plant in some districts of Europe.

P. viscosa, Clammy Winter-cherry, is an herbaceous plant, and scabrous from being covered with short doubly three-forked hairs; the root is perennial, creeping; the stem is dichotomous; the leaves ovate or subcordate, entire or toothed; the flowers almost spotless; the segments of the calyx unequal, broad, and ovate. This plant is a native of Brazil, and extends from Pennsylvania to the Carolinas in North America. It is remarkable from its being covered with forked bristles. It has a yellow berry, which is smooth and viscid, and has a pleasant acid taste. In most cases the fruit of Physalis has a bitter taste when eaten with the calyx, which contains a bitter secretion. Many other species, as *P. Peruviana*, bear eatable berries, and are reputed to possess medicinal properties, but they do not appear to be of an active kind.

WINTER-GREEN, the common name of the genus *Pyrola* and its allies. This genus forms the type of the tribe Pyroleæ, of the order Ericaceæ; but Lindley constitutes this tribe a distinct order, with the name Pyrolaceæ. It has the following characters:—'Calyx 5 leaved, persistent, inferior. Corolla monopetalous hypogynous, regular, deciduous, 4 or 5-toothed, with an imbricated æstivation. Stamens hypogynous, twice as numerous as the divisions of the corolla; anthers two-celled, opening by pores. Ovary superior, 4 or 5-celled, many-seeded, with a hypogynous disk; style 1, declinate; stigma slightly indusiate. Fruit capsular, 4 or 5-celled, dehiscent, with central placentæ. Seeds indefinite, minute, winged; embryo minute, at the base of a fleshy albumen.' (Lindley, *Nat. Syst.*) The species are herbaceous plants, rarely under-shrubs. The stem is round, and in the frutescent species leafy. The leaves are simple, and are either entire or toothed. The flowers are either solitary or disposed in terminal racemes.

The habit of these plants is very different from that of Ericaceæ; they have also winged seeds, a minute embryo, and declinate styles, all marks of difference which have induced Dr. Lindley to place them in an order separate from Ericaceæ. Monotropaceæ are distinguished from this order by their leafless scaly stems and parasitical habit. The embryo also is at the apex of the albumen in Monotropaceæ, while it is at its base in Pyrolaceæ. *Pyrola aphylla* forms a passing link from Pyrolaceæ to Monotropaceæ; whilst *Tolmiea*, in the latter order, is a link in the other direction. There is an approach to an indusiate stigma in some of the species of Pyrolaceæ, which indicate an affinity with Goodeniaceæ.

The following are the characters of the genera belonging to this order:—

Pyrola: calyx 5-cleft or 5-parted; 5 petals; 10 stamens, slightly adhering at the base; style exserted; stigma 5-lobed; capsule 5-celled, dehiscing near the base, and the margins of the valves connected by tomentum.

Chimaphila: calyx 5-toothed; 5 petals; 10 stamens; style short; stigma cuniculate, 5-lobed; filaments stipulate; capsules 5-celled, dehiscing at the summit, and no tomentum on the margins of the valves.

Moneses: calyx 5-parted; corolla deeply 5-lobed; stamens recurved; stigma radiate; anthers 2-horned, opening at the bottom of each horn; capsule 5-celled, 5-valved, dehiscing at the apex, and unconnected.

Cladothamnus: calyx 5-parted; 5 petals; 10 stamens, with anthers adnate; stigma 5-lobed; capsule 5 or 6-valved, and 5 or 6-celled; seeds small and arillate.

Galax: calyx 5-parted; 5 petals; stamens united into a ten-toothed tube, the alternate teeth bearing anthers, the anthers 1-celled; stigma entire; capsule 3-celled.

The species of these genera are natives of Europe, North America, and the northern parts of Asia. The following species may be taken as examplos of the order:—

Pyrola rotundifolia, Round-leaved Winter-green, has the stamens curved upwards; the style declinate, arcuate at the apex; the petals obovate; the segments of the calyx lanceolate, acute, recurved at the apex, half the length of the corolla, and with equal racemes. This plant is a native of Asia, Europe, and North America. It is found in Great Britain, in the North of England and the Highlands of Scotland, but it is a rare plant. It has milk-white flowers and numerous leaves, and is the largest plant of the genus. There are four other species of Pyrola natives of Great Britain; one of these, *P. uniflora*, is only found in Scotland.

Pyrola aphylla, Leafless Winter-green, has no leaves, the scape is angular and furnished with numerous scales at the base; the racemes are many-flowered; the petals are roundish and the disk of the stigma is elongated. This plant is a native of Nootka Island, on the north-west coast of America, where it was collected by Mr. Menzies. It is remarkable as indicating the approach of the genus to the characters of Monotropaceæ. It has globose, pendulous, milk-white flowers, and the scales upon the scape are of a greenish colour.

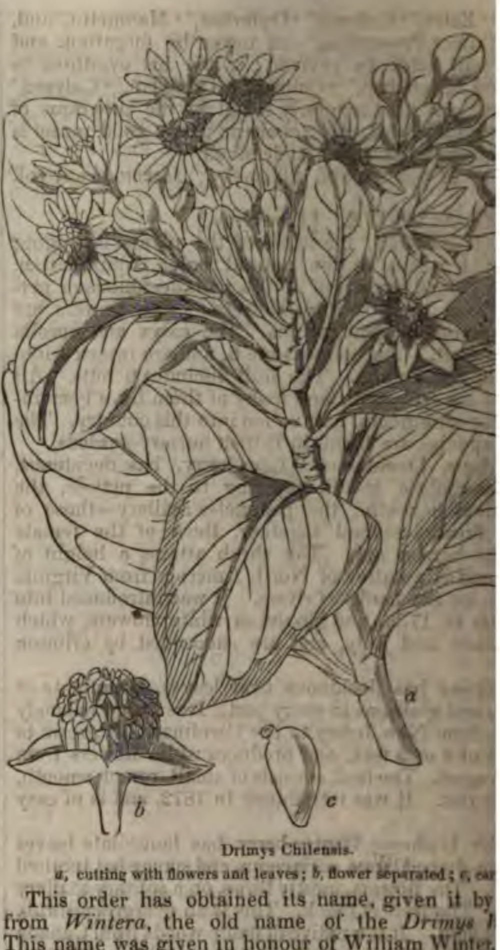
The species of Pyrola are pretty plants in gardens, but they are very difficult to cultivate. They grow best in a sandy or gravelly soil, and in a shady situation. They should be surrounded by moss and covered with a hand-glass. They may be propagated by division.

Chimaphila corymbosa is the *Pyrola umbellata* of Linnæus. It is a native of Europe, Asia, and North America. It is a very bitter plant, and on that account has been introduced into medicine. [CHIMAPHILA.] *C. maculata* is a North American species, and found in sandy or gravelly woods from Canada to the Carolinas, and also on the north-west coast. It has lanceolate acute leaves, with white bands on the upper surface along the nerve and veins, placed opposite, or 4 in a whorl. The peduncles are downy and from 2 to 3-flowered. The Indians value this plant highly, and use it medicinally under the name of *Sipsisewa*. Mr. Pursh recommended a decoction of this plant in cases of hysteria, and also in scrofulous diseases.

Moneses and *Cladothamnus* have each one species. *M. grandifolia* is a native of Europe, Asia, and North America, in alpine woods. *C. pyroliflorus* is a native of the north-west coast of America, and of the island of Sitcha.

Galax is a genus of doubtful position. Lindley places it in Pyrolaceæ; many botanists refer it to Saxifragaceæ; whilst Don makes it the type of a distinct order Galacinæ, and combines with it the genus Francoa, and Tetilla genera which constitute Jussieu's order Francoaceæ. Galax has but one species, *G. aphylla*. It is a small herbaceous plant, a native of Virginia. It has naked scapes, which bear a loose spicate raceme of small white flowers at the apex. It is a pretty plant, worthy of cultivation, and may be grown in a peat soil in a moist situation, and increased by dividing the roots.

WINTERA'CEÆ, a natural order of plants belonging to the albuminous group of polypetalous Exogens. This order is characterised by possessing hermaphrodite or unisexual flowers; from 2 to 6 sepals, which are sometimes not to be distinguished from the petals; the petals are from two to thirty in number, and when more than five, in several rows; the stamens are hypogynous, short, indefinite, and distinct; the anthers adnate; the ovaries are definite, arranged in a single whorl, 1-celled, with simple sessile stigmas; the fruit is either dry or succulent, and consists of a single row of carpels, which are distinct, and dehiscent or indehiscent; the seeds are solitary or numerous, and either with or without an aril; the embryo is very small and straight, and situated at the base of a fleshy albumen. The order consists of small trees or shrubs, with alternate, dotted, coriaceous, persistent leaves; convolute, deciduous stipules; and solitary, sweet-scented, brown or chocolate-coloured flowers.



Drimys Chilensis.

a, cutting with flowers and leaves; *b*, flower separated; *c*, ca

This order has obtained its name, given it by
from *Wintera*, the old name of the *Drimys*
This name was given in honour of William Winter,
tain in the Royal Navy, who sailed round the wor
Sir Francis Drake. It contains four genera, which
distinguished:—

Illicium. Capsules disposed in a stellate form,
above; 1-seeded; seeds shining; calyx composed
petal-like sepals.

Temus. Carpels two, baccate; seeds with an
style single; calyx trifid.

Drimys. Carpels crowded, baccate, many-
filaments of stamens thickened at the top; calyx
three-parted.

Tasmannia. Carpel solitary, membranous, inde
many-seeded; calyx of three sepals, or three-parted

These genera constitute the section Illicieæ of th
Magnoliaceæ of De Candolle. They differ from
liaceæ in their dotted leaves and also in their
qualities. A. de St. Hilaire states that some sp
Michelia have dotted leaves, which destroys the dis
between these plants and those belonging to Magn
This order, though small, has an extensive geog
range. There are about ten species, of which two a
in New Holland, two in the hotter parts of Amer
in South and two in North America, one in Ch
Japan, and one in New Zealand.

The following species of the genera are w
notice:—

Illicium Floridanum, the Florida Anise-seed
from twenty-seven to thirty dark purple petals, t
ones oblong and the inner ones lanceolate. It is a
West Florida. The leaves of this plant, when
smell like anise, and the whole plant contains a vol
which may be obtained by distillation. It has a s
matic taste and smell, which in the plant is comb
a bitter principle.

Illicium anisatum, the Chinese Anise-seed tree,
twenty-seven to thirty yellowish petals; the out
are oblong, the inner ones linear awl-shaped. It is
like the last, reaching about eight feet in height,
native of China and Japan, where it is freque
tivated in gardens as an ornament. The fruit of t
is known by the name of Chinese Anise, and is f

ed as a condiment to give an agreeable aromatic flavour certain dishes. It is the material used to flavour the ueur called *Anisette de Bordeaux*. In China it is chewed er dinner as a stomachic and to sweeten the breath. the East Indies it is sometimes mixed with tea. In pan the powdered bark is burned as incense in the uples, and garlands of the tree are placed upon the idols, l are also laid upon the tombs of the dead. There is a small-flowered species of Illicium found in Western rida, the bark of which has the flavour of sassafras root.

Temus moschata is a shrub found in Chili. It has green ning leaves two inches long, and crowded upon the nches, with musk-scented flesh-coloured flowers having als two or three inches long. The berries resemble se of the coffee-plant, and are exceedingly bitter to the te.

Drimys Winteri, the true Winter's Bark, has oblong, use leaves, the inner surface glaucous; the peduncles ost simple, aggregated together, and divided into elon- ed pedicels; the petals six, oblong. This plant is a from six to forty feet in height, and is a native of the aits of Magalhaens and of Statenland. This tree was ught back from the Straits of Magalhaens by Captain Winter, in the expedition of Sir Francis Drake round the rld. He had found it useful against scurvy in his ship's w, and employed it both as a medicine and a condiment food. The bark which is met with in English com- rce is in quills about a foot in length and from one to inches in diameter. It is pale greyish-red externally, l has an agreeable pungent aromatic taste. It contains acid resin, an acid volatile oil, and a little tannin. It is excellent aromatic, but can seldom be met with in uggists' shops. The bark of the *Canella alba* is often bstituted for it. It is the *Winterea aromatica* of older tanists.

Drimys Granatensis, New Granada Winter's-bark, has ate-oblong or oblong acute leaves, tapering to the base d glaucous on the under surface; the peduncles are mbellate, and usually aggregate at the tops of the anches. This is a tree about twenty feet high, and grows the mountains of New Granada and Brazil. In New anada this tree is called *Agi*, and in the provinces of ito and Popaya, *Canela de Parama*. Several varieties ve been described. The bark of all of them is aromatic d stimulating, and is much used by the natives where y grow, both as a medicine and for seasoning their food. ere are three other species of Drimys possessing the ne aromatic properties.

Tasmannia aromatica is a native of New Holland, espe- lly in Van Diemen's Land. It possesses the same aro- tic qualities as the species of the other genera of the nily. The only other New Holland species, *T. insipida*, s not however appear to possess the aromatic qualities ich are so striking in the first.

WINTERTHUR. [Zürich.]

WINTERHEIM. [Rhin, Haut.]

WINTRINGHAM, CLIFTON, father and son. The der Wintringham practised as a physician at York, and blished several works, which have obtained for him a putation both as a physician and physiologist. His first ork was on gout, and was published at York, with the itle 'Tractatus de Podagra, in quo de ultimis et liquidis t succo nutritio tractatur,' 1714, 8vo. In this work here are evident indications of his belonging to the echanical school. He attributed gout to several causes, ch as the acrimonious viscosity of the nervous liquid, he rigidity of the muscles, and a contraction of the iameter of the vessels near the joints. In 1718 he blished 'A Treatise on Endemic Diseases.' This work nsists of an analysis of the causes producing en- mic diseases, and attributes them variously to a change temperature, to prevailing winds, to the nature of the l, to the influence of water and food, and particular cli- tes. In 1729 he published a commentary on the epi- mic diseases of York and its neighbourhood, with the e 'Commentarium nosologicum morbos Epidemicos et s variationes in urbe Eboracensi, locisque vicinis, ab o 1715 ad anni 1725 finem grassantes complectens,' don, 8vo. This work is an admirable description of the ases on which it treats. A second edition was pub- ed by the younger Wintringham in 1733. In 1740 he lished in London 'An Experimental Enquiry on some ts of the Animal Structure,' 8vo. These inquiries were principally directed to the vascular system and the functions of the eye. In 1743 he published a second physiological work, entitled 'An Enquiry into the Exility of the Vessels of a Human Body,' 8vo. In this work he has attempted to apply mathematical formulæ to the solution of physiological problems. But as the data upon which all the subsequent reasoning is based were mere assumptions, he came to no results of any importance; but these works, independent of their speculations, contain much accurate observation and valuable research. These works are often erroneously attributed to his son, and this error pervades most of the continental biographies. The elder Wintringham was a fellow of the Royal Society, and died at York, on the 12th of March, 1748.

The younger Clifton Wintringham was born at York in 1710, and was educated at Trinity College, Cambridge, and took his degree of doctor of medicine in that university in 1749. He afterwards became a fellow of the College of Physicians, and settled in London. In the same year he was appointed physician to the Duke of Cumberland, and in 1762 was made physician to George III., by whom he was knighted. In 1759 he was made physician extraordinary, and subsequently was appointed physician-general to the army. He was created a baronet in 1774, but the title has now become extinct. He had a large practice, and was much respected both in public and private life. In 1782 he published some essays on various departments of medicine, under the title 'De Morbis quibusdam Commentarii,' 2 vols. 8vo. He also published an edition of his father's works, and edited Mead's 'Monita et Præcepta Medica,' to which he added numerous annotations. There is a small marble bust of Æsculapius, which was found near Rome, in Trinity College, Cambridge, which was the bequest of Sir Clifton Wintringham. He died at Hammersmith, on the 9th of January, 1794.

(Eloy, *Dictionnaire Hist. de la Médecine; General Biographical Dictionary.*)

WINWOOD, SIR RALPH, Knt., was born at Aynho, or Ayno-on-the-Hill, a village in the north-western corner of Northamptonshire, about the year 1564. His father, whose name was Richard, was the son of Lewis Winwood, who was at one time secretary to Charles Brandon, duke of Suffolk. Winwood was educated at Oxford, where he was first admitted of St. John's College, but was in 1582 elected probationer-fellow of Magdalen. He took his degree of B.A. in November of that year; that of M.A. in June, 1587; and that of LL.B. in February, 1590. In April, 1592, he was chosen proctor of the University. He then spent some years in foreign travel. After his return home, on Sir Henry Neville being, in 1599, sent as ambassador to France, Winwood was appointed his secretary; and he was ultimately left for some time, during Sir Henry's absence, as resident at Paris. From this post he was recalled in January, 1603, and was the same year sent on a mission by James I. to the States of Holland. He was knighted 28th June, 1607, and in August following he and Sir Richard Spence were together appointed ambassadors to Holland. In August, 1609, he was once more sent as envoy to that country; and two years after he distinguished himself by the zeal with which he acted in the affair of the Arminian divine, Conrad Vorstius, whose appointment as professor of divinity at Leyden so enraged the English king, that he threatened to separate himself from his alliance with the States unless they deposed and banished the heretical doctor. Vorstius in fact was in the end obliged to resign his professorship, and to leave the country. When Winwood was recalled from Holland does not appear; but on the 20th of March, 1614, he was made Secretary of State; and he continued in that post till his death at London, on the 27th of October, 1617. The name of his wife is not stated, but he left a son and heir, Richard Winwood, Esq., of Ditton Park in Buckinghamshire, who died without issue, at above the age of eighty, 28th June, 1688, when his estate went to his nephew Ralph Montagu (afterwards duke of Montagu), who was the son of his sister Anne, by her husband Edward, lord Montagu.

The name of Sir Ralph Winwood has been preserved in our literature by a valuable historical collection, which was published at London in 1725, in 3 vols. folio, under the following title:—'Memorials of Affairs of State in the Reigns of Queen Elizabeth and King James I., collected chiefly from the original papers of the Right Honourable Sir Ralph

Winwood, Knt., sometime one of the Principal Secretaries of State; comprehending likewise the negotiations of Sir Henry Neville, Sir Charles Cornwallis, Sir Dudley Carleton, Sir Thomas Edmonds, Mr. Trumbull, Mr. Cottington, and others, at the Courts of France and Spain, and in Holland, Venice, &c. Wherein the principal transactions of those times are faithfully related, and the policies and intrigues of those Courts at large discovered. The whole digested in an exact series of time. By Edmund Sawyer, of Lincoln's Inn, Esq., and one of the Masters in Chancery.'

(*Biographia Britannica*, Supplement)

WINZET, or WINGET, NINIAN, a Scottish ecclesiastic, is supposed to have been born in Renfrewshire in the year 1518, and to have been educated at the university of Glasgow. In 1551 he was master of the grammar-school of Linlithgow, and soon afterwards, while he continued in that situation, he entered into holy orders. In 1561, on the establishment of the ecclesiastical polity of the Reformation, he was cited before the Superintendent of the Lothians, to answer for his religious opinions, when, adhering to the doctrine of the Roman Catholic church, he was deposed from his office. In the following year he published 'Certane Tractatis for Reformatioun of Doctryne and Maneris, set furth at the desyre and in ye name of ye afflicted Catholikis, of inferiour ordour of Clergie, and Layit Men in Scotland.' The object of this work was one which few attempted in those days of fierce controversy—an internal Reform in the Roman Catholic Church, as distinct from its severance from the papal authority. At a later period in the same year, and after Knox had addressed against him some controversial arguments from the pulpit, he attempted to publish a work called 'The Last Blast of the Trumpet of Gode's Worde against the usurpit auctoritie of Johne Knox, and his Caluiniane brether, intrudit Precheouris,' &c., but the Protestants had not made sufficient progress in religious toleration to leave a free press at the disposal of their adversaries, and the copies of the work were seized in the printing-office. Winzet himself made a narrow escape, and the printer was imprisoned. The only fragment of this work which has survived to the present day is a copy of the first five leaves, preserved in the University Library of Edinburgh. Winzet now thought it prudent to take refuge in Flanders, and in 1563 he published at Antwerp 'The Buke of four scoir thre Questions, touching Doctrine, Ordour, and Maneris.' This is a controversial tract, in which, though complaining of the usage he had received from the reformers 'for denying only to subscrive yair phantasie and factioun of faith,' there is an air of gentleness which seems to have been peculiar to the disposition of the author, and is not characteristic of the controversial writings of the times. Winzet affected to adhere to the older style of the Scottish language. He says to Knox, 'Gif ze, throw curiositie of novationis, hes forzet our auld plane Scottis, quhilk zour mother lerit zou, in tymes cuming I sall wryte to you my mynd in Latin;' yet Winzet's own style shows nearly as great a divergence from the Scottish of a century earlier as that of Knox, though the latter made a nearer approach to the English of the sixteenth century. In 1576 Winzet was appointed abbot of the Scottish monastery of St. James's, at Ratisbon. In 1582 he published 'Flagellum Sectariorum,' another controversial work, to which he appended an attack on the 'De Jure Regni apud Scotos' of Buchanan, which is one of the earliest works in which the spirit of free inquiry then in operation as to religion was extended to politics. Winzet died on the 21st of September, 1592.

(Irving, *Lives of Scottish Writers*, i., 98-101; *Memoir prefixed to Collection of Winzet's vernacular Works, printed for the Maitland Club.*)

WIRE is metal elongated into the form of a slender cylindrical rod, often so fine as to be rather comparable to a thread, by the operation of wire-drawing, which consists in passing a piece of ductile metal through a series of holes, successively diminishing in diameter, in a hardened steel-plate called a draw-plate, so as to reduce its cross-section to the size and figure of the last or smallest hole, increasing its length at the same time in proportion to the diminution of thickness occasioned by the process. Though ordinary wire is cylindrical, the nature of the process of wire-drawing renders it available for the formation of slender rods of any other required figure. An important application of the process to the production of other forms is to the manufacture of *pinion-wire* for time-keepers. This is produced of any required size a
ber of teeth, and the wire being cut to the requir
for both pinion and axis, the teeth are filed a
the portion used for the latter. By this mean
may be formed at much less expense than by the
process of wheel-cutting. The grooved rims of
frames form another example of the useful appl
the wire-drawing process, they being formed of
for the purpose.

Beckmann, in his 'History of Inventions
coveries,' devotes a long chapter to the history
drawing, in which he observes that, in early time
were probably beaten out with a hammer into th
or leaves, which were then divided into small
means of scissors or some other cutting instrume
slips being subsequently rounded by a hammer an
as to form threads or wires. In confirmation of
position, he refers to the description of the sacerdo
given in the third verse of the thirty-ninth ch
Exodus, and to the fable of Vulcan forging a net
cate wire-work for Mars and Venus, when detected
illicit amour. He states distinctly that he did
member a single passage in any antient author in
drawn wire is mentioned, and expresses his opin
the rarity with which works made with threads
are alluded to strengthens the presumption that
tients were unacquainted with the process of pr
wire or metallic threads by drawing. He was u
determine when this was first attempted, but argu
an allusion to gold and silver threads formed by
mer in Muratori, that the process was not known
in the time of Charlemagne. So long as wire wa
by the hammer, the artists of Nürnberg, by whor
fabricated, were styled 'wire-smiths,' but subse
the introduction of the drawing process their de
was changed to 'wire-drawers,' or 'wire-millers
these appellations occur as early as 1351 and 13
histories of Augsburg and Nürnberg respective
mann conceives that the invention of wire-draw
be assigned to the fourteenth century. In a
bility the earliest drawn wire was made by h
ere long a machine, impelled by water-power,
pable of drawing wire without the interventio
hand, was introduced. Though the point is not
established, this ingenious machine appears to h
first constructed at Nürnberg by a person name
who kept it secret for some time, and realised much
the use of it. Conrad Celtes, who wrote about the
relates these circumstances, and adds that the so
dolf was induced to divulge the secret, whereby
censed his father that he was compelled to fly f
From mere conjecture this invention has been a
the year 1400. Nürnberg also gave birth to ma
quent improvements in the manufacture of vari
of wire. The precious metals were undoubted
the first made into wire; and perhaps brass and
not drawn until some time after the inventio
art. Blanch iron-wire, or white wire, is howe
tioned in a list of manufactured articles the imp
which into England was prohibited by an act of
of Edward III., in the year 1463; and in a
passed in 1484 both iron and latten wire are m
Beckmann states that in France iron wire is
d'Archal, and that this name is supposed to com
person named Richard Archal, who was either th
of the art of making it, or the first to introduce
facture in France. He adds that such wire is oc
termed *fil de Richard*. Nothing however is
Archal, and Menage suggests a different derivati
name.

Anderson records, under the year 1565, the g
patents to certain Dutchmen or Germans for th
tion in England of various manufactures, amon
that of wire; and he states that prior to tha
English iron wire appears to have been drawn
strength, in the Forest of Dean and elsewhere
until these foreigners introduced the use of a dra
the quality of English wire was so bad that m
used in the country, as well as ready-made wool
similar articles, was imported from abroad. By
1630 the manufacture appears to have made such
that in a proclamation of Charles I. it is allude
manufacture of long standing, and one which

any thousand persons, and it is asserted 'that English re is made of the toughest and best Osmond iron, a native mmodity of this kingdom, and is much better than what mes from foreign parts, especially for making wool-cards.' he proclamation then forbids the importation of foreign on wire, and of wool-cards, hooks and eyes, and other rticles made of it. Holland observes, that insignificant as ooks and eyes may appear, to be mentioned in a royal roclamation, they were at that time, and had been long reviously, used in such great quantities as to cause a vast onsumption of wire. Anderson subsequently states that he first wire-mill in England was set up at Sheen, near ichmond, by a Dutchman, in 1662. Holland observes hat in the seventeenth century the wire-drawing business, ither following the cloth manufacture or determined by e proximate localities of coal and iron-stone, took deep ot in the neighbourhood of Barnsley in Yorkshire. Ac-rding to No. 257 of Houghton's 'Collection for Improve-ent of Husbandry and Trade,' the manufacture of copper d brass wire in this country was commenced about the ar 1649, at Esher, by two foreigners; but they used edish rose-copper. At the time when this paper was ginally published, in 1697, it is stated that the brass re made in this country from British copper was equal in ality to any brought from foreign countries.

For the manufacture of iron wire the very best and ughest iron is selected. Before the process of rolling th grooved rollers had become common, this superior n, variously called *asleom* or *esleom* iron, or, as in the oclamation above cited, Osmond iron, was prepared for e drawing-machine by extending it with the hammer to convenient rods, about the thickness of the little finger. hese rods were further reduced in thickness and extended length by a coarse kind of drawing, called *ripping* or *mpling*, with the kind of machine described by Beckmann probably the invention of Ludolf. In this admirable ntrivance a peculiarly formed pair of pincers is so con-cted by means of levers and cams with the main axle, hich is driven by a water-wheel, that the open jaws ad-ance to the drawing-plate, through a hole in which e reduced end of the rod is passed, and then close firmly on the end of the rod, and draw it forcibly through the ate as far as the range of their motion will allow; the pres-re of the jaws upon the end of the wire being proportioned, ring this operation, to the force requisite for drawing the d through the hole in the draw-plate. So soon as the ncers are drawn back to the utmost extent, the lever by hich they have been moved slips off the cam that has en applying power to it, the pincers relax their hold of e wire, and then again advance to the draw-plate, to take sh hold, so that the action of the next cam may repeat e operation of drawing. Notwithstanding the ingenuity the contrivance, it is defective, especially for the pro-ction of the finer sorts of wire, on account of its inter-ittent action, which not only occasions loss of time be-een each drawing stroke, but also renders the wire more less uneven in surface, and leaves upon it, at every few ches, the marks of the pincers. Holland, writing about 833, states that although this contrivance is now rarely to e seen in the large wire-mills of this country, it remains use in some old establishments; and also that in France, nd among the continental manufacturers generally, iron ire was, until within a late period, altogether drawn by ch an apparatus.

In modern practice both iron and steel, but especially e former, are prepared for the final drawing by passing tween grooved rollers, the same in principle as those re-esented under IRON, vol. XIII., p. 34, though much aller, and made with the greatest accuracy. The rollers ed for this purpose are generally at least seven or eight ches in diameter, and are sometimes made to perform 0 revolutions in a minute. A bar of steel thirty inches ng and an inch square, heated to redness, is passed be-een the rollers, through grooves successively diminish-g in size, eight times in less than a minute, and is thereby ngated to from twenty to thirty feet. As it would be ficult and inconvenient to pass the rod back between h rolling, in order that it might always enter the grooves the same direction, three rollers are used, placed one ve the other, so that when the wire has passed in one ection between the two upper rollers, it may pass back he opposite direction between the two lower rollers, and *versâ*, thus avoiding any loss of time, heat, or labour in passing it backwards and forwards. For ordinary wire the rods are commonly reduced to a thickness of about one-eighth of an inch by this process. The slender rods thus produced are called, from their appearance, 'black wire,' to distinguish them from drawn or 'bright wire;' and, on account of its cheapness, such wire is preferred for coarse purposes in which it is either to be painted or concealed from view. It is commonly used by tinmen and braziers for strengthening the rims of pots, kettles, and various kinds of tin-ware and copper-ware, in which the tin-plate or sheet-copper is turned or wrapped round the wire so as to cover it. The kind of cast-steel wire of which the best needles and some other articles are made, is not usually submitted to the rolling process, but, after being tilted to about a quarter of an inch square, it is rounded on an anvil previous to elongation by the draw-plate.

In whatever way the metal may have been prepared for the ultimate process of drawing, or whatever may be the motive-power employed in that process, it is essentially the same. The draw-plate is usually formed of a stout piece of shear-steel, about six inches long and an inch and a half in diameter, but being somewhat reduced in thickness towards each end, like a cucumber, and flattened on one side. It is pierced transversely with several conical holes, the larger orifices of which open upon the flattened surface of the plate, while their smaller orifices are carefully finished to the size to which it is intended to reduce the wire drawn through them. When the holes have become enlarged by use, their smaller orifices are reduced by hammering, and then re-opened to the proper size and form by means of a long taper needle called a *pritchell*. The art of making draw-plates has been carried to much greater perfection in France than in this country; and in time of war French draw-plates have been sold for their weight in silver. Of the mode of preparing them a circumstantial account has been published by M. Du Hamel, whose directions are given at length by Holland, Hebert, and some other English writers. From this authority it appears that the French plates consist of a band or bar of wrought-iron, about two inches broad and one inch thick, covered on one side with a very hard composition called *potin*, which consists of fragments of cast-iron pots, broken with the hammer, and mixed with pieces of white-wood charcoal. The broken iron and charcoal are exposed to heat until they are fused into a kind of paste, which is heated or fused ten or twelve times, and thrown into water with the tongs between each heating. By this process the cast-iron is converted into a kind of steel, well adapted for yielding to the action of the hammer and the instrument by which the holes are enlarged and formed. One side of the wrought-iron bar is hammered to a furrowed surface, and covered, to the depth of about half an inch, with pieces of the prepared potin; the whole is then wrapped up in a coarse cloth, which has been previously dipped in clay and water mixed to the consistency of cream, and finally put in the forge. Being more fusible than the wrought-iron, the potin is the first to melt; and as soon as it begins to do so, the plate is withdrawn from the fire and gently hammered; and the heating and hammering are repeated alternately until the union of the two metals is complete, after which dry powdered clay is thrown upon the plate, for the purpose, it is said, of softening the potin. The plate is subsequently reheated, and extended by hammering to double its original length; the harder metal being so perfectly united with the other as to form a malleable alloy with it; and while the bar remains hot the holes are formed by punching. For this operation the bar is four times heated, and after each reheating a finer punch is employed, so as to make the holes taper. The holes are formed from the wrought-iron side of the bar, and are not carried completely through by the plate-maker; the completion of the holes being performed with sharp punches when the plate is cold, by the wire-drawer himself. In completing the holes, care should be taken to make them smaller and smaller by regular and almost imperceptible gradations, so that the wire may not have to be reduced too much by any one drawing. Another mode of producing draw-plates, practised at one of the principal wire-manufactories in France, that of the Messrs. Mouchel, at l'Aigle, in the department of l'Orne, is by arranging several pieces of wrought-iron in the form of a box without a lid, and filling the cavity with cast-steel. The whole is then covered with a luting of clay, heated until the steel begins to melt, and worked with a hammer in a similar way to that above described. When draw-plates have been hammered up several times, to reduce holes worn too large by use, they become so hard as to require annealing. After every precaution has been observed, draw-plates will vary somewhat in hardness; but those which are too soft for drawing iron wire may be used for brass, while the very hardest are reserved for steel wire.

In drawing wire by hand the draw-plate is laid against two upright pillars fixed on a bench or table, and, the extreme end of the wire to be drawn being so reduced as to enable it readily to pass through the hole, a small portion is drawn through by a lever apparatus which resembles in its operation the machine for *ripping* or *rumpling*, before described. When a sufficient length of wire has thus been brought through the plate, it is secured to a conical or cylindrical drum, which is mounted upon a vertical axis opposite to the hole in the draw-plate. The workman then takes in one hand the coil of thick wire to be reduced, and in the other a lever handle attached to the drum; and while he turns the drum so as to wind the wire upon its circumference, and consequently to draw it through the plate, he imparts a kind of twist to the wire which enters the plate, by a peculiar motion of the hand in which the coil is supported. In drawing coarse wire, which requires considerable power, the workman walks round the bench at each revolution of the drum, carrying the lever round with him; but for finer wire the apparatus is much lighter, and requires very little labour. In factories where inanimate power is used the winding-cylinders are turned by bevil-gearing underneath the bench, and the coil of undrawn wire is placed on a reel. This apparatus is accompanied by an ingenious contrivance which allows the drum to fall out of connection with the gearing, and consequently to cease to revolve, as soon as the piece of wire is drawn completely through the plate. In some cases, as for pinion-wire, which would be injured by winding upon a drum, wire is drawn upon a long draw-bench in a straight line, the power, which is equalised by the use of a fly-wheel, being applied to a winch-handle which, by means of spur-gear, imparts motion to an horizontal rack.

Between the repeated drawings which are necessary to reduce wire, especially of the finer or smaller sizes, to the required degree of tenuity, it is necessary frequently to heat and anneal it, by which processes the fibrous character imparted by the drawing is in some degree removed before a fresh extension takes place. The annealing-oven should be so contrived as to avoid oxidation as much as possible, and to heat all sizes of wire with tolerable uniformity, the thickest being placed in such a situation as to receive most heat; and after leaving it the wire must be scoured or washed to free it from whatever oxide may have formed upon its surface. An improved furnace for this operation, contrived by the Messrs. Mouchel, is described by Holland. In order more perfectly to remove the oxide (which, if left on the surface, not only impairs the appearance and the strength of the wire, but also injures the draw-plate) the coil of wire is sometimes immersed in starch-water or stale beer-grounds during the operation of drawing. A curious and important discovery was made some years since at an eminent wire-manufactory, where, in order to heat the acid liquor in which the annealed wire was steeped, some ingots of brass which happened to be at hand were made red-hot and quenched in it. It was subsequently found that, owing to the action of the acid upon the brass, the iron wire had become coated with a thin film of copper, which greatly facilitated its passage through the draw-plate, acting, it would appear, like a lubricating medium. So important was the advantage gained, that the practice has been universally adopted in that factory of using a weak solution of copper in the acid liquor in which iron or steel wire is washed. The film of copper is entirely removed by the last annealing process. The operation of drawing is also facilitated by the free use of grease, or, for the finer descriptions of wire, wax, to lubricate the wire as it passes through the plate. The repeated annealings of steel-wire would deprive it of too much of its carbon, but for the practice, which is not pursued with iron wire, of surrounding it with charcoal-dust while in the furnace. The rapidity of the drawing process must vary with the quality of the metal, the hardest steel wire requiring the slowest motion; but as each successive drawing increases the fibrous or filamentous character of
the metal, the rapidity of the extension may
creased as the wire becomes more and more
Dr. Ure states that iron and brass wires 0·3 o
diameter will bear drawing at the rate of 12
per second; but that when reduced to 0·02
an inch, they may be extended at the rate
inches per second; while finer wire of silver
may be drawn out from 60 to 70 inches in a s

Even when made with the greatest possib
holes of iron or steel draw-plates will enlar
with wear as to render it impossible to dra
great length of wire perfectly uniform in thi
remedy this, Mr. Brockedon obtained a patent
making draw-plates the holes of which consist
or other hard precious stones. Dr. Ure state
plate of this kind mounted with a ruby, pi
hole 0·0033 of an inch in diameter, a silver w
long has been drawn so perfectly uniform,
ference could be detected either by weighin
equal length or by measuring with a microme

Dr. Wollaston communicated to the Roya
the year 1813, a method of drawing wire
tenuity, suitable for use in telescopes. This
plished, in the first instance, by boring or dri
silver, longitudinally, with a hole one-tenth
diameter, and then filling it with gold. Th
bar being drawn into wire $\frac{1}{300}$th or $\frac{1}{500}$th of an
meter, the silver was afterwards dissolved in
acid, leaving a perfect gold wire $\frac{1}{3000}$th or $\frac{1}{5000}$
in diameter. Finding the operation of drilli
rod very troublesome, he subsequently drew
and cast the silver round it, treating the com
before. The extreme ductility of the precio
still more strikingly illustrated by the manufa
is commonly known as gold wire, but which is
of silver gilt; actual gold wire being made only
work and a few other purposes. In the ordi
making gold wire a silver rod about an i
covered with leaf-gold, and then extended to
tenuity by successive drawings and annealing
portion of gold allowed to a pound of silver
more than 140 grains, and sometimes as little a
Fine gold wire is used for wrapping or tw
thread to form gold thread; and its beauty i
creased, while it is enabled to cover a large
flattening it between polished steel rollers.

For making needles, cards for the woollen
manufacture, and various other articles into
fabricated, it is necessary to remove the cur
it receives by being wound upon the cylindric
drum above alluded to. This is done by draw
between pins fixed in a piece of wood, and so
to bend the wire into a wavy line, the flexu
gradually diminish until they disappear altoge
the wire perfectly straight. The size of wire
measured by means of a gauge which consists
steel with a series of deep notches or slits a
varying slightly from each other in width, an
according to the number given to wire of c
size. An ingenious kind of gauge for showi
diameter of wire is represented in Holland's wo
of two straight steel rulers fixed together wit
in contact at one end, but separated about h
the other end, where a cross-piece serves to c
The narrow triangular space thus left betw
of the rulers will receive a wire of any size n
half an inch in diameter, while a series of eq
marked along the edge of one ruler will aff
means of ascertaining the diameter of the
large or small.

Among the many uses to which wire is
manufacture of wire-gauze or cloth is peculiar
Beckmann, in that part of his 'History o
which is devoted to the history of knitting n
ings (vol. iv., pp. 309, 310, English edition
presses an opinion that the art of knitting
may have originated in an attempt to imit
some of the ingenious and beautiful wire net-
employed for screens; and he alludes to some
cimens of wire net-work plaited or woven in s
ingenious a manner as to give rise to the trad
artists who made them were enabled by infe
accomplish that which appears too difficul

iner kinds of weaving are performed by a modi-
f the common loom, the coarser varieties of
re-work produced being used for fences, phea-
oarse riddles or sieves, &c.; while the finer sorts
yed for lanterns, sieves, flour-dressing machines,
king machinery, window-blinds, &c. The pro-
h renders wire-gauze so invaluable in the safety-
been taken advantage of by the chevalier Aldini
nstruction of wire armour for the use of firemen,
ugh very light, is in a great measure flame-proof.
e is also formed into dish-covers, baskets, and
ul and ornamental articles, by pressing it between
to the required shape, which it retains perma-
This process is of foreign invention, but was
in this country several years ago by Mr. Gosset,
ymarket, London. After being pressed into the
form, the articles are strengthened and neatly
ff by the addition of hoops or rings to their edges
y are removed from the mould. Much iron and
is used also for the manufacture of bird-cages,
nd other articles of similar character. Needle-
one of the most important applications of steel
some of the finest sorts are made into watch-
which form they receive an augmentation of
ond the prime-cost of the material probably un-
in the whole range of manufacturing industry.
licate hair-like springs alluded to, which weigh
tenth of a grain, 70,000 are required to weigh a
nd it has been repeatedly stated, though perhaps
tatement may be hardly correct, that the value
rings is half a guinea each; so that while a
crude iron cost but one halfpenny, a pound of
ate manufactured articles produced from it were
00 guineas. One of the most elegant applica-
ld and silver wire is to the production of *filagree*
ne work, to form which, according to Beckmann,
and silver wire, often curled or twisted in a ser-
rm, and sometimes plaited, are worked through
r and soldered together so as to form festoons,
d various ornaments; and in many places also
equently melted together by the blow-pipe into
, by which means the threads are so entwisted
e a most beautiful and pleasant effect.' This
rk is of great antiquity, and was formerly much
for caskets, needle-cases, trinket-boxes, baskets,
d various decorations for church furniture; but
great measure fallen into disuse. *Spangles*
tes, which are small round leaves of metal,
the middle, and used for ornamenting garments,
rmed of wire. A piece of wire is twisted round
the thread of a screw, and then cut into little
s, each of which, being laid on a smooth anvil,
by a hammer into the form of a spangle.
ortant purpose to which iron wire has been
pplied is in the manufacture of ropes, which are
ior in strength to those made of hemp, weight
An account of wire ropes is given under Rope,
156; and under Suspension-Bridge, vol. xxiii.,
are notices of wire bridges.
nn's *History of Inventions*, vol. ii., pp. 212-234;
History of Commerce; Holland's *Manufactures*
vol. ii., in Lardner's *Cabinet Cyclopædia*; He-
gineer's and Mechanic's Encyclopædia; Dr.
ionary of Arts; Barlow's *Treatise on Machinery*
factures, in the *Encyclopædia Metropolitana*.)
AUZE LAMP. [Lamp, Safety.]
ORM, a name given by farmers to the larvæ
insects injurious to various crops: they are
the coleopterous genus *Elater*, popularly known
ks, so called on account of their power of throw-
lves up in the air with a spring when laid upon

ter (Agriotes) lineatus produces a larva which
ly injurious to oats, often appearing in great
d destroying whole fields of corn. It attacks
when the leaves turn yellow and die off. The
riotes) sputator is another destructive species.
like that of the last, resembles the common
in appearance, and may be found at the roots
g lettuces, by destroying which plant it greatly
gardener. It eats the root as far as the collar,
lant dies. *Hemerhipus segetis*, another insect
f which is called wire-worm, is less choice in its ravages, destroying plants of all kinds. Fifty wire-worms of this kind have been found preying on the roots of a single plant.

The wire-worm is injurious to hops and destructive to all culinary vegetables. In 1838 it seriously damaged the potato crops in Shropshire, Worcestershire, and Herefordshire. Mr. Hope attributes the disease called curl to it. It attacks potatoes when the slices are placed in the earth. Mr. Andrew Knight recommended as a remedy to plant whole potatoes, and not slices. Sir Joseph Banks recommended the burying of slices of potato at the roots of infected plants to attract the worm. Lord Albemarle advises the use of rape-cake in powder as a manure to the ground drilled for wheat where wire-worms abound. Hand-picking seems to be the only effectual way of getting rid of them. The mole, fowls, and above all, rooks, are their natural enemies; and the last-named bird is a valuable ally of the farmer in following the plough tracks to devour these mischievous larvæ.

(Westwood, in *Gardener's Magazine*, No. 96; and Hope, in *Entomological Transactions*, vol. iii., pt. 2.)

WIRKSWORTH, an antient market-town of Derbyshire, 140 miles from London, and 13 miles north of Derby: it is on the road from the Amber Gate station on the North Midland Railway to Matlock, and is between five and six miles from the railway and three from Matlock. Wirksworth is the antient seat of the lead-trade, and is situated near the southern edge of the mining district, in a valley nearly shut in by limestone hills. The view from the crags at Stonnis, about a mile from Wirksworth, is said, by the author of 'Peak Scenery,' to be unequalled in Derbyshire in its approach to grandeur. Roman coins and relics have been found at Wirksworth. The right of holding a weekly market was granted in 1307, by Thomas, earl of Lancaster, grandson of Henry III. The manor and hundred belong to the duchy of Lancaster; and the dean of Lincoln, who is the patron of the living, enjoys some manorial rights which attach to the church. The town is governed by a constable and headborough, and is lighted with gas. The antient courts, called Barmote Courts, are held twice a year at Wirksworth, in a handsome stone building, erected in 1814, at the cost of the duchy of Lancaster. In this place is kept the miners' standard dish for lead-ore, made in the reign of Henry VIII. The vicar was formerly entitled by custom to every fortieth dish (of 14 pints) of lead-ore raised in the parish. The living is a vicarage, held with Middleton, value 340*l*. The church is a handsome Gothic structure of the fourteenth century, and contains several interesting monuments. The grammar-school was founded by Anthony Gell, after the middle of the sixteenth century. Sixteen or seventeen years ago a new school-house was built, to accommodate 200 boys; but the number of scholars a few years afterwards was under 10. The Baptists, Independents, and Methodists have places of worship.

The entire parish of Wirksworth comprises 14,640 acres. It extends into the three hundreds of Wirksworth, Appletree, and High Peake. The population, in 1841, was 7891, distributed as follows:—

Wirksworth, parish	4122
Callow, hamlet	112
Cromford, chapelry	1407
Hopton, township	83
Ible, township	93
Middleton-by-Wirksworth, hamlet	1031
Ivonbrook Grange, hamlet	30
Alderwasley, chapelry	398
Ashleyhay, township	272
Biggin, township	149
Ideridgehay and Allton, townships	194

The cotton, hosiery, hat, and some other manufactures are carried on in the parish. [Derbyshire, vol. viii., p. 422.] The living of Cromford is a perpetual curacy, valued at 96*l*. Hopton is famous for its quarries, which afford excellent material for mantel-pieces. The living of Alderwasley is a donative. (*Journey-Book of England—Derbyshire*; Rhodes's *Peak Scenery, &c.*)

WIRTEMBERG. [Würtemberg.]

WISBADEN, or WIESBADEN, the capital of the duchy of Nassau, is situated in a small and pleasant valley on the southern declivity of Mount Taunus. On the south and east it is surrounded by rich pastures and cornfields, and on the north by gentle eminences covered with vines, protected from the bleak winds by the lofty wooded mountains beyond. In the immediate vicinity of the town there are productive gardens and orchards, and on every side neat farmhouses and villages. Wisbaden is an open and constantly improving town, and has broad and well-paved streets. This place owes its prosperity and its name, 'Baden,' to the celebrated hot springs, which were known to the Romans, and are spoken of by Pliny the Elder, who says, 'Sunt et Mattiaci in Germania fontes calidi, quorum haustus triduo fervet.' (*Nat. Hist.*, xxxi. 2.) There are in all fourteen warm and two cold mineral springs. The warmest spring, which is called the Kochbrunnen, *i.e.* the 'boiling spring,' has a temperature of 156° Fahr. The water is used both for bathing and drinking: the town has only one spring of water fit for drinking; all the others are brackish. There are twenty-five private bathing-houses and two public ones, the hospital baths, and the city bath. The present palace was built by John Louis, duke of Nassau, towards the end of the sixteenth century; it contains a library of 27,000 volumes. The town-hall is worthy of notice for some carvings in wood and other ornaments. The new Kur Saal, built in 1800, is a very handsome edifice, 350 feet in front, and 170 feet deep. It contains a splendid saloon, 127 feet long and 67 broad, which has a gallery supported by twenty-eight pillars and four pilasters of marble found in the country. The daily table-d'hôte is served in the saloon, which is also used as a ball and assembly room. The gaming-room is on the right, and the supper-rooms on the left hand of the saloon. Another building, which deserves notice as one of the largest and handsomest in the town, is the hôtel called the Vier Jahreszeiten, which has a frontage of 210 feet, and contains 144 apartments, with a large and splendid saloon, and good baths. To these we may add the duke's palace, the barracks for 800 men, the new school, the new theatre, and the little palace, in which there is a public library of 60,000 volumes, and a museum of antiquities, Roman coins, and inscriptions, mostly dug up in the town and environs; for the Romans had a station here, and there are still some remains of the fort built by Drusus, and Roman baths and sepulchres have been discovered. There are also in the neighbourhood fragments of a wall from 15 to 20 feet high, faced with masonry, and called Heidenmauer, *i.e.* the 'heathen wall.' There are several useful public institutions, such as a school for drawing, mathematics, and civil architecture, an antiquarian society, an orphan asylum, and a house of correction. The town has one Lutheran, one Calvinist, and one Roman Catholic church. The inhabitants, said to be now 10,000, have some manufactures, but derive their chief subsistence from the expenditure of the public offices of the duchy, the garrison, the baths, which are annually visited by 12,000 to 15,000 strangers, by agriculture, and the cultivation of their gardens and vineyards.

(Brockhaus, *Conversations Lexicon*; Murray, *Handbook of Northern Germany*; Head, *Bubbles from the Brunnen of Nassau*; Hassel; Stein; Hörschelmann.)

WISBECH, a municipal borough and seaport, in the county of Cambridge, in the division of the Isle of Ely, and hundred of Wisbech, 90 miles north by east from London, in 52° 42′ N. lat. and 9′ E. long.

The town is situated in the flat district of the Fens, chiefly on the east bank of the river Nene. The town is about 7 miles from the embankment of the Wash where it is crossed by the road from King's Lynn to Sutton. The present bridge of stone, which connects the two parts of the town, was erected at an expense of about 1800*l.*, in the place of a wooden one which was destroyed in 1758. It has only one arch of 72 feet span. The road-way is so narrow as not to allow two carriages to pass, and the descent from the centre so steep that accidents frequently occur from the difficulty of checking the rapid movement of vehicles when heavily laden. The town itself has a neat and uniform appearance; the houses are tolerably good, the streets are clean and lighted with gas, and a handsome circus, which was constructed in 1816, occupies the space on which the castle of Wisbech formerly stood. The surrounding country is exceedingly bare of trees. The markets both for meat and vegetables are well supplied. In dry seasons however water for domestic use is very scanty and bad, the best being often rain-water collected in cisterns from the roofs of the houses.

The Corn Exchange, or Exchange Hall, was
the corporation in 1811, for the accommodatio
merchants and farmers on the market-day, but
not find it to answer their purpose, and deserte
1831 it was inclosed by the capital burgesses,
verted into a room for lectures, concerts, and sim
poses, the rooms above being used as billiard-r
news-rooms. At the back of the Corn-Excha
large plot of ground used as a cattle-market.

The New Town-Hall was built in 1801 on the
building called 'The Firkin Cross,' which was th
market, the town having formerly had a co
trade in butter, but the land in the neighbou
now nearly all under tillage, and the butter
ceased. The lower part of the Town-Hall is th
market; one division of the upper part is the
house, and the other division is the council-cham
burgesses.

The House of Correction was built in 1807.
tread-wheel erected at an expense of 600*l.*, whi
as a flour-mill; the prisoners are generally about
sessions-house, or shire-hall, is part of the same
and in it the Lammas assizes and Midsummer
phany sessions are held. The workhouse wa
1722, and cost about 2000*l.* A union workhouse
since built, which, when the population returns
were given in, contained 154 persons.

The market-place occupies a large piece of
the centre of the town. In 1811 it was paved w
shire slabs at an expense of 1170*l.* The public
short distance below the town, on the west ba
river, are small, but neatly constructed.

St. Peter's Church is a large and antient buil
a tower detached from the body. The chambe
porch is used as a public library. St. Peter's is a
which, with the curacy of St. Mary, is of the ann
of 1779*l.*: it is in the gift of the bishop of Ely.
Chapel, which is a perpetual curacy under trus
the annual value of 200*l.* There is a General
Chapel, a Baptist Chapel, a Methodist Chapel,
pendent Chapel, and places of worship for Unita
Quakers. A neat cemetery has been recently fo
opened.

The free grammar-school was established in
charter of Edward VI. Two scholarships for
College, Cambridge, were attached to it, but the f
misapplied for many years, till in 1765 the co
were compelled by proceedings in Chancery t
them to the purposes of the founder. A chari
for boys and another for girls were established ab
There are several public charities in Wisbech,
which were under the management of the corpor
are now under trustees, according to the regulatio
Municipal Corporations Act.

There is a canal between Wisbech and Outw
was completed in 1792: it connects the Nene
Ouse. Considerable sums have lately been ex
making new sluices and repairing old ones.

The navigation of the Nene to Wisbech had
become very difficult and dangerous, from the
tion of mud and sand; but by cuts and other wo
recently been much improved. The mills w
used to force the water to the sea are no longe
and vessels can arrive at the quay of the port w
material impediment. The vessels belonging t
in 1842 were 22 under 50 tons, of the total burt
tons, and 56 above 50 tons, of the total burthe
tons. There are two steamers, under 50 tons bu
1841 the number of vessels which sailed coast
the port were 840, total 39,317 tons; the num
entered the port were 1024, total 62,401 tons.
British and 16 foreign vessels, total 4674 tons, en
bech from foreign ports; 1 British and 3 foreign
tons, sailed for foreign ports. There is no colo
In 1840 the gross receipt of customs' duty was

The corporation, previous to the Municipal R
consisted of ten capital burgesses and 40*s.*
who were householders in the town. The burg
elected by the household freeholders. The who
of the corporation, including the burgesses, in
280, and the total population of the borough
The governing charter was 21 Chas. II. By the
Reform Act Wisbech was divided into 2 ward

ermen, and 18 councillors. The burgesses on the roll he first registration in 1835 were 396; the limits of the ough were not altered.

n 1841 the population of the parish of Wisbech St. Peter 8530; of Wisbech St. Mary, 1599; and of the cha- ry of Guyhirn, 332: total 10,461.

castle was built at Wisbech in 1086 by William I. m the Domesday Book it appears that 'In the town fisheries did render to the abbot [of Ely] 14,000 eels, at present doth render 13*s*. 4*d*. The abbot hath soke r all the men of the town.' The inhabitants were made -free by grant from Richard I., and confirmed by sub- ent kings. Wisbech suffered greatly more than once he breaking down of the embankments and overflowing he sea. In 1379 the Guild of the Holy Trinity of Wys- h was established; and there were eight minor guilds. last meeting of the Guild of the Holy Trinity was in 7 (1 Edw. VI.), but there is no entry of proceedings r 1540, soon after the dissolution of the monasteries, n the Guild of the Holy Trinity was suppressed. Com- sioners met at Ely in 1548 to inquire into its affairs property. The castle was dismantled in the reign of ry II.; it was destroyed by an inundation in 1236, was afterwards rebuilt. It had a constable, and several sons were confined in it as state prisoners. It became property of the bishops of Ely, and was afterwards ght by Thurloe, Cromwell's secretary, who rebuilt it as odern mansion. It has since been demolished.

The History of Wisbech, Wisbech, 1833; *Municipal porations' Report*, 1835; *Parliamentary Documents*.)

ISBY. [GOTHLAND.]

ISCONSIN. [MISSISSIPPI RIVER.]

ISCONSIN HILLS. [MISSISSIPPI RIVER.]

WISCONSIN is a part of the United States of North erica, extending over the most north-western portion the country which is east of the Mississippi River. It between 42° 30′ and 49° N. lat. and between 86° 40′ d 95° W. long. On the south it borders on Illinois, from ich state it is separated by the parallel of 42° 30′. Its stern side is washed by Lake Michigan from the bound- y-line of Illinois to that large inlet which is called Green y. This bay receives a river, called Menomonies, which nstitutes the boundary between Wisconsin and the rthern peninsula of the state of Michigan nearly to its rce. Where the river approaches Lake Desert, the iding line passes through that lake to the source of the er Montreal, and then along this river to its mouth in ke Superior. The most western portion of Lake perior lies within Wisconsin. On the north-west Wis- sin borders on the British colonies. The boundary-line tween these countries begins on the shores of Lake perior at the mouth of Pigeon River (48° N. lat.) and s through a series of lakes connected with one another short rivers westward to Rainy Lake and the Lake of Woods. The western boundary-line of Wisconsin is med by a meridian line drawn from the south-eastern tremity of the Lake of the Woods to the Mississippi, hich river it strikes below Lake Cass. Farther south the ississippi divides Wisconsin from Iowa Territory. The ea of Wisconsin is estimated at 95,000 square miles, or bout 10,000 square miles more than Great Britain.

Elevation of the Country.—Wisconsin is more than 60 miles distant from the Atlantic in a straight line, d between 1070 and 1080 miles from the Juan de ca Sound, an inlet of the Pacific. The elevation the two great lakes lying east and north of it has en determined. Lake Michigan is 595 feet, and Lake perior 627 feet above the Atlantic. The only point on banks of the Mississippi in these parts which has ctly been determined is Roch Island (41° 30′), which is egree south of the southern boundary of Wisconsin and feet above the Gulf of Mexico. The other data are exact. According to the observations of Major Long, Mississippi at the mouth of St. Peter's River is 680 above the sea, but this appears to be somewhat too , and others give it 780 feet elevation. The country rounding the lakes which constitute the head-waters of Mississippi is estimated to be about 1300 feet above sea-level. Along the British boundary-line is the Lake of Woods, which is 1040, and Rainy Lake, which is about 0 feet above the sea-level. The Grand Portage, which ns the watershed between the Pigeon River flowing ward into Lake Superior and the waters which run westward towards Lake Winnipeg, is probably somewhat more than 1200 feet above the sea, or not quite 600 feet above Lake Superior.

Surface and Soil.—We are only well acquainted with those parts of Wisconsin which are contiguous to the boundary-lines. The interior has been traversed by traders along three water-courses, but no account of these parts has been given.

The Lake of the Woods occupies the most north-western corner of Wisconsin. This lake is about 75 miles long, and from 10 to 35 or 40 miles wide. The surface is studded with numerous islands of various sizes and forms. The larger part of the lake is within the British territories, and its waters are carried off to Lake Winnipeg, by a very rapid river called likewise Winnipeg. The country surrounding the lake is one of the most dreary imaginable. The climate is rigorous, the surface exceedingly rugged and broken, and the soil uniformly thin; in many places it is totally wanting. A solitary moose-deer, caraboo, or bear is occasionally found, and a half-starved family of savages sometimes fix their solitary residence upon some of the water-courses and subsist on fish. The woods contain only a few stunted trees, among which the most numerous are two species of pine, called white and red epinette, a small species of pitch pine, birch, and a liard or variety of poplar. The undergrowth is dense in many places, and consists of stunted oak and a great number of bushes which produce berries. Rainy River falls into the Lake of the Woods, and extends eastward 100 miles to the lake of the same name. The country along its course is of a better description. Here bottoms and table-lands of considerable extent are often met with, but they are generally bounded by tracts of a rugged and broken character. The forests are more dense and heavy, and contain, besides the above-mentioned trees, white oak, ash, hickory, water-maple, white walnut, linden, and elm. The pine and white birch are more abundant, and attain a stately size. It seems that in this part considerable tracts are fit for cultivation. The country farther east is not quite so good, but much better than that which surrounds the Lake of the Woods. Patches of ground susceptible of cultivation here and there present themselves. The forest-trees exhibit a greater variety and attain a larger size; but as the dividing ridge between the waters of Lake Superior and Lake Winnipeg is approached, tracts of flat and marshy lands become more numerous and more extensive, and in the immediate vicinity of that limit the country appears to consist almost entirely of swamps, quagmires, and stagnant pools. The swamps have a growth of spruce, epinette, and larch, and some pines, exceedingly dense, and in some places rendered almost impenetrable by a profusion of underwood. The lakes of this region are exceedingly numerous and thronged with islands. From the watershed the broken and rocky country descends rather rapidly towards the northern shore of Lake Superior, where it terminates in precipitous cliffs, varying in height from 200 to 400 feet. The country contiguous to the southern shores of Lake Superior is little known. When seen from the lake it rises in the immediate vicinity of the shores into cliffs, from 100 to 400 feet above the water. These cliffs are very steep, and either bare or only covered with low bushes. Forest trees rarely occur, except in the depressions formed by the outlets of the rivers or in the recesses of some bays. The rivers generally form cataracts at a short distance above their mouths.

The country surrounding the lakes, whose united waters constitute the most remote feeder of the Mississippi, consists of a succession of swamps, and of sandy ridges overgrown with pines, and in some parts there are extensive savannahs with a scanty vegetation. It does not seem fit for cultivation, and contains little game. Below the Falls of Packagama (47° 20′ N. lat.) the country contiguous to the banks of the river is alluvial, and well timbered with pine, hemlock, and other kinds of trees. At some distance below the falls the river passes through an immense cypress swamp. South of this swamp, which is called Tamerack Swamp, the country along the river presents a dreary aspect of high barren knobs covered with dead or fallen pine timber; only in a few places there are ridges of yellow or pitch pine, and there occur occasionally in the immediate vicinity of the river small bottoms overgrown with lime-trees, elm, oak, and ash. The Mississippi is here a small river, flowing through a low country. In approaching the mouth of the

Sac River and the Big Rapids the country changes into a fine prairie with groves of pine on the edges of the banks, and occasionally a small bottom of oak, ash, and maple. The soil, which farther north is sandy, has here more consistence, and it is supposed that it would produce small grain in abundance; the bottoms are rich and fit for corn and hemp. Below the Big Rapids the woods are still more extensive, but in approaching St. Anthony's Falls the country is either entirely barren or a prairie with scarcely any timber, except some scrub oak. The bottoms are very small.

After descending the Falls of St. Anthony the Mississippi enters a region of limestone. It runs in a bottom, which below Lake Pepin widens from 4 to 12 miles. This bottom is uniformly bounded by limestone cliffs, which are generally abrupt and often precipitous. Within the bottoms, especially in the vicinity of Lake Pepin, isolated hills and knobs of considerable magnitude based upon horizontal strata of rock and towering to various heights are frequently met with. The valley consists of prairie and woodlands alternating; the former are usually elevated above the reach of floods and are richly covered with herbage and flowers; while the latter sustain a heavy growth of trees, but the greater part is inundated in flood time. The cliffs bounding this fine valley are of different heights. Above Lake Pepin they vary between 100 to 200 feet, on the banks of the lake they attain from 300 to 500 feet, and below it they rise to 700 or 800 feet over the surface of the river. Towards the mouth of the Wisconsin River they sink again to 500 feet, and south of it they are still lower. These high lands are intersected by deep and numerous rivers and watercourses, which give to that part of the country a hilly and broken aspect. At the back of them the country is diversified by hills and valleys; the hills are high and rugged, and contain timber; the valleys often present extensive flats, abounding in lakes, swamps, and ponds. The soil is sandy and the vegetation not vigorous; the trees do not attain their full growth. This country is bounded on the east by a ridge of hills, which, near 44° N. lat., is called the Ocooch and Smokey Mountains, and in the vicinity of Lake Superior, Porcupine Hills or Wisconsin Mountains. Their altitude is estimated at 1200 feet above the common level, or about 2000 feet above tide-water. This hilly region lies near 90° W. long., and there originate the head-waters of a great number of rivers and numerous lakes. The country east of this ridge is less broken and rugged, the soil is less sandy, the vegetation more luxuriant, and the forest trees attain a more stately growth. Large tracts in this part of Wisconsin are considered fit for cultivation. The forests on the Ocooch and Wisconsin Mountains consist chiefly of yellow pine, pitch pine, and white pine of excellent quality, but white birch, white cedar, spruce, and juniper are also common.

The best known portion of Wisconsin is that which lies contiguous to the State of Illinois. The country between the southern boundary and the Wisconsin, where that river runs from east to west, is an irregular plain, elevated from 250 to 300 feet above the surface of the Mississippi, and consists of limestone, which is often rent by deep and nearly perpendicular chasms of considerable depth but little width. On the upper surface of the plain are numerous single hills rising from 200 to 600 feet above their bases, and from 600 to 1000 feet above the watercourses which run in the chasms. The highest of these hills is called Blue Mould, and is stated to be 1414 feet above the surface of the Mississippi at the mouth of Wisconsin River. The greater part of this region is a prairie destitute of wood, and generally covered with a good turf. There are also many tracts overgrown with trees, especially stunted oak, but these woods have no underwood, and the single trees are generally from 10 to 20 feet from one another. In a few places the forests are more dense, and consist mostly of Quercus alba, Quercus macrocarpa, Juglans squamosa, and Juglans tomentosa. The limestone rocks rarely appear on the surface except in the chasms, being usually covered with a black mould, which has frequently a depth of from 4 to 5 feet, and to appearance all the qualities of a fertile soil. But no part of it has been cultivated, agriculture being at present limited to the bottoms of the rivers, which run at a considerable depth below the general level of the country, especially that of the Wisconsin, which resembles the bottom of the Mississippi, but is only from one mile to two miles wide.

The country along the shores of Lake Michigan has a different aspect. The southern part, as far north as the small bay into which the river Milwaukee falls, is a portion of the great level and low plain which surrounds the southern extremity of the lake, and extends from St. Joseph's River to the Wilwaukee. It is an extensive flat embracing woodlands and prairies alternating with each other. The soil is apparently good, but the chilling northern winds which blow from the lake charged with vapour frequently spoil the crops. Farther north the shores of the lake are skirted by high sand-hills, which sometimes extend inland, and are barren, but protect the more level and fertile country which is traversed by the Milwaukee and Manawakee Rivers, against the winds blowing from the lake. North of 44° N. lat. and up to Green Bay, and the boundary-line of Michigan, the shores of the lake are somewhat rocky, uneven, and partly wooded, but do not appear to be fertile: the country farther inland along the Fox River, and towards Winnebago Lake, has a considerable degree of fertility.

Rivers and Lakes.—The largest and most important rivers fall into the Mississippi. The Wisconsin, from which the name of the country is derived, runs through the middle of the southern half. It flows from some lakes north of 45° N. lat., and runs first nearly 150 miles in a southern direction, when it turns to the south-west and west, and, after a course exceeding 100 miles more, falls into the Mississippi near Prairie du Chien. When swollen by a freshet it affords an easy navigation for boats of considerable burthen for more than 100 miles from Prairie du Chien to the place where the river changes its southern into a south-western course. At this place is a portage of one mile and a half, across a flat meadow, which is occasionally subject to inundation, to the Fox River of Green Bay, thus affording a navigable communication between Lake Michigan and the Mississippi, through which boats have been known to pass. The current in the lower part of the river is rapid, and like the Mississippi it contains numerous islands: when the water is low, the navigation is obstructed by shoals and sand-banks.

The river next to the Wisconsin in importance, if not in magnitude, is the Fox River, whose head-waters lie to the east of the great bend of the Wisconsin. From the portage above-noticed between the two rivers it runs northward to a series of lakes extending from west to east. Issuing from these lakes the Fox River runs north-west, until it is joined from the north by the largest of its affluents, the Wolf River. The united river passes through a small lake into Winnebago Lake, which is 30 miles long and nearly 10 miles across in the widest part. It leaves this lake at its north-western extremity and soon afterwards forms some rapids, which obstruct navigation, but do not interrupt it. The remainder of its course lies to the north-east, and it falls into the most southern recess of Green Bay. The navigable part of this river from the portage to its mouth considerably exceeds 100 miles.

Of the other rivers we shall only mention three, which fall into the Mississippi, the Black River, the Chippeway and St. Croix Rivers. Black River drains a valley, in which the surrounding hills are covered with fine forest trees, and the pine timber procured in this place is sent as far south as St. Louis in Missouri. The Chippeway and the St. Croix rise near some of the tributary streams of Lake Superior, and this circumstance has given them some commercial importance, as traders generally choose one of these rivers for their routes.

The number of lakes which are dispersed over the country between the Mississippi River and Lake Superior is very great. In some parts they cover more than half the surface, most of them varying from 2 to 10 miles in circumference; but there are also several larger lakes. The largest, besides the Lake of Woods, are the Flambeau Lake and the Tomahawk Lake, each of which sends its waters to the Chippeway River. The country south of 45° contains comparatively few lakes, with the exception of the low tract of country which lies between the great bend of the Wisconsin River and Green Bay, and is drained by Fox River. This tract contains numerous lakes, among which is the Winnebago Lake.

Climate.—The winters are very cold and the summers very hct. The long and cold winters prevent wheat from succeeding in any part of Wisconsin, though the grain and plants which are sown in spring succeed very well.

ifference between the two seasons is much greater
n the northern countries of Europe which are under
ıme degree of latitude and nearly as elevated as
nsin. This is evident from the subjoined table,
is founded on the meteorological observations made
t Shelling, at the mouth of St. Peter's River, at
du Chien, near the mouth of the Wisconsin, and at
Ioward, at the mouth of Fox River. We add for the
comparison the result of the meteorological observa-
nade at Wexiö, situated on the table-land of Smaland
hern Sweden.

ly mean temperature of Fort Shelling, Prairie du Chien, Fort Howard, and Wexiö.

ts.	Lat 44° 53′ Fort Shelling. Altitude about 780 ft.	Lat. 43° 03′ Prairie du Chien. Altitude about 620 ft.	Lat. 44° 40′ Fort Howard. Altitude about 600 ft.	Lat. 56° 53′ Wex.5. Altitude about 500 ft.
er .	3·26°	6·20°	9·40°	28·66°
.	11·68	14·86	13·20	27·86
y. .	19·92	23·73	21·40	28·18
. .	37·39	38·01	34·86	30·68
. .	43·75	43·99	48·18	40·80
. .	61·28	60·49	61·15	53·12
. .	70·19	69·25	66·48	62·20
. .	75·47	73·66	72·49	66·04
. .	72·77	72·37	69·59	63·12
ber .	60·58	61·16	59·18	54·30
. .	42·56	44·37	43·47	44·48
er .	30·58	34·26	36·32	35·42
. .	11·63	14·93	14·67	28·23
. .	47·47	47·50	45·73	41·53
. .	72·81	71·76	69·52	63·45
. .	44·57	46·60	46·32	44·73
mean	44·12	45·20	44·06	44·56

ing the three winter months, and even in November,
ld in Wisconsin is so intense, that the thermometer
ntly descends below zero, which very seldom takes
in southern Sweden; however the temperature rises
y in the month of March, much more so than in any
Europe, and this seems to be the case in all parts
th America, but more especially in those west of the
achian Mountains, where the warmth increases most
March and April. Accordingly we find, that the
is much warmer in these countries than in Europe,
ces which have the same mean annual temperature.
other hand, the decrease of heat in the months of
r and November is also greater.

prevailing winds in the countries situated near the
of Lake Michigan are from the south-west for at
en months in the year. But on the banks of the
ippi the north-west is the prevailing wind, except in
nd June, when the south-east is more frequent. At
helling however the north-west is frequently re-
by a south-west wind. Thunder-storms are frequent,
lly at the beginning of the spring and towards the
he summer.

ctions.—As the number of agricultural settlements
, and of very recent date, we are not yet fully ac-
d with the agricultural productions that may be
Indian corn is said to succeed in a few places.
o only oats and potatoes have been raised to any
able extent. In many of the numerous lakes dis-
over the country between the Mississippi, Lake
r, and the British boundary, wild rice grows in
nce. It is collected by the native tribes, and also
the whites, who reside in these parts as traders.
forests contain white, black, red, and post oak,
, walnut, sugar-maple, lime-tree, cotton-wood, white,
d black ash, elm, red cedar, sassafras, willow, elm,
different kinds of pine before mentioned, white
hite cedar, spruce, and juniper. The prairies in the
n districts are covered with a fine turf, and afford
stures for cattle and sheep.

pean animals which have been introduced, appear
e. Cattle and sheep begin to be numerous. The
ces, who inhabit the northern district, keep that
dog which is used to drag sledges. There are wild
of several kinds. In the northern districts are buffaloes, elk, and deer in large numbers; but these animals are rare in the southern districts. Bears, wolves, and foxes are still numerous. The black and silver fox are greatly prized for their skins. The other animals are beavers, otters, minks, martins, sables, and musk-rats, all of which are numerous only in the northern districts. The lakes, swamps, and rivers abound in water-fowl, such as swans, geese, ducks, and teal. There are also eagles, falcons, storks, wild turkeys, and partridges. Fish abound in the lakes. The most important kind is the white-fish, which weighs from 4 to 6 pounds, and is very numerous in some of the northern lakes. The rivers abound in sturgeon. Rattlesnakes occur, but they are not numerous.

The mineral riches of this country begin to be turned to account. It may be more than twenty years since it was discovered that in the southern districts of Wisconsin and the north-western corner of Illinois veins of lead occurred; and since that time the mines have been worked with great success. Their produce in 1829 had risen to thirteen millions and a half of pounds; and in 1839 nearly to twenty-two millions. In the same part copper is found, and this metal has also been extracted, but not yet to any extent. At Mineral Point (42° 50′ N. lat.) copper ore to the amount of 50,000 lbs. was shipped on the Mississippi for Swansea in 1838; and it is stated in the Report to Congress that this ore contained more than twice the quantity of metal which is contained in the ore obtained from the mines in Cornwall. The veins which yield copper ore contain also large quantities of zinc and calamine, of which however no use is made. Iron ore is also stated to be common, but it is not worked, and the small quantity which is consumed in the country is brought from Tennessee. There is also black lead, chalcedony, jasper, and cornelians. Good building stone is obtained from the limestone cliffs.

Inhabitants and Population.—Though the aboriginal tribes which once lived on the east of the Mississippi River have been removed to the countries west of it [NORTH AMERICAN INDIANS, vol. xvi., p. 286], some native tribes still keep their footing in Wisconsin. Their removal was not necessary, as there is no agricultural settlement of the whites north of a line drawn from the mouth of Wisconsin River to Green Bay. In the northern districts of this country there are still Chippeways, Sauks, and some families of Potawatomis; but the whole number of the Indian population probably falls short of 10,000 individuals. According to the census of 1840, the white population amounted to 30,945. Perhaps one-half are of French origin. In the beginning of the last century, when the French traders in furs had taken possession of the Island of Machilimackinac, in the straits of that name, which unite Lake Michigan to Lake Huron, they discovered that the best road to the Mississippi was by the Fox River and Wisconsin River; and accordingly they gradually settled small colonies at the mouth of the Fox River, on the portage between this river and the Wisconsin, and at the mouth of the last-mentioned river. The descendants of these traders turned to agriculture; and even after the beginning of the present century these Frenchmen were the only whites in Wisconsin who were agriculturists. Since that time the discovery of the lead mines has attracted many settlers from other parts of the United States. It is stated that about 3000 people are occupied in the mines.

History, Government, Towns.—Wisconsin was discovered by the French from Canada towards the end of the seventeenth century, as is related in 'Hennepin's Travels.' In 1836 Wisconsin was erected into a territory, and the government was organized. The legislative assembly consists of a council of thirteen members, elected for four years, and a house of representatives of 26 members elected for two years. The governor, who is also superintendent of Indian affairs, is appointed and paid by the federal government, and also the judges. As the country has only been recently settled, no towns have yet had time to rise. The seat of the government is at Madison, situated near the great bend of the Wisconsin; the most populous place is Milwaukee, built at the mouth of the river of the same name, but it contained, in 1840, only 1712 inhabitants. Since the territorial government has been introduced, those districts in which several white families were settled have been converted into counties, of which, in 1840, there were twenty-two. These counties occupy the tract which is south of the Wisconsin River.

along the Fox River up to its mouth, and the district watered by the Milwaukee River. The remainder of the country is not yet formed into counties.

(Pike's *Exploratory Travels through the Western Territory of North America, &c.*; Keating's *Narrative of an Expedition to the Source of St. Peter's River, &c., under the command of Long*; *Report to Congress on the Mineral Lands of the United States*, 1839 and 1840; *The American Almanac for* 1842; Carver's *Travels*.)

WISDOM, BOOKS OF. [JESUS, SON OF SIRACH; SOLOMON, WISDOM OF.]

WISE, MICHAEL, one of the most justly admired of our church composers, was born in Wiltshire, and was among the first set of Children of the Chapel-Royal at the Restoration. He was chosen as organist and master of the choristers in the cathedral of Salisbury in 1668. Seven years later he received the appointment of Gentleman of the Chapel-Royal; and in 1686 he added to his other offices that of almoner of St. Paul's Cathedral, including the mastership of the choristers. He was a great favourite of Charles II.; but it is said that, presuming too much on the notice of royalty, he incurred the king's displeasure, and was for some time suspended from his situation at court. He was a man, says Sir John Hawkins, of much pleasantry, and this, added to his high musical talents, may have recommended him to the favour of the 'Merry Monarch.' His end was tragical; for, quitting his house late at night in a state of great irritation, he was stopped by the watchman, with whom he entered into a quarrel, and was killed in the affray.

The compositions of Wise are among the glories of our cathedral music. He added melody to science, and in setting sacred words evinced as much judgment as genius. His anthems, 'Awake up, my Glory,' 'Prepare ye the way of the Lord,' and 'The ways of Zion do mourn,' have lost none of their charms by use or age, and are still listened to with admiration by all who hear them and whose feelings are attuned to church music of the most elegant and expressive kind.

WISEMAN, RICHARD, lived in the seventeenth century; he became first known as a surgeon during the civil wars of Charles I., and was the companion of Prince Charles when a fugitive in France, Holland, and Belgium. He was afterwards a surgeon in the Spanish navy for three years, and returning to England, he was present at the battle of Worcester, where he was made prisoner. He was liberated in 1652, and then took up his residence in London. At the Restoration Charles did not forget his old companion, and he was made sergeant-surgeon to the king. He was an observant judicious surgeon, and his publications on various diseases were read by the profession with much avidity. In 1676 he collected his various treatises into one volume, and published them with the title, 'Several Surgical Treatises on Tumors, Ulcers, Diseases of the Anus, Scrofula, Wounds, Gunshot-wounds, Fractures and Luxations, and Syphilis,' 2 vols. 8vo. This work is remarkable for the honesty of the writer, in which, with a single eye to the advancement of medical science, he records everything that occurred, whether successful or unsuccessful, in the treatment of his cases. He suffered in early life for his attachment to royalty, and he will perhaps be excused on this ground, if his feelings are considered, for having advocated the efficacy of the royal touch in cases of scrofula. His works have always been considered valuable contributions to surgical knowledge, and the two volumes in which they are contained have gone through several editions. (*Gen. Biog. Dict.*)

WISHART, GEORGE, called 'The Martyr,' a champion of the Reformation in Scotland, is supposed to have been a son of James Wishart of Pittarrow, justice-clerk during the reign of James V. The time of his birth is not known. At the beginning of the sixteenth century he was master of a grammar-school at Montrose, where he introduced the study of Greek. Whether he ever took orders is a point undetermined. He began to diffuse the doctrines of the Reformation at Montrose, but becoming alarmed by the enmity which he roused, he fled to England. He preached the same doctrines at Bristol in 1538, but sterner measures seem to have been there adopted towards him, and he recanted and publicly burned his faggot. In 1543 he was at Cambridge. According to a notice of his character, appearance, and habits at that time, by his pupil Emery Tylney, he 'was a tall man, polde headed, and on the same a round French cap of the best. Judged melancholye complexion by his physiognomie, bl [illegible] haired, long bearded, comely of personage, well spo[illegible] after his country of Scotland, courteous, lowly, lo[illegible] glad to teach, desirous to learne, and was well travai[illegible] He is further described as charitable to the poor, [illegible] abstinent to the extent of austerity. In July, 154[illegible] returned to Scotland along with the commissioners [illegible] had been sent to England to treat for a marriage bet[illegible] Prince Edward and the infant Queen of Scots. Prot[illegible] by the heads of the Reformation party, he now pre[illegible] with boldness and fervour in Dundee, Perth, Montrose [illegible] Ayr, creating popular tumults,which ended in the de[illegible]tion of several ecclesiastical edifices, and threatenin[illegible] authorities with coming vengeance when they inte[illegible] with his proceedings. The timidity which attended [illegible] while he was an obscure propagator of his opinions, [illegible] now that he exercised a wide influence on the p[illegible] mind and filled a large place in the eye of his co[illegible] men, to have been succeeded by a resolute spirit [illegible] fiance and a contempt of danger. The view whic[illegible] impartial narrator must take of Wishart's charact[illegible] lately been materially changed by the discovery of [illegible] ments, affording, what is almost conclusive hi[illegible] proof, that he was engaged in the plots against C[illegible] Beaton's life. This charge, stated by two old [illegible] biographical authors, Dempster and Dr. George Mac[illegible] whose accuracy is justly doubted, was repeated [illegible] by a Roman Catholic historian (Carruthers, [illegible] *Queen Mary*, p. 40), and has been amply illustrate[illegible] original documents by Mr. Tytler. In a series of [illegible] which show that there were several parties who w[illegible]re pared to assassinate the cardinal, if they had th[illegible]he authority of Henry VIII. to perpetrate the deed, and [illegible] hi mise of protection and reward, one signed by the earl [illegible] of ford, Holgate bishop of Landaff, and Sir Ralph Sa[illegible]dler, addressed to the king, dated 17th April, 1544, has [illegible] this sage: 'Please it your highness to understand, that [illegible] this arryved here with me, the erll of Hertford, a Sc[illegible]tishm called Wyshert, and brought me a letter from the [illegible] Larde Brunstone, which I sende your highnesse herewi[illegible]th: a according to his request, have taken order for the [illegible] repay of the said Wysshert to your majestie by poste, b[illegible]othe f the delyvire of such letters as he hathe to your [illegible] majesti from the said Brunstone, and also for the declarati[illegible]n of his credence, which, as I can perceyve by him, cons[illegible]steth i two poyntes: one is that the Larde of Graunge, [illegible] ate the saurer of Scotlande, the Mr. of Rothes, the earl of [illegible] Rothe's eldest son, and John Charters, wolde attempt eyth[illegible]er t'apprehend or slee the cardynal at some tyme when [illegible]e shall pass through 'the Fyflande, as he doth sundrye [illegible]ymes to Saint Andrewes,' &c. It appears from these let[illegible]ers that Wishart had immediately afterwards an intervie[illegible] with Henry, in which he repeated the offer to put Beaton t[illegible] death. The negotiations were continued by Brunston and [illegible]he ear of Cassilis, but were not quite satisfactory to either [illegible]f them, the king declining to authorise the assassination [illegible] or, as Sir Ralph Sadler said, 'his highness, reputing the [illegible]act not mete to be set forward expressly by his majesty, will not seem to have to do in it, and yet not misliking the offer.' In the end however the two persons whom Wishart represented as prepared to commit the murder, Kirkaldy of Grange and the master of Rothes, were the actual perpetrators of it. It remains of course a matter of doubt whether George Wishart the martyr was the same Wishart who was the vehicle of the proposal, but this doubt is much narrowed by the fact that the laird of Brunston was George Wishart's champion and familiar friend. It is believed that Beaton was aware of the plots against his life, the full evidence of which had not, it may be remarked, been published at the time when the memoir of Beaton, in this Cyclopædia, was written. Wishart had therefore probably good reason to predict danger to himself, and he was generally surrounded by armed friends, of whom Knox was one. While in Dundee he received an invitation from Cassilis and other Protestant barons to hold a disputation in Edinburgh. Repairing thither, his friends, probably from timidity, did not meet him. Unprotected however as he was, he preached in the neighbourhood, and then, on the approach of the governor and the cardinal, fled to the laird of Brunston's house, four miles from Edinburgh. Venturing to preach in the town of Haddington, he took refuge with another supporter, Cockburn of Ormiston, in

house he was seized by the cardinal's troops, and
ed to St. Andrews. He was immediately put on
r heresy before a special ecclesiastical council;
the governor, having refused to give the proceed-
countenance of the civil power. He was con-
to be burned at the stake, and the sentence was
d at St. Andrews on the 28th of March, 1546, amid
tentous murmurs of the people.

ng many fulfilled prophecies traditionally attributed
art was one, that Beaton should soon hang in igno-
om the same window whence he was witnessing the
on; and the circumstances above detailed show
ishart might perhaps have reasonably anticipated
event without possessing the gift of prophecy.

kenzie, *Lives of Scots Writers*, iii. 9-19; Tytler,
f Scotland, vol. v.; Lyon, *Hist. of St. Andrews*,
366; M'Crie, *Life of Knox*, period ii.)

HART, GEORGE, an ecclesiastic and biographi-
ter, is said to have been born in Haddingtonshire, in
nd to have studied in the university of Edinburgh.
9 he was a clergyman in St. Andrews, when, refus-
take the covenant, he was deposed from the mini-
On 28th January, 1645, he is found petitioning the
h parliament as 'sometymes minister at St. An-
and laitly at Neucastle, nou prissoner in the comon
of Edinbrughe, beging mantinence, since he and his
and 5 children wer lykly to sterve.' (Balfour's *An-*
no 1645.) He was several times imprisoned dur-
e dominancy of the Presbyterian party. The ap-
of Montrose's army enabled him to join that com-
r, to whom he became chaplain. In 1647 he pub-
his history of the wars of Montrose, with the title
ebus sub Imperio Jacobi Montisrosarum Marchionis,
1644 et duobus sequentibus præclare gestis, Com-
rius.' On the execution of Montrose in 1650, this
was hung, in contumely, from his neck. It was
ted at Paris in 1648, and acquired a high reputation
e elegance of its Latinity. It was translated into
h in 1652, and the author is supposed to have
he translator. There is in the Advocates' Library a
ontinuation of the work to the death of Montrose,
has never been published in the orginal Latin; but
slation of it was appended to a translation of the first
n 1720, and both were re-translated and published by
man in 1756. A new edition of this translation was
hed at Edinburgh in 1819. After his patron's death,
rt became chaplain to Elizabeth, the Electress Pala-
At the Restoration he was made rector of Newcastle,
1662 was consecrated bishop of Edinburgh. Though
d himself suffered persecution, and in his writings
ated the cruel acts of Montrose, he is said to have
averse to the intolerant policy of Charles II.'s govern-
and to have recommended leniency to the Covenan-
He died in 1671.

eith, *Catalogue of the Bishops of Scotland*; Lyon,
ry of St. Andrews, ii. 10-12.)

ISMAR, an important seaport in the grand-duchy of
lenburg Schwerin, is situated in 53° 53′ N. lat. and
5′ E. long., on a bay of the Baltic called the Walpich.
surrounded with a wall and moat, and has four gates
rds the land and four towards the harbour. The har-
r is very safe, but not deep enough for large vessels.
npel however says, 'the harbour is one of the best on
coast of the Baltic, not only having sufficient depth,
being also secure against storms. The same may be
of the road.' It is a tolerably well-built town; the
ets are in general straight, sufficiently broad, and ex-
tely well paved. The houses in the principal streets
almost all of brick, but in general with the gable ends
rds the street. The principal public buildings are,
hree churches, all in the Gothic style; the town-hall,
ndsome modern edifice; the school-house, a very large
ofty stone building; the orphan asylum, and some
s. The trade of Wismar, which had greatly declined
the town was under the Swedish government, has
derably increased in the last 30 years, though it is by
eans to be compared with that of Rostock. Between
nt. 300 ships annually arrive and as many leave the
ur, and of these 60 or 70 belong to the inhabitants
elves. But Hempel (in 1837) complains 'that the
duties render a flourishing and secure maritime com-
e very difficult, and almost impossible. Besides the
levied by the town, there is an import duty levied
by the government, so that altogether the duties are double those paid at Rostock. The merchants of Wismar are still considered in the Mecklenburg customhouse as foreigners, so that they cannot compete with those of Rostock, and still less with those of Hamburg and Lübeck. Colonial produce imported by sea pays 5 per cent., whereas at Lübeck it pays only ⅛ per cent. It is therefore no wonder that the merchants obtain colonial produce by land from Hamburg, Lübeck, and Rostock, by which they save at least 3 per cent., because they thus avoid import duty by sea, and have only to pay the town duty. The imports by sea are chiefly confined to Swedish productions, which are exempt from duty.' There are several breweries, brandy distilleries, tobacco manufactories, and some of linen and yarn; many of the inhabitants derive their subsistence from agriculture, and the fisheries in the Baltic. The exports are especially of corn, but chiefly by Dutch ships, which are so built that they can pass through the Belt, and so avoid the Sound duty. Wismar joined the Hanseatic League in the middle of the thirteenth century, and from that time increased in power, wealth, and population. In 1376, 10,000 persons died of the plague, which carried off many thousands in several subsequent years. At present the population little exceeds 10,000.

At the beginning of the seventeenth century Wismar was incorporated with the duchy of Schwerin. It has since been several times besieged and taken. In 1803 it was sold by Sweden, to which it had been assigned by the peace of Westphalia (1648), with its territory and the little island of Poel, to Mecklenburg Schwerin for 1,200,000 dollars banco.

(Hassel, *Handbuch*, vol. v.; Brockhaus, *Conversations Lexicon*; Gustav. Hempel, *Geographisch Statistisch Historisches Handbuch des Mecklenburger-Landes*.)

WISTAR, CASPAR, was born at New Jersey in America, where his father was a glass manufacturer, in the year 1760. His father was a German emigrant, and a member of the Society of Friends, of which society Wistar remained a member. He was educated in Philadelphia at the school founded by William Penn, and commenced his medical education in that city. In 1782 he received the degree of Bachelor of Medicine in Philadelphia, and afterwards came to pursue his studies in Europe, and graduated in medicine at Edinburgh in 1786. His thesis was entitled 'De Animo demisso.' He returned to his own country in 1787; and when the college at Philadelphia was revived, he was appointed professor of chemistry and physiology, and delivered the courses of lectures on these subjects in 1789 and 1790. He was afterwards appointed to share the chairs of anatomy and surgery with Dr. Shippen, and at the decease of Dr. Shippen the whole duties of these chairs devolved on him. He was successively appointed physician and consulting physician to the dispensary, and physician to the hospital, of Philadelphia. In 1816 he was elected president of the American Philosophical Society. He published several papers on medicine and anatomy: amongst others, 'Remarks on the Fever of 1793,' and Memoirs 'on the Ethmoid Bone,' and 'on the Remains of an Animal belonging to the genus Bos.' In 1812 he published, in 2 vols. 8vo., 'A System of Anatomy,' a work embracing the subjects, anatomical and physiological, which constituted his course of lectures in the college. He was very successful as a teacher, and his lectures were always well attended. He died on the 22nd of January, 1818, of a fever which he caught during his professional duties. He was married twice, and left behind him a widow and two children. (*Encyclopædia Americana.*)

WISTA'RIA, a genus of plants belonging to the natural order Leguminosæ, named by Nuttall in honour of Caspar Wistar, professor of anatomy in the university of Pennsylvania. This genus has the following character. The leaves are unequally pinnate, and without stipules. The flowers are arranged in terminal racemes, and are of a blue lilac colour; when young they are accompanied by bracts which fall off as the flowers expand. The calyx is campanulate, somewhat bilabiate, the upper lip has two short teeth, the lower lip three teeth, which are subulate; the corolla is papilionaceous; the stamens diadelphous; a nectariferous tube girds the stipe of the ovary; the legume is coriaceous, 2-valved, 1-celled, and rather torulose. The species are deciduous twining shrubs, natives of North America and China. They grow vigorously in Great Britain, and form when in flower the handsomest ornaments of our gardens. The following are the species:—

W. frutescens, Shrubby Wistaria, has the wings of the corolla each furnished with two auricles; the ovary glabrous; the flowers odoriferous. This is an elegant climbing plant, and is a native of Virginia, the Carolinas, and Illinois, in boggy places. The flowers open from July to September. They are of a bluish-purple colour, the standard having a greenish-yellow spot at the base. They give out a sweet scent.

W. Chinensis, Chinese Wistaria, has the wings of the corolla each furnished with one auricle; the ovary villose; the flowers large. This plant is a deciduous twiner, and is a native of China, and was introduced into this country in 1816. It flowers in Great Britain in May and June, and sometimes produces a second crop of flowers in August. The flowers are larger than in the last species, and are of a paler colour and hang in looser racemes. This plant is one of the most elegant additions that have been made to British gardens during this century. It was introduced into England by Captain Robert Welbanke and Captain Richard Rawes, who both brought over the plant from Canton at the same time. The first plant that flowered was reared at the Rook's Nest near Godstone, in Surrey. From this plant the splendid specimen of this shrub which is now growing in the garden of the Horticultural Society at Chiswick was a cutting. This specimen is trained against a wall 11 feet high, and the branches extend on each side of the trunk to a distance of nearly 100 feet. This plant, on account of its rapid growth and hardy habits, is getting very common in England, and will probably soon be as great a favourite as the laburnum. This species was originally called *Glycine Chinensis*, a name which in some places it still retains.

W. floribunda is known by its glabrous stems and leaves. This is the *Dolichos polystachos* of Thunberg, and is a native of Japan. It is represented as an elegant plant, but has not yet been introduced into the gardens of Europe.

The species of Wistaria are not difficult of cultivation; they are hardy climbers. They flourish most in a light rich soil, and should be trained against a south wall, which they will frequently cover with a profusion of blossoms. They may be propagated by cuttings or layers.

WISTONWISH, *Arctomys* (*Spermophilus?*) *Ludovicianus*. Some obscurity having prevailed in consequence of the different views of zoologists with reference to this animal, it becomes necessary to lay before the reader some of the descriptions and opinions extant concerning it.

Description.—Light dirty reddish-brown above, intermixed with some grey and a few black hairs. Hair coating dark lead-colour next the skin, then bluish-white, then light reddish, then grey at the tip. Lower parts dirty white. Head wide and depressed above, eyes large, iris dark brown, ears short and truncated; whiskers moderately long and black; a few bristles projecting from the anterior portion of the superior orbit of the eye, and a few also from a wart on the cheek; nose somewhat sharp and compressed; hair of fore-legs, throat, and neck not dusky at the base. Feet five-toed, covered with very short hair, armed with rather long black nails; external toe of fore-foot nearly reaching the base of the next, middle toe half an inch long. Tail rather short, banded with brown at the tip, the hair, excepting near the body, not plumbeous at the base. (Say.) Total length, including the fur of the tail, 19 inches 4 lines.

Dark brown colour except their bellies, which are white; tails not so long as those of the grey squirrels, but shaped the same. (Pike.)

Head resembling the squirrel in every respect, except that the ear is shorter; tail like that of the ground-squirrel; toe-nails long; fur fine, long hair grey. (*Petit Chien.*) Weight three pounds, colour uniform bright brick-red and grey, the former predominating; under side of the neck and belly lighter than other parts of the body; legs short, breast and shoulders wide; head short and muscular, terminating more bluntly, wider, and flatly than the common squirrel; ears short, having the appearance of amputation; jaw furnished with a pouch to contain food, but not so large as that of the common squirrel: five toes on each foot, the two outer much shorter than those in the centre. Two inner [illegible] f fore-feet long, sharp, well adapted to digging and [illegible]g. From extremity of nose to end of tail one foot five inches, of which tail occupies four. (*Barking Squ* Lewis and Clark.)

Locality.—Banks of the Missouri and its tributaries

This, according to Dr. Richardson, is the *Prairie d* Gass; *Prairie dog* or *Wistonwish* of Pike; *Petit c* *Prairie dog, Barking squirrel*, and *Burrowing squ* of Lewis and Clark, but not the Burrowing squirrel of third volume; *Arctomys Ludovicianus* of Ord and *Cynomys socialis et cinereus* of Rafinesque-Smaltz; *M* *Missouriensis* of Warden; *Arctomys latrans* of Ha and *Prairie Marmot* of Godman.

Dr. Richardson states that the best accounts of this mal, which has obtained so many appellations sinc year 1807, are given by Lieut. Pike and Captains and Clark. He further remarks that M. Rafinesque, sidering the *Petit chien* briefly noticed by Lewis and C in their first volume, to be distinct from the *Bar* *Squirrel* more fully described in their third, drew up their notices the characters of his *Cynomys sociali* *C. cinereus*. 'Dr. Harlan,' says Dr. Richardson, in tinuation, 'has given the name of *Arctomys latrans* t *Cynomys socialis*, at the same time treating of the *tomys Ludovicianus* as a separate species. An atte perusal of Lewis and Clark's narrative however has l the conclusion that in the passages cited above the vellers speak only of one species of Marmot under a v of names; and Mr. Say seems also to have been o opinion. Lewis and Clark, vol. i., p. 246, mention a animal, about one-third of the size of their Missouri rowing squirrel, but otherwise closely resembling it. could not obtain a specimen, and its characters the have not been recorded by them; but from their vi at the time to the plains of the Saskatchewan, from general colour of the animal, and from the descriptio its earths, it most probably was the *Tawny Marmot* of work. The genus *Cynomys* of M. Rafinesque correspo to the *Spermophilus* of M. F. Cuvier; but the charact given by the latter author are more precise and more fully drawn up.'

Habits, &c.—Mr. Say states that this interesting a sprightly animal has received the name of *Prairie d* from a fancied resemblance of its warning cry to the h ried barking of a small dog. The sound, according to h may be imitated by the pronunciation of the syllable ch *chek, chek!* in a sibilated manner and in rapid successi by propelling the breath between the tip of the tong and the roof of the mouth. The assemblages of their bu rows are denominated *Prairie-dog villages* by the hunte They vary widely in extent: some are confined to a ar of a few miles; others extend to a circumference many miles. Mr. Say further observes that only one o these villages occurred between the Missouri and t Prairie towns; thence to the Platte they are much mo numerous. He describes the entrance to the burrow a being at the summit of the little mound of earth brough up by the animal during the progress of the excavatio below. These mounds are sometimes inconspicuous, bu generally somewhat elevated above the common surfac though rarely to the height of eighteen inches. Their for is that of a truncated cone, on a base of two or three fe perforated by a comparatively large hole or entrance at th summit or in the side. 'The whole surface,' contin Mr. Say, 'but more particularly the summit, is trod down and compacted, like a well-worn pathway. T hole descends vertically to the depth of one or two fe whence it continues in an oblique direction downward. single burrow may have many occupants. We have s seven or eight individuals sitting upon one mound. burrows occur usually at intervals of about twenty f They delight to sport about the entrance of their burr in pleasant weather. At the approach of danger they treat to their dens, or when its proximity is not too im diate, they remain barking and flourishing their tails o edge of their holes, or sitting erect to reconnoitre. W fired upon in this situation, they never fail to esc or if killed, instantly to fall into their burrows, where are beyond the reach of the hunter. As they pass winter in a lethargic sleep, they lay up no provision of for that season, but defend themselves from its rigour accurately closing up the entrance to the burrow. further arrangements which the Prairie dog makes fo comfort and security are well worthy of attention. constructs for himself a very neat globular cell with

, having an aperture at top large enough to admit
r, and so compactly formed that it might almost
over the floor without injury.'
chardson observes that the Prairie dog seems to
m other American Marmots in the length of its
il, and to approach in that respect *A. fulvus* of
ein.

term which is applied to a faculty of the mind
e products of that faculty. As a faculty, it de-
a distinct power, but certain specific modes of
operating upon the notions or images with which
happens to be furnished. It ranges itself under
comprehensive faculty of imagination, with which
riters it was generally used as synonymous; they
s used it in a sense still more general, as denot-
tellectual faculty as distinguished from the will.
se boundaries of the term are still too unsettled
of any strict definition. It may however be de-
enerally as consisting in the display of remote
ces between dissimilar objects, or such at least
no apparent resemblance. This species of wit is
in great perfection in two poems of a very oppo-
, the 'Hudibras' of Butler, and the 'Night
' of Young: ludicrously by Butler, to display
dities of hypocritical pretence; seriously by
add force and point to his reasonings in favour
s belief and conduct.

inds of remote allusion, often without any actual
, but suggestive to the mind, by indirect in-
make the comparison for itself, are considered
d produce a similar effect of surprise and plea-

instead of the remote resemblances discoverable
hemselves, the different meanings of the same
brought into equivocal contact, the operation
unning, and the product is a pun. [PUN.]

-HAZEL. [WYCH-HAZEL.]

CRAFT. There is probably no age or country
there has not existed a belief in the possibility
beings acquiring the use of supernatural powers
urpose of accomplishing some object of their
od or evil. In this, as in other species of super-
ere will be more or less resemblance in the
tions, wherever or whenever they are exempli-
that peculiar class of examples which comes
denomination of witchcraft admits of certain
marcation, which may be serviceable in keeping
t distinct from others. The proper field of this
n was among the Christian nations of Europe—
he north more particularly. It is to be found in
ity about the middle of the fifteenth century, and
with tolerably equal vigour through Catholicism
stantism, till it gradually decayed before the pro-
perimental science. In its doctrinal principles
ischievous application of the doctrines of Chris-
ing held to be a manifestation of the powers of
ting as antagonists to the authority of the Deity.
necessarily used to accomplish evil ends, because
he accusations of witchcraft relate to acts which
re condemned by no known moral code, but
ame crimes from the means made use of. The
evil thus employed by human beings had their
mbodiment either in the Prince of Darkness in-
, or in certain sublunary agents called imps or
the messengers between the contracting parties,
in this agency of evil the same position as that
by the angels in the holy hierarchy. The return
he human being for the use of the miraculous
s obtained was generally his own eternal soul,
ording to a superstition entertained by the ig-
ll countries where the immortality of the soul is
doctrine, it was held to be in the power of the
possessor to convey in remainder, for value given
luxury, power, or any other object of ordinary
re. Besides the bargain in which the parties are
to covenant openly with each other, each party
y presumed to have in view the secondary object
the other. German romance and, since the days
French romance have dealt largely in the horrors
hese mutual efforts of imposition, where the one
ggling to recover his chances of eternal salva-
other to abridge the promised rewards, or to
duration of their enjoyment. In its most simple aspect the struggles of the evil one to cheat his victim are exemplified in the ordinary Scottish superstition that he gives them money which, when they come to use it, is turned into slates or other rubbish; and the same instance is given by way of example by Biensfeldius, a German author, who in 1591 published 'Tractatus de Confessionibus Maleficorum.' This author, who is one of the most systematic of the numerous writers on this subject, and is one who, instead of venting the indignation of an excited and terrified mind against the lost agents of infernal power, treats all the horrors of sorcery with the gravity of an analytical philosopher,—tells us that there are three elements necessary to the accomplishment of witchcraft: the divine will permitting it; the power of the devil instigating and assisting the operation; and man's corrupt will consenting to be the instrument. It is a further general characteristic of witchcraft that from the commencement of its history the agents or victims have, in the majority of cases, been females; and that in later times, when the character of the superstition had degenerated both in the magnitude of the objects accomplished and the rank of the actors, witchcraft came to be considered a power exclusively possessed by old women. It is probable that a propensity to attribute the faculty of divination and the art of perpetrating supernatural mischief to females may have legitimately descended from the Pythia of the more early classical times, and the venefica or poisoner of the later periods of Roman history; and that the account of the witch of Endor may have tended to strengthen the opinion. In the superstitions however of nations which have had no means of acquiring knowledge from these sources—the African Negroes, the North American Indians, and the Scandinavians anterior to their adoption of Christianity—females seem to have always been the prominent agents in the application of the minor supernatural influences. In the practice of witchcraft within the limits assigned to it in this article, it might be possible to find, in the nature of the connection between the supernatural being and the earthly agent, a tolerably sufficient reason why the influence of a female must generally be greater in the infernal court than that of a male. Whoever has perused the full records of the trials for witchcraft, or the books in which the subject is most minutely investigated, will observe how necessarily it must follow that the power of evil being endowed with the masculine gender, and communicating his sex to those spiritual emanations of his power which sometimes in his stead do his bidding upon earth, the mortal recipients of his malign influence must necessarily be of a different sex. The institutional writers on the subject however are not found to allude to such a cause, though they lay it down as a general principle that women are more liable to be the agents of Satan than men, a circumstance which Sprenger, in his 'Malleus Maleficarum,' traces to what he calls their inferiority in mental strength, and the natural wickedness of their hearts.

In going back to an earlier period than that which is here assigned as the time when the superstition of witchcraft was full grown, it will be found that the accusations most nearly resembling the more modern offence of witchcraft are of two distinct kinds—attempts to accomplish mischief through the operation of poison or other natural agents, and lapses from Christianity into heathen practices. The Anglo-Saxon laws against sorcery or witchcraft are simply levelled against the practices connected with the heathen worship from which the people had not been long converted. The corresponding accusations in the south of Europe are levelled against intercourse with dæmons who represent Diana and her nymphs or Pan and his satyrs; and down to the antient period of the belief in witchcraft we find the same personages officiating with changed names, and with natures adjusted to the religious opinions of the age. The secrecy with which the Waldenses and other early seceders from the church of Rome were compelled to hold their religious assemblages, brought upon them charges of indulging in such unhallowed rites as were traditionally considered the characteristics of antient heathenism. The horrors of the witches' Sabbath had their origin in the mystery that shrouded these religious conventicles, and the same charges are made against those who frequented them in the thirteenth century which we find made against witches in Sweden and Scotland in the seventeenth. One remarkable practice of which the Waldenses were accused will be recognised by every schoolboy who has heard a witch legend in the nursery—they were called 'scobaces,' because they rode to their meetings on a scoba, or broom. The 'Narrative of the Proceedings against Dame Alice Kyteler, prosecuted for Sorcery in 1324,' edited by Mr. Wright, for the Camden Society, and which is perhaps still more curious from the light it throws on the early conflicts between the ecclesiastical and the civil power, than in its reference to this subject, exhibits both the classes of offence here alluded to. She was charged with having prepared noxious compounds, productive of debilitation which ended in death, and also with abjuring her belief in the holy church, with having deserted the mass and the eucharist, with having sacrificed to dæmons, and with having attempted to usurp the keys of the Church by impiously imitating the ceremony of excommunication.

During its earlier stages, the art of witchcraft was in far higher hands than those to which it afterwards descended, and was used for greater purposes. Witchcraft or sorcery was the means by which Joan of Arc was charged with having obtained her power as a warrior. The duchess of Gloucester was banished to the Isle of Man for sorcery against Henry VI. Richard III. made repeated accusations of this offence, the most noted of which is the charge against Jane Shore. The earlier witch trials in Scotland generally implicate persons of rank. Sometimes the women who are accused are young, and they do not always use their power for mischievous and malicious purposes. Bessie Dunlop, who was tried in 1576, appears to have used her art for no other purpose than the cure of diseases and the performance of other benevolent acts, accomplishing them through the instrumentality, not of Satan or any of his emanations, as they are spoken of in the later canons of witchcraft, but through the aid of an amiable old gentleman, who had the misfortune to be a prisoner among the fairies in Elfland. Alesoun Pearson, tried in 1588, had a long intercourse with Elfland, which appears to have commenced when she was but twelve years old. She had many personal friends among the fairies there, one of whom was her cousin William Symsoun, a doctor of medicine and 'ane great scholar.' She was in the practice of appealing to her friends in fairyland for the means of curing earthly diseases, and Archbishop Adamson did not disdain to follow a prescription which she obtained for him, his reliance on it being probably not weakened by his acquaintance with the virtues of the principal ingredient, which was claret. These two trials so far exhibit the darker characteristics of the witchcraft of later times, that Bessie Dunlop's adviser from Elfland wished her to put her soul in his possession; and Alesoun Pearson was told that of the fairy host the tithe is taken every year to hell. The method in which the same occurrences are mentioned by writers of different ages shows the progress towards the accepted doctrines of the authorities of witchcraft; and, as may be afterwards more particularly mentioned, both in England and Scotland the investigations of King James did much to establish a settled creed in relation to this dark subject. Wyntoun, who wrote early in the fifteenth century, in describing the prophecies made to Macbeth, brings the three weird or fatal sisters to him in a dream, and makes him inquire after the auguries of his fate, as Crœsus is made to consult the Pythia. By the time the history had descended to Shakspere's days, it had acquired from the state of opinion on the subject which it passed through such adjuncts as enabled the poet, by selecting the grander and more terrific features, and adding some elements from the current superstitions of his day, to create those hags 'so withered and so wild in their attire, that look not like the inhabitants o'th' earth, and yet are on't.' Perhaps the latest conspicuous occasion in which rank and beauty have been allied with charges of the nature of witchcraft, is that of the countess of Essex and Mrs. Turner, in the murder of Sir Thomas Overbury and the practices against the earl of Essex; but the direct and palpable crimes exhibited in this horrible history throw the attempts at evil through supernatural influences into the shade. When in later ages it ceased to be encouraged by the great and the learned, witchcraft degenerated, till, in the end of the seventeenth and the beginning of the eighteenth centuries, it was entirely confined to such persons as Harsnet so early as the year 1599 describes in this passage:—'An old weather-beaten crone, having her chin and her knees meeting for age, walking like a bow leaning on a staff, hollow-eyed, un-
toothed, furrowed in her face, having her lips tre
the palsy, going mumbling in the streets,—one
forgotten her Pater-noster, and yet hath a shr
to call a drab a drab. If she hath learned of an
a chimney end Pax Max Fax for a spell; or
John Grantham's curse on the miller's eels—
have stolen the miller's eels, laudate Dominu
and all they that have consented thereto, b
Domino: why then beware, look about you,
bours. If any of you have a sheep sick of the
a hog of the mumps, or a horse of the sta
knavish boy of the school, or an idle girl of th
a young drab of the sullens, and hath not fat
her porridge, or butter enough for her bread, a
a little help of the epilepsy or cramp, teach he
eyes, wry her mouth, gnash her teeth, start
body, hold her arms and hands stiff, &c., and
old Mother Nobs hath by chance called her
housewife, or bid the devil scratch her, then n
Mother Nobs is the witch, and the young
blasted.'

There are two causes which account for th
often found to exist in the superstitions of differ
tant nations:—1, Physical and mental pheno
mon to all mankind and to all parts of the
ducing like effects when brought into the sam
tions; 2, A reference to a common origin ant
commencement of the superstition, by which
opinions adopted by families of mankind se
apart may be traced by ascent to a common
A great portion of the witchcraft superstition
may be traced to both these causes; but at the
the identity of the phenomena of this men
as exhibited in different nations, is so rem
well as the rapidity with which the opinio
in one part of the world travelled to others
evident some other causes have contributed
the effect. The similarity of the incidents n
only in the books which convey the knowled
mysteries, but in the reports of criminal trials
in the confessions of the wretched victims of t
so remarkable, down to the most minute partic
justify the supposition that a large proportion of
craft superstition was propagated by means o
through the tuition of men of letters; and th
that age of imperfect science, literature became
the means of propagating and concentrating th
of one of the most baneful superstitions which
visited the human mind.

Among the most obvious means which the i
would suggest for indicating to supernatural
exact evil effect which they are solicited to
mortal beings would be the symbolical accom
or exhibition of its performance on an effigy of
intended to be injured. The principles of hu
which originally suggested this device are so w
as to include the deification of idols and the bur
obnoxious politician in effigy; but in the practic
craft, the method of symbolically producing de
poral injury is so far uniform as to predicate a
opinion on the subject. An image of the devo
was made of wax and melted before a fire, stu
with pins or needles, or perforated with arrow
times the model was of the heart, or some other
sometimes a picture was used in its stead. Be
whose 'Masque of Queens' brings together al
minent witch superstitions to be found in t
authors, in the commentators, and in the prac
own days, says in the third charm:—

> 'With pictures full of wax and of wool
> Their livers I stick with needles quick;'

nearly a paraphrase of Ovid's—

> '. . . . . simulacraque cerea figit,
> Et miserum tenues in jecur urget acus.'
>
> *Heroides*, v

Jonson in his notes refers for this practice
an example as the epistle of Hypsipyle to J
which the above is taken; he probably had t
in his eye. He refers also to what he calls
known story' of King Duffus, one of the
kings of Scotland, the legend of whose su
as old as the days of Wyntoun, by whom it is
but would be searched for in vain among those

ts who had not the means of ornamenting their s with some of the wisdom of the antients. Jonson e remembers some such figures having been dug up nghill in his youth. The story of Bolingbroke and ch of Eye, in Fabyan's 'Chronicle,' illustrates this e. In Middleton's 'Witch,' Hecate says, 'Is the f wax stuck full of magic needles?' King James, in monologie,' has a very full examination of the opera- this charm; and after receiving so high a sanction, ourse cuts a conspicuous figure in the subsequent rials both of England and Scotland. In the latter y it became united with a belief in the unearthly of the numerous small flint arrowheads of antient anship, conspicuous for the regularity and beauty eir shape, which are frequently dug up in the of Scotland. The witches of Auldearne, whose re recorded in Pitcairn's 'Criminal Trials,' de- a cavern in the centre of a hill where the end and his attendant imps conducted a complete ctory of these missiles; the inferior spirits hewing ut of the rough stone, and their master giving each s presented to him in a rough state the proper edge ish, to adapt it for service.

e objects which, from their connection with death cay, are apt to produce loathing and horror in nds of persons whom habit has not made familiar hem, are favourite instruments in the hands of s, to whom their use seems to have descended he necromancers. There are few narratives of raft or sorcery, from Apuleius downwards, which present us with some of the spoils of the charnel- Animals loathsome to the sight from their struc- eing associated with notions of deformity, or from nom with which their otherwise feeble frames lowed, are naturally made use of by those who among orant aim at the possession of supernatural powers. respect the medicine-man of the Indians, called on his charms when the traditionary usages of the tribe application of simples have failed, uses many of the tools as the witch of the sixteenth and seventeenth ies. In warm climates the serpent, the scorpion, and ard are among the charms resorted to; but in colder les the adept must be contented with the toad, the he mole, and the bat. Jonson, in his third charm 'Masque of Queens,' thus mentions the animals lly befriended by northern superstition:—

> 'The owl is abroad, the bat, and the toad,
> And so is the cat-a-mountain;
> The ant and the mole sit both in a hole,
> And the frog peeps out o' the fountain.'

are animals which hold out many inducements to aginative and superstitious. They bring to a certain the habits of a wild beast into the domestic circle. ontrast between their strength and agility, their and fragile appearance, their tenacity of life, their and rapid movements, their mysterious gatherings at and strange cries, invest their presence with a fascinat- ystery. The tombs of Egypt and the history of the s Templars show that they have received attention er quarters; but the very peculiar position which old in the councils of the powers of darkness, in con- n with the ministrations of witches, shows by its uni- y that the opinions regarding them entertained by thorities on witchcraft lore were widely adopted by ithful. In several of the Scottish trials and con- s women are found to have assumed the shape of and to have betrayed their pranks by exhibiting restored to human form the wounds inflicted on in their bestial capacity. At so late a period as the 718 a solemn judicial inquiry was made in the shire thness, by the sheriff or local judge, into the perse- suffered by William Montgomery, whose life was ed miserable by the gambols of a legion of cats. rrative of the circumstance, as given in Mr. Kirk- Sharpe's introduction to Law's 'Memorials,' is a nd somewhat exaggerated picture of those general ous gatherings of domestic cats which sometimes countably disturb the repose of a neighbourhood. imals, it was solemnly maintained by the persecuted ervant, 'spoke among themselves;' and at length omery, his patience being entirely exhausted, fell e conclave with a broadsword and an axe, and dis- them with several casualties. The consequence t two old women in the neighbourhood died immediately, and a third lost a leg, which, having been broken by a stroke of the hatchet, withered and dropped off. In a curious little book published at Leyden in 1656, called 'Magica de Spectris et Apparitionibus Spirituum,' &c., which is a complete repository of diabolical experience, consisting of a series of narratives extracted without comment from historical chronicles and books of magic, an occurrence is said to have taken place (p. 236) at a town in Calabria, so exactly like the above, that whereas Mr. Montgomery was a carpenter by profession, the hero of the foreign adventure was in the act of cutting wood when he was distracted by the presence of a turbulent bevy of cats, whom he dispersed with his implements. In this case the metamorphosis was made known by a charge being brought against the individual of having assaulted and wounded some women of rank in the neighbourhood, when he disclosed the fashion in which they had appeared, and the affair was hushed up. In the same work (p. 292) there is another instance, the same in its essential particulars, quoted from Bodinus. A belief in the metamorphoses of human beings into brutes is a superstition so widely exemplified in classical literature, and in the sculpture and paintings of all societies of men sufficiently civilized to provide such testimonies of their customs and belief, that it cannot be assigned as a special feature of the belief in witchcraft. The minuteness however of the analogy exhibited in the above, and discoverable in many like cases, seems to those who do not believe in the actual metamorphosis to leave no other alternative but the belief, that the doctrines promulgated in one part of the world were in all their minute particulars adôpted in another. Lucanthropie, or the conversion of men into wolves, was so prevalent a belief in France and Germany as to be the subject of separate treatises and of various judicial inquiries. It naturally did not extend to Britain. This superstition may be perhaps more distinctly traced to the influence of a diseased imagination than most of the others connected with this subject: by the Greek physicians it is understood to have been treated as a disease. Both the English and Scottish trials frequently illustrate the power supposed to be possessed by those in league with Satan of converting their victims into beasts of burthen, which they employ to convey them to the scenes of their unhallowed assemblies. This feat was performed on a large scale by the great army of witches charged with assembling at Blocula in Sweden, in 1669, according to the narrative of Glanvil, in his 'Saducismus Triumphatus.'

A power over the elements is one of those gifts with which superstition will be most likely to invest its invisible agents. In its less striking form it has the aspect of a malign interference with the natural fruits of the earth, either by blasting some particular district, or transferring its elements of fruitfulness that they may increase the produce of some other tract in which the sorcerer is interested. This species of incantation is prohibited by the Twelve Tables (Dirksen, *Uebersicht, &c. der Zwölf-Tafel-Fragmente*, p. 539), and the illustrations of it in the witch trials are too numerous to be mentioned. A trading or maritime population living on a stormy coast will endow their malignant dæmons with a more awful authority over the winds and waves. Olaus Magnus treats largely of the storm-raising powers of the Scandinavian witches. It was on his return from these regions with his wife Anne of Denmark, that King James produced so goodly an array of accusations against witches for aiming against his life; and coming from a spot where such a particular department of witch superstition was prevalent, it is natural that the aspect assumed by the accusations should be an attempt to create a storm at sea for the purpose of intercepting his voyage. In the accusations against the witches of Aberdeen in 1596 and 1597, the record of which is printed by the Spalding Club, the exercise of a power over the elements is one of the charges. In the curious narrative as to Margaret Barclay and others, preserved by Sir Walter Scott in his 'Demonology' (p. 317), we find the same feature. This specific superstition does not seem to have taken root in England, and Shakspere, whose witchery in 'Macbeth' is essentially Scottish in character, has given it a place there:—

> 'Though you untie the winds and let them fight
> Against the churches; though the yesty waves
> Confound and swallow navigation up.'

It is a remarkable circumstance that nowhere are the identities between the opinions promulgated in doctrinal works and the practice of witchcraft more fully developed than in the confessions of the witches as produced in official documents. The horrible tortures, which the alarm produced by the supposed existence of a coalition with Satan seems to have prompted men of ordinary humanity to sanction, appear to have generally called from the exhausted victims an assent to whatever narrative was dictated to them, and the inquisitors being learned men, acquainted with the best authorities on the subject, would know how to connect the received doctrines of sorcery with whatever train of real circumstances may have been brought home to the victim. Knowing in fact the outline of natural events they would be able to fill up the supernatural details. Margaret Barclay, tried in 1618, was, according to the record preserved by Sir Walter Scott, subjected to 'gentle torture.' Sir Walter calls this 'a strange conjunction of words;' but it is not without precedent, and we can imagine it taken from Biensfeldius, who tells us of a lady who, in 1590, at Cologne was subjected to 'moderata tortura.' The Incubus and the Succubus—the former the visitant of males, the latter of females—are prominent in the confessions, and open up a world of psycho-physiological inquiry. According to the book 'De Spectris,' &c. above-mentioned (p. 262), it is given as a characteristic of the confession of a female: 'Ex eo tempore Deo et religioni renunciâsse, et illum [Diabolum] sic concubuisse secum, ut viri cum fœminis solent, nisi quod frigidum erat semen.' These notabilia, and singularly enough the last and most particular one, are enlarged upon in several of the Scottish trials. Reference may be made to the appendix to Pitcairn's 'Criminal Trials,' p. 610, and to a pamphlet called 'History of the Witches of Renfrewshire.' Reginald Scot goes over the same subject, and further curious matter will be found in Glanvil, 'Saducismus Triumphatus;' Sprenger, 'Malleus Maleficarum,' p. 257; and Delrio, 'Disquisitiones Magicae,' p. 74. There is no doubt that some of the confessions recorded were voluntarily made; and that, whether dictated by their own imagination or by their reading, the self-accusers did not speak on the suggestion of others. There are thus two mingled elements in these documents, the separation of which would be necessary to and would materially aid a philosophical examination of the causes which have produced such singular effects: the one would bring before us the physical and psychological causes from which the mind voluntarily imagines itself an actor in such supernatural occurrences; the other would explain the utterance of confessions of such acts by persons who until they were subjected to torture never imagined their existence. The confessions made under torture were frequently revoked during moments of mental and physical resuscitation; and the circumstance reminds one of the recantation in the old French case of the trial of Father Girard, whose victim Catherine Cadiere confessed that she was the agent of a conspiracy against him; and of the revocation in the later case of Madame Manson, who, under the excitement, as she maintained, of the recent occurrence of an atrocious murder, and of a harassing cross-examination in relation to it, confessed to having witnessed it under circumstances which blackened her previously-unblemished character, an admission which she afterwards revoked.

The influence on society of a belief in witchcraft was of the most pernicious kind. It gave an unchecked flow to all the malignant passions; some venting them in accusations, others in attempts to practise the nefarious art. In the year 1515 five hundred people are said to have been executed at Geneva on charges of witchcraft; and Remigius, the inquisitor, boasts that he put nine hundred to death in Lorraine. The first person who lifted his voice against these cruelties was Wierus, who wrote in 1568. He and his followers carried on a controversy with Delrio, Bodinus, Scribonius, and others, in which it is generally admitted that the defenders of witchcraft were the more successful logicians. The supporters of old and received fallacies have their compact and complete system of sophistry, and he who would break through it must, like a Bacon or a Locke, possess strength enough to destroy the whole fabric. Wierus and his followers ventured to raise their voice against the method only of the manifestation of Satan's power of diabolical possession, not its existence. Against the brutal practice of swimming a witch to see if she will sink or float, which may be traced as an ordeal succeeding
that of the red-hot ploughshares, and which infer
body in which an evil spirit dwells is lighter th
they could do no more than adduce the experim
that the herd of swine into which Jesus cast
spirits, running into a lake, were drowned. Of al
opponents of this superstition the English Regi
who wrote in 1584, was perhaps the most suc
the employment of an acquaintance with nat
rations, a bold scorn of fallacies highly suppor
ready sarcasm. He was followed by Harsnet in
in 1720 by Francis Hutchinson, who however
chiefly to the unlearned, among whom alone
lingered at the time when he wrote.

The learned men of Europe generally wer
in witchcraft down to the end of the seven
tury. Selden has an apology for the law agai
which shows a lurking belief. He says t
believes that, by turning his hat thrice and
he could take away a man's life; 'this w
law made by the state, that whoever should t
thrice and cry "buz," with an intention t
a man's life, shall be put to death.' The logi
mind, if untainted by superstition, would
shown him that a law waging war with i
capable of being fulfilled must be both usele
chievous. Sir Thomas Browne and Sir Matthe
believers in witchcraft, and attested their be
instrumental in convictions for the crime. It
that there were no executions for witchcraft i
subsequently to the year 1682; but the statute of
c. 12, so minute in its enactments against witches
repealed till the 9 Geo. II., c. 5. In Scotland, so la
year 1722, when the local jurisdictions were s
ditary, and had not been put into the hands of pro
lawyers, the sheriff of Sutherlandshire condemned
to death. It is worthy of remark, as one of the last
of this superstition in educated and profession
that in a work called 'The Institutes of the Law
land,' published at Edinburgh in 1730, by Willia
an author deservedly neglected by practical law
a specific definition of the nature of witchcraft, th
following passage:—'Nothing seems plainer to
there may be, and have been witches, and that
such are now actually existing; which I intend,
ing, to clear in a larger work concerning the
law.' This promised work never made its appear

WITENAGEMOTE, literally an 'assembly of
from the Anglo-Saxon 'gemoth,' an 'assembly,' an
'to know,' which has the same root, 'wit' or 'w
words wit, witness, wise, and the legal phrase
'to wit.'

Although the chief rulers of the Anglo-Sax
nearly down to the time of the Conquest, bore t
king, and in their charters and letters attached
of the sonorous epithets in which, especially am
barbarous nations, kings indulge, yet in fact
little raised in power above the other chiefs of
tion, who either had themselves shared together
own particular followers, or were descended from
who had so shared the risk of the first invas
seated the tribe in Britain. To election by th
the king owed his office; and if the sceptre des
his race, it was, if not by force of renewed ele
tainly by means of the formal recognition of the
by the nobles in an assembly convened for th
Of this assembly the chief ecclesiastics in the
archbishops, bishops, and abbots, the judges (if
were), and the largest landholders formed part.
upon the faith of a single instance, that five hy
were an indispensable qualification. Whether
body of the people had a voice in this great
doubtful; judging by the analogy of the shire
of all the political and judicial institutions of
Saxon ancestors, it is probable that each distric
at these national assemblies (even if it did no
active part in their deliberations) by means of
sible officers, its reeves, and of the persons who
for it at the county court: there is however, we
evidence that there was a systematic representa
people at the witenagemote by persons electe
specific purpose.

Nor did the functions of these national coun
with the election of a king: their meetings, if n

ere frequent, and were held usually at the great
ls of the year, Whitsuntide, Christmas, and espe-
Easter; they formed the highest court of judicature
kingdom; they were summoned by the king in the
f any political emergency; their concurrence is
mentioned in the preamble to the laws, and was
ary to their validity, as well probably as to that of
grants and charters; and the chief persons who
ed them frequently expressed their approbation of
oyal acts by their signatures under that of the king.
en the Saxon states were united under the dominion
king, whether as bretwalda (whatever office that
implied), or by the union of smaller states into one
m, the national council retained its powers. It was
by the king, in his grants and laws, his witan, his
gemote, his mycel synoth (great synod), michel
ht (great deliberation), his eadigan (worthy); and
n by similar names, *e.g.* magnum concilium sapien-
niversæ gentis Angliæ concilium; or by names in-
g the rank and property of the members, such as
tes, and very frequently proceres. A knowledge of
mposition of this council must be gathered from the
in which its members are mentioned, and (as we
aid) from its analogy to other smaller political as-
es.

Sharon Turner enumerates, from various extant
rs, the designations given by the king to his great
l in the preambles of those instruments, or added
e members themselves to their signatures; and
ancis Palgrave, in his 'Rise and Progress of the
h Commonwealth,' more fully sets out many of these
ents (*Proofs and Ill.*, p. ccxviii.). After the signa-
or more frequently crosses, are found the titles of
, abbot, deacon, prince, dux, comes, ealderman,
er, miles; and of the great household offices of the
, pincerna, disc thegn, chief carver, &c. The names
ally of ecclesiastics often have some verb after them,
is fantastically varied, as adfui, comprobavi, favi,
vi, confirmavi, subscripsi, to which the petty kings
rchbishops often added consensi, and the king him-
equently adopted in his signature the form 'Con-
et signo crucis munio.' To some charters the names
ses of princesses of the royal family and of abbesses
r. In one case the title *electus* follows a name.
itenagemote in the reign of Ethelwolf (855) granted
church a tenth, with the assent of the kings, thanes,
, and people. The eighth law of Edward the Con-
names the people; and the 35th law recites that it
by the common advice and assent of all bishops,
s, chiefs (procerum), earls, and of all the wise men
lders, and of the people (populorum) of the whole
m. Sergt. Ruffhead, in his preface to the Statutes,
tures, confessing at the same time his ignorance,
he folcmote resembled our House of Commons, the
vitenagemote our House of Lords, and the witenage-
ur privy council. Undoubtedly some of the func-
hich in far more recent times the privy council has
ned did devolve upon the witan; for instance, their
al was required for certain acts of the king; and
lly their office was less to devise measures than to
er and to sanction those which were submitted to

oncurring in royal charters and grants the witena-
performed the double office of consenting to and
sting these gifts or privileges; and here their office
alogous to that of the shire-mote, which in those
lays distributed justice rather according to the
ty of the facts than to any systematic rules of inves-
g the truth, and qualified itself for this office by
ng that the main transactions touching the rights
operty of individuals within its district should pass
resence.

hose cases where the administration of justice was
ible in the county courts, owing either to their want
sdiction, or to the power of one of the parties, the
ity of the witan was appealed to; and the nation
d itself to support the executive power of the king
ing to his arrangements the force of a law. Thus
eat family of Godwin earl of Kent was outlawed in
nd restored in 1052 by the authority of the witan;
her case the title of a great landholder to estates of
the muniments had been destroyed was] acknow-
, and a new deed setting out the bounds was granted.

During the Anglo-Saxon times the possessions of the king, and the ordinary payments made to the crown by every landholder, together with the duties paid by townships, were sufficient for the ordinary wants of the government, especially as the triple duty (trinoda necessitas) of repairing roads and bridges (*brycg-bote*), maintaining the walls of the burghs (*burh-bote*), and resisting invasion (the *fyrd*), was invariable. The king too was entitled to tolls on goods sold in most markets and fairs, and to customs on imported goods; but in those emergencies when a pecuniary contribution was to be made by the nation, the witan were called on to accede to the tax.

If the domestic affairs of the nation were thus considered and confirmed by the witan, treaties with foreign states were equally submitted to their approval. Thus the treaty between Alfred and Guthrun the Danish leader, whereby the eastern counties were abandoned to the Danes, is made with the approbation of the witan.

The duties of the witenagemote were therefore partly legislative, partly, and indeed for the most part, judicial. It was to the whole nation what the shire-mote was to its own district, the court where the king's laws and his most important acts were promulgated, his rights ultimately enforced, and justice administered if denied elsewhere: and in enumerating these offices one is necessarily led to observe the analogy which subsists between that antient aristocratic assembly and the House of Lords of recent times.

When the Norman Conquest had destroyed all the rights of the English people, it did not obliterate from their minds the memory of their institutions; so again on the one hand the king, as the emergency arose, availed himself of those institutions to strengthen his title or assist his projects; and on the other hand the Norman nobles found in them the means of uniting to themselves the great body of the people, in order to check the oppression or to limit the power of the crown. The circumstances of the Norman invasion, and the fact that the nobles who accompanied William in that enterprise were rather fellow-adventurers than subjects, led necessarily to the calling together by himself and his successors of a general council of his chiefs, sometimes expressly to consult upon state affairs, often only for the avowed purpose of celebrating with him, and at his cost, the great religious festivals of the year. Thierry ('Conquête d'Angleterre,' tome i., p. 319) quotes from the 'Chronique de Normandie,' that before William undertook the expedition to England, his immediate counsellors, whose concurrence he had obtained, warned him 'that he must also ask aid and counsel of the people generally; for it is just that he who pays should be called to assent;' and that the duke then convened the principal chiefs, ecclesiastics, and merchants. Sir F. Palgrave observes, that the great council of William the Conqueror differed little from the witenagemote, and that the Saxon thanes were mingled in it with the Norman barons. Certainly his muster at Salisbury or Winchester of his Norman companions or their sons at the head of their followers, in 1086, the year before his death, savoured little of a national and constitutional council, although the members of the assembly renewed their oath of allegiance to him, and he promulgated his ordinances, among which was one requiring the maintenance of the law (legem) of King Edward. Orderius Vitalis says that 60,000 were then assembled. Henry I., who affected to conciliate his native subjects, summoned a national council by the antient name of witenagemote.

By degrees the English recovered some political rights: their Norman rulers yielded, at least in words, to their demand for the restitution of their antient customs, or, as the people called them, the laws of Edward the Confessor: the machinery already established of townships, hundreds, and shires, with their motes (assemblies) and officers was maintained, as useful for the collection of the crown revenue, and as tending to the maintenance of civil order, by the responsibility which each district incurred for the acts of its inhabitants. Hence, although the antient popular officer, the reeve, was displaced for the Norman count, viscount, and bailiff, who derived their authority immediately from the crown, yet the popular assembly, the schire-mote, and the habit of representation at that assembly of the burghs and hundreds in the county remained.

The power of the aristocratic element (unquestionably the main ingredient) in the witenagemote was therefore never suspended, although in its conflicts with the crown it might be greater or less. Its influence was most efficiently shown when, in 1215, the nobles wrested Magna Charta from King John. The popular element in the witenagemote assumed a distinct form, when in the succeeding reign (1265) Simon de Montfort, earl of Leicester, high-steward of the realm, issued in the king's name writs to the sheriffs of all counties, commanding them to return to the parliament two knights for the county, and two burgesses from every borough, to consult concerning the affairs of the nation. [PARLIAMENT.]

(Turner's *History of the Anglo-Saxons*; Sir F. Palgrave's *Rise and Progress of the English Commonwealth*.)

WITHAM. [LINCOLNSHIRE.]

WITHAM. [ESSEX.]

WITHAMITE occurs crystallized. Primary form an oblique rhombic prism; it is found also in small imbedded globular masses composed of radiating crystals. Fracture uneven. Hardness, scratches glass readily. Colour, red and reddish-white. Streak white. Translucent; opaque. Specific gravity 3·137.

It is not acted on by acids. Before the blowpipe intumesces and fuses with difficulty into a dark-grey scoria. With salt of phosphorus it dissolves with effervescence into a globule which contains a little silica, and becomes opaque on cooling.

Found at Glencoe in Scotland, and is regarded as a variety of epidote. Dr. Coverdale's analysis performed on only six grains gave—

Silica . . .	55·28
Alumina . .	16·74
Peroxide of iron .	21·13
Lime . . .	8·13
Water . . .	3·25
	104·53

WITHER, or WYTHER (sometimes improperly *Withers*), GEORGE, was born 11th June, 1588, at Bentworth, near Alton in Hampshire, and was the only son of George Wither of Bentworth, who was himself the second son (the first by a second wife) of John Wither, Esq. of Manydowne, near Wotton-St.-Lawrence, in that county. The name of Wither's mother was Anne Serle. After receiving the usual instruction at the grammar-school of Colemore, or Colemere, under its eminent master, John Greaves, he was sent about 1604 to Magdalen College, Oxford, where he had for his tutor Dr. John Warner, afterwards bishop of Rochester. After remaining however about three years, during which, according to his snarling biographer, Anthony Wood, he 'made some proficiency, with much ado, in academical learning,' he was called home without having taken a degree, as he himself tells us (in his 'Abuses Stript and Whipt'), 'to hold the plough.' Wood only says that 'his geny being addicted to things more trivial' than the studies pursued at the university, he went to London, and entered himself first at one of the inns of Chancery, afterwards at Lincoln's Inn. 'But,' continues Wood, 'still his geny hanging after things more smooth and delightful, he did at length make himself known to the world (after he had taken several rambles therein) by certain specimens of poetry; which being dispersed in several hands, [he] became shortly after a public author, and much admired by some in that age for his quick advancement in that faculty.' Some pieces of less pretension had already made his name known in a limited circle, when in 1613 he published his volume of poetical satires on the manners of the time, entitled 'Abuses Stript and Whipt.' For some things in this production which gave offence to the government he was committed (it is not stated by what authority) to the Marshalsea prison, and lay there for several months. While in confinement he wrote and published his 'Satire to the King,' 1614, in which he complains bitterly of the injustice of his detention, and which is supposed to have procured his release. The spirit of his poetry and the usage he had met with now made him a great favourite with the puritanical party, by whom, Wood states, he was much 'cried up for his profuse pouring-forth of English rhyme.' Afterwards, it is added, 'the vulgar sort of people' came to regard his poetry as having in it something prophetical. He denounced the abuses of the times, too, in various prose pamphlets as well as in his more frequent discharges of flowing verse. All this while he appears to have lived in easy circumstances on the landed property which he had inherited. But, as might have been expected in so hot and restless a spirit, Wither, as soon as the storm of the civil war began to blow, hastened to throw himself into the scene of commotion and excitement—at first, as it would appear, without much minding which side or what principles he fought for. He served as a captain of horse, and quarter-master-general of his regiment, in the expedition which Charles I. led against the Scotch Covenanters in the spring of 1639 (also, it may be noted, the first campaign of the cavalier poet Lovelace). Three years after, when the war began between the king and his English subjects, Wither sold his estate and raised a troop of horse for the Parliament, in whose army he was speedily promoted to the rank of major. On his colours, we are told, he carried the motto, 'Pro Rege, Lege, Grege.' Being taken prisoner by the royalists, he is said to have been indebted for his life to a bon-mot of Sir John Denham:—'Denham,' says Wood, 'some of whose estates at Egham in Surrey Wither had got into his clutches, desired his Majesty not to hang him, because, so long as Wither lived, he, Denham, would not be accounted the worst poet in England.' He also probably soon recovered his liberty. Not long after this, Wood tells us, 'he was constituted by the Long Parliament a justice of peace in quorum for Hampshire, Surrey, and Essex, which office he kept six years, and afterwards was made by Oliver major-general of all the horse and foot in the county of Surrey, in which employment he licked his fingers sufficiently, gaining thereby a great odium from the generous royalists.' A MS. note on a copy of one of his tracts in the British Museum, his 'Boni Ominis Votum,' printed in 1656, describes him as 'lately made master of the statute office.'

At the Restoration Wither was not only forced to disgorge all this spoil, but was by a vote of the Convention Parliament sent to Newgate on the charge of being the author of a publication entitled 'Vox Vulgi,' which was regarded as a scandalous and seditious libel. There is extant a 12mo. pamphlet which he published in 1661, entitled 'The Prisoner's Plea humbly offered in a Remonstrance, with a Petition annexed, to the Commons in parliament assembled, by G. Wyther, falsely charged to have composed a libel against the said Commons, and therefore now a prisoner in Newgate;' but Wood asserts that he afterwards confessed himself the author of the obnoxious publication, upon which he was committed a close prisoner to the Tower, with orders that he should be debarred the use of pen, ink, and paper, and at the same time an impeachment was ordered to be drawn up against him. The impeachment does not appear to have been proceeded with; and he even contrived, by the connivance of the keeper, to write and to send to the press from time to time sundry pieces both in verse and in prose. It is not known when he was released: Wood says that he lay in the Tower three years and more; Aubrey's account is, that his imprisonment lasted about three-quarters of a year; it is certain however that he had obtained his liberty some years before his death, which took place on the 2nd of May, 1667. He was 'buried,' says Aubrey, 'within the east door of the Savoy Church, where he died.' He had married, the same authority states, Elizabeth, eldest daughter of H. Emerson of South Lambeth: 'she was,' Aubrey adds, 'a great wit, and would write in verse too.' It appears that a grandson of Wither's, Hunt Wither, of Fidding, in the county of Southampton, designating himself colonel of foot in her majesty's army, and brigadier-general in the service of Charles III. of Spain, was alive in 1709. But his paternal estate of Bentworth had latterly come into the possession of an heir female, and was a few years ago held by Mr. Bigg Wither, who in consequence had taken the old family name. (See 'Memoir of Wither' in *British Bibliographer*, vol. i. pp. 1-18, published in 1810.) Anthony Wood characteristically rounds off his account of Wither with the critical remark that 'the things that he hath written and published are very many, accounted by the generality of scholars mere scribbles.' The list of his works fills about 13 columns in Dr. Bliss's edition of the 'Fasti Oxonienses.' But the most detailed catalogue of them is that contributed to the 'British Bibliographer' by the late Mr. Thomas Park; it includes 112 articles (among which however are some not known to have been printed), and extends over vol. i., pp. 179-205, 305-332, 417-440; and vol. ii., pp. 17-32, 378-391. Various bibliographical

relating to Wither are also to be found in the pages
Restituta' and the 'Censura Literaria.'

e of Wither's religious verses continued to be
l for some time after the commencement of the last
, but were in request no doubt more for their devo-
than their poetical qualities. The estimation in
he was then held as a poet may be gathered from
ntemptuous mention of him by Pope in the 'Dun-
—

> 'Safe, where no critics damn, no duns molest,
> Where wretched Withers, Ward, and Gildon rest.'*

has also spoken of him in similar terms (in an un-
passage however in which he couples him with
). Even Bishop Percy, long after this time, in pub-
one of Wither's short pieces in the first (1765) edi-
his 'Reliques,' vol. iii., p. 120, does not venture to
the author's name: 'This beautiful old song,' he
says, 'is given from a very antient copy in the
folio MS.' So also in the case of another frag-
p. 253. And even in the subsequent editions of
k his admiration of Wither is very cautiously ex-
. In the fourth edition (1794), the last he superin-
he speaks of him as merely 'not altogether devoid
us' (vol. iii., p. 190). Long before this indeed, in
em entitled 'Bibliotheca,' published in 1712, the
supposed to be Dr. William King, mentions him
e epithet of 'melodious Wither;' and seems to in-
that he had still a sort of reputation among poetical
ries—

> Though living scorned and never read,
> Like other things, admired when dead;'—

is far from anticipating that his muse will ever
e a popular favourite:—

> 'No curious eye shall e'er presume
> To alter her appointed doom,
> Her peaceful labours to molest,
> But seal them up in endless rest;
> That sleep allow her in the grave
> Which she to all when living gave.'

of the first persons who expressed a cordial appre-
of the merits of Wither's poetry was the late Mr.
s Gilchrist in a Life of him which he communicated
70th volume of the 'Gentleman's Magazine,' pub-
n 1797. Since then ample justice has been done to
g neglected writer by the late Mr. George Ellis, in
edition of his 'Specimens of Early English Poetry'
by Mr. Thomas Campbell, in his 'Specimens of the
Poets' (1819); by the late Mr. Hazlitt, in his 'Lec-
English Poetry' (1818); and especially by the late
rton Brydges, in the 'Restituta,' the 'Censura Litera-
'British Bibliographer,' and other publications.
following list of modern reprints of portions of
s poetry may serve to evince the extent of the in-
has recently excited, and also to point out the most
ed of his productions:—1, 'Extracts from Juvenilia,
ns by George Wither,' 12mo., London, 1785. The
of this small volume was Alexander Dalrymple,
e has interspersed his extracts with a series of critical
highly laudatory of his author. 2, 'Epithalamia,
tial Poems' on the Marriage of Frederick V., count
, and the Princess Elizabeth, reprinted in the 'Re-
vol. i., 1814. 3, 'The Shepherd's Hunting,'
London, 1814, with a copy of the print of the
head by Holle (edited by Sir Egerton Brydges).
elia: a Love Epistle, by George Wither, of Lin-
nn, gentleman; a new edition, from the edition of
ollated with the edition of 1633,' &c., 12mo., Lon-
15 (also edited by Sir E. Brydges). 5, 'Hymns
ngs of the Church, by George Wither; a new edi-
printed from the original published in the reign of
ames I., with a preface by the Editor' (Sir E.
s), 12mo., London, 1815. (The preface extends to
the reprint to 304 pp.) 6, 'Select Lyrical Poems,
rge Wither; written about 1622; Kent, printed at
vate press of Lee Priory,' 4to., 1815 (only 12 leaves,
by Sir E. Brydges). 7, 'Fair Virtue the Mistress
arete, by George Wither, gent.; a new edition,
ed from the edition of 1622,' 12mo., London, 1818
by Sir E. Brydges, who has prefixed a preface of
o the reprint, extending to 165 pp.). 8, 'Juvenilia,
tion of Poems written by George Wither, in 2 vols.
s: Abuses Stript and Whipt, Prince Henry's Obsequies, A Satire to the King, Epithalamia, or Nuptial Poems, The Shepherd's Hunting, His Motto, and Hymns and Songs of the Church, &c.,' 8vo., London, 1622. This reprint is without date, but was executed about 1820, by Gutch of Bristol, under the superintendence of the late Dr. Nott. It appears to have been intended as the commencement of a complete edition of Wither's poetry; but it was carried no farther than the two first volumes, and the greater part of the impression was sold for waste paper. The 'Abuses Stript and Whipt' fill the first volume, making 465 pp. 9, Another reprint of Selections, in 2 vols. 8vo., also without date, and without any general title-page: vol. i. contains 'Fair Virtue, the Mistress of Phil'arete,' 215 pp.; and 'Selections from Abuses Stript and Whipt,' to the end of the volume on p. 347: vol. ii. contains the first five cantos in full of 'Britain's Remembrancer,' and the metrical summaries of the 6th, 7th, and 8th; selections from a 'Collection of Emblems, Ancient and Modern,' London, 1634; and 'Selections from Hallelujah, or Britain's Second Remembrancer,' 1641.

Wither's poetry is of very unequal excellence, and a good deal of it is worthless enough. His fatal facility, which grew upon him as he advanced in life, and soon debased his style from freedom to slovenliness, has left nearly everything he has done weak and unfinished in some part or other. But there was in him a true poetic genius, a quick and teeming invention, a universal sympathy, a fancy that could gild any subject, or 'make a sunshine,' like Spenser's Una, 'in the shadiest place;' above all, a natural love of truth and simplicity, which, whatever else may be sometimes wanting, has put a life and enduring freshness into all that he has written. His earliest style is his happiest; in that he seems to have sought by art and pains for the directness and transparency for which he afterwards trusted mostly to negligence or chance; latterly also he took, apparently from design, to a greater harshness both of phraseology and rhythm; but, both in his verse and in his prose, his English is rarely without the charm of great ease and clearness, as well as idiomatic vigour.

WITHERING, WILLIAM, was born in 1741, at Wellington in Shropshire, where his father was a surgeon-apothecary in considerable practice. He received his early education at a school in his native place, and commenced his medical education under his father's instruction. After spending the usual preliminary time with his father, he was sent to complete his medical education at Edinburgh, in the university of which place he took his degree of Doctor of Medicine in 1766. He commenced the practice of his profession at Stafford, where he married; but not succeeding, he removed to Birmingham in 1774. Here he became the successor to Dr. Small, and quickly succeeded in obtaining a large and lucrative practice. His income is said to have been larger than any physician of his day out of London. In the midst however of his great professional avocations he found time to cultivate with great ardour the sciences connected with natural history. He was exceedingly attached to botany, and having become acquainted with a large number of the plants growing in Great Britain, he was induced to publish, in 1776, a work on the plants of this island. It appeared first at Birmingham, in 2 vols. 8vo., and was entitled 'A Botanical Arrangement of all the Vegetables naturally growing in Great Britain.' As this work appeared at first it was little more than a translation of the descriptions of the British genera and species from the great work of Linnæus, with the addition of many of the habitats of the plants from Ray's works. The work however was wanted, and quickly found a sale. A second edition was published in 1793, and a third in 1796. In this edition the work was increased in size to four volumes, and a vast amount of original matter added, so as to give it quite a different character from the first edition. In this work he was much assisted by many of his botanical friends, and he has everywhere acknowledged how much he was indebted to Dr. Stokes and Messrs. Woodward, Velley, Stackhouse, and others. Since the death of Dr. Withering several editions of his 'Arrangement of British Plants' have been published. It is now however entirely superseded by the more valuable manuals of Smith, Hooker, Lindley, and Babington. It had the merit of being the first British Flora arranged according to the Linnæan system; and the early editions may now be consulted with advantage on the properties and uses of the plants native to Great Britain, and the traditions about them.'

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* Book i. 296. See also the Note on v. 146.

Botany was not Withering's only scientific pursuit; he was fond of chemistry and mineralogy. He published, in 1793, a translation of Bergmann's 'Sciagraphia Regni Mineralis,' with the title 'Outlines of Mineralogy.' He was a fellow of the Royal Society, and published several papers on mineralogy and chemistry in the 'Philosophical Transactions,' of which the following are the titles:—In the volume for 1773, 'Experiments on different kinds of Marle found in Staffordshire;' in 1782, 'Analysis of the Toad-stone of Derbyshire;' in 1784, 'Experiments on the Terra Ponderosa;' in 1798, 'An Analysis of a Hot Mineral-Spring in Portugal.' These papers display a very competent knowledge of the chemistry of the time. But whilst pursuing science he did not neglect his profession, and he published several papers on medical topics. In 1778 he published 'An Account of Scarlet Fever and Sore Throat, especially as it appeared at Birmingham in the year 1778,' 8vo. He also published in 1785 'An Account of the Fox-glove and some of its medical uses; with practical remarks on the Dropsy and other diseases.' Although he was not the first to recommend foxglove (digitalis) as a medicine, he must still be looked upon as the first physician who knew how to use it, and by his writings gave it the character as a powerful medicinal agent, which it has never since ceased to retain.

Dr. Withering was always the subject of a weak state of health, and was frequently attacked with inflammation of the lungs. This had so much weakened him in 1793 as to induce him to try a change of air for the benefit of his health, and he accordingly spent the winter of that year in Lisbon. At the latter end of the year 1794 he again went to Lisbon, and returned the following year. His health was somewhat re-established, and on returning to Birmingham again he changed his residence from Edgbaston Hall to a place called the Larches, previously the residence of Dr. Priestley. Here in retirement he spent the remainder of his days, and died in November, 1799.

Dr. Withering was a man of considerable discernment and great perseverance. He was humane towards the poor, and mild and courteous in his manners. He was conscientious in the practice of his profession, and never prescribed where he thought necessity did not require it. Although reserved in public, he was exceedingly open amongst those who knew him; and he left behind him a large private circle of friends. (*Gentleman's Magazine*, vol. lxix.)

WITHERI'NGIA, an extensive genus of plants belonging to the natural order Solanaceæ, named in honour of Dr. William Withering. It has the following characters:—calyx 4-5-cleft, urceolately campanulate; corolla rotate; tube short; limb 4-5-cleft; stamens 4 or 5, with connivent anthers dehiscing longitudinally; stigma subcapitate; berry 2-celled, supported by the permanent calyx, many-seeded; the placenta adnate. The species of this genus are trees, shrubs, or herbs, with a soft wood, having a large pith, and the habit of the plants belonging to the genus Solanum. The corollas of the flowers vary in colour, and are whitish, rose-coloured, yellow, greenish, or bluish. The flowers are arranged in umbels, racemes, or panicles; rarely solitary. The branches are opposite or alternate, and thickened at their nodi. With the exception of one of the species which inhabits the Cape of Good Hope, they are all inhabitants of South America. About twenty species have been described. They are not handsome plants, so that they have not been introduced into gardens as ornaments. Their properties as far as known are similar to those of the family to which they belong. The first species of this genus, which was described by M. L'Heritier, is the *W. Solanacea*. It has an herbaceous stem, and a root composed of fusiform tubers; the leaves are ovate-oblong or ovate-lanceolate, rather pilose; and the umbels are axillary, sessile, and longer than the petioles. It is a native of South America, and has very much the appearance of a Solanum. *W. stramoniifolia*, a native of Mexico, is a tree, and attains a height of 10 or 20 feet. *W. rhomboidea* is found on the Andes at a great height, and is a climbing shrub. In their cultivation the species of Wi-

iire the same treatment as Solanum.

TE. [BARIUM.]

[HORSE.]

OHANN PHILIPP LORENZ, a German physician who distinguished himself as a writer of didac poetry, was the son of Johann Hildebrand Withof, p fessor of history, eloquence, and Greek literature, and born at Duisburg on the Rhine, June 1st, 1725. In 1 he entered the university of his native place, where, the first three years, he applied himself to classical li rature, history, and antiquities, and afterwards entirely medicine. His father then sent him to Utrecht and L den, on returning from which seats of study he obtain his medical diploma at Duisburg, in 1747, and began practise at Lingen, but did not remain there above th years. After an interim of about two more, at Duisb again, during which he lectured on anatomy and phys logy, he accepted, in 1752, an appointment in the gy nasium at Hamm, as professor of history and philosop About the same time he was made corresponding mem of the Göttingen Scientific Society, and also of the Ro Society, London. He continued at Hamm until he r ceived an offer from the university of his native place, 1770, inviting him to accept the professorship of eloquen and Greek literature, which he held at the time of h death, July 3, 1789.

Though most of his poems had been composed very lo before, being in fact the productions of his youth, a some few of them had actually appeared in print, it was n till 1782 that he gave them to the public, in two volume under the title of 'Academische Gedichte,' one, as Esche burg observes, not particularly well chosen, since it do not convey any idea of their subjects, but would rathe imply their being only occasional pieces, or else writte for academical purposes. 'Philosophical' would hav been a far more appropriate general epithet for them tha 'Academical,' since it is the philosophical spirit, the depth of thought, and extensive learning they display, which have established for them the high though limited reputation they possess. Withof is a writer for thinkers, and not for mere readers of poetry; since, instead of alluring the latter to his didactic strains by the graces of language and felicity of expression, he is generally negligent even to harshness in his versification, and at times very obscure as to meaning, faults which he appears in some degree to have affected rather than to have endeavoured to shun. Still those who can overlook imperfections of that kind, and who attach more importance to the value of the matter than to any charm of manner, will be repaid by his 'Die Moralischen Ketzer,' and 'Sinnliche Ergötzungen,' for the studious perusal which they require.

(Jörden's *Lexicon Deutscher Dichter und Prosaisten.*)

WITIKIND, WITTEKIND, or WITTICHIND, was the principal duke or commander-in-chief of the Saxons in their wars with Charlemagne. He is also called king (Rex Saxonum et Alborum), but incorrectly, because the Saxons have never had kings: the government was in the hands of an assembly, which met annually at Macklo, on the Weser, and to which each 'gau,' or county, sent twelve edelings or nobles, twelve freemen being freeholders, and twelve freemen having lands in lease. The Saxons inhabited the extensive tract between Friesland, the Northern Sea, and the Eider, in the north; the Baltic, the Trave, and the Middle Elbe, in the east; the Saale, Thuringia, and Hesse, in the south; and a line in the west which corresponded probably to the present limits of the Prussian province of Westphalia. The western limits however were never well fixed. The Saxons were divided into Westphalians west of the Weser; Engerns, who lived likewise west of the Weser, in the mountainous province of Sauer-land; Eastphalians, between the Weser and Elbe; and Al or North Albingians, in the present duchy of Holstein. They were a fierce and warlike nation, and made contin incursions into the Frankish empire by land and by se Faithful to the worship of Woden and other gods of th forefathers, they made a strong opposition to the progr of Christianity, which was in their opinion only a di guised form of slavery. When Lebuin, the Anglo-Sax appeared among them for the purpose of preaching t Gospel, they not only refused to listen to him, but thre ened his life; and he only escaped death by the mediat of his friend Buto, a Saxon noble. By choosing Aach (Aix-la-Chapelle) for his residence, Charlemagne cle indicated that, being sure of the obedience of the west, intended to extend his empire towards the east. He clared his intention to subdue the Saxons, and to force th to adopt the Christian religion, in the diet at Worms e first year of his reign, 772. His first campaign was ccessful. He penetrated into the country of the Engerns, ok their fortress of Eresburg (now Stadtberg, on the iemel) by surprise, and destroyed the 'Irmensul,' a na- onal monument. Great wealth was found there by the ranks. In the neighbourhood of this monument Charle- agne made a truce with the Saxons, and returned to his ominions in order to prepare his expedition against Desi- erius, king of the Longobards. During the absence of harlemagne in Italy the Saxons prepared for a fresh war, nd chose two commanders-in-chief, Witikind and Albion. itikind had extensive estates in Engern and Westphalia, nd it appears that he was 'duke' of the warriors of these wo countries; while Albion commanded the Eastphalians nd North Albingians. Witikind immediately invaded he Frankish territory; but in 775 Charles approached ith a mighty host, and penetrated as far as the Ocker, in he present duchy of Brunswick. After several defeats he Eastphalians, under their duke Hessi, or Hassio, and he Engerns, whose duke was then Bruno, made peace and ave hostages to Charles. Bruno and Hessi were probably ubordinate dukes. The Westphalians followed their ex- ample, but it does not appear that Witikind submitted. The truce was of short duration; but Charles made new progress, and built fortresses, in which he placed strong garrisons. In 777 he held a meeting at Paderborn, which was attended by a great number of Saxon nobles and commoners, part of whom were baptized and submitted to the Franks. Witikind however did not appear, but fled to Siegfried, king of Denmark, whose sister Gera he had married. Charles, believing that Saxony would keep quiet, urned his arms towards the Arabs in Spain; but no sooner as he gone than Witikind, supported by a body of Danish orsemen, renewed the war; and when the Saxons heard at a Frankish army had been destroyed by the Basques the valley of Roncesvalles, the whole country took up rms, and Witikind ravaged the Frankish territory as far Cologne and Coblenz. Charles returned from Spain in 79, invaded Saxony, defeated his enemy at Bocholt (not r from Wesel), and in 780 encamped near the junction the Ohre with the Elbe, where he once more received e homage of many Saxon chiefs, but not of Witikind, ho remained in Holstein, and quietly waited for the sence of Charles, against whom he secretly excited the rbi, a Slavonian nation on the right bank of the Elbe. ddenly he crossed the Elbe and destroyed a Frankish my at Mount Süntelberg, near Minden. Charles, infu- ated, appeared with fresh troops, and having compelled portion of the Saxons to give up their principal leaders ith their adherents, he ordered them all to be beheaded ar Verden, on the Aller, 4500 in number (783). This uelty produced a terrible outbreak among the Saxons. bloody but indecisive battle was fought near the place here Varus perished with three Roman legions, in the eutoburger Wald; nor could Charles boast of having efeated his enemy in a second engagement which was ught near the sources of the Hase, north of Osnabrück. he places where Charles and Witikind had ranged their rmies, two sand-plains, at a short distance from each ther, near Vörden, in a barren desolate country, are called the present day, the one the 'Kerlsfeld,' the other he 'Wittefeld.' During the two following years Charles ontinued an obstinate struggle with the Saxons; and eeing the impossibility of subduing them unless he gained their chiefs, he sent messengers to Witikind and Albion, who were then in Holstein, and promised them the free enjoyment of all their estates if they would adopt the Christian religion and recognise Charles as their master. Upon this proposition they both sacrificed the interest of their country to their own. They went to Attiniacum, now Attigny, near Rheims in Champagne, where Charles then resided, submitted to the Frankish king, and were baptized; whereupon they returned to their dominions (A.D. 785). The final subjugation of the Saxons, which was not com- letely effected till the year 803, and the conditions of the eace, have been given in the history of the Teutonic ations. A proof of Witikind's attachment to the Christian eligion is his foundation of the convent, afterwards chapter St. Alexander, at Wildeshausen, in the grand-duchy of ldenburg, where the respective documents (though not gned by Witikind) may still be seen. At Wildes- usen there are some ruins, situated on a hillock sur- unded by the Hunte, which are said to be the remains of the chief residence of Witikind; and in the mountains near Dissen, east of Osnabrück, there is a ruined stronghold called Witikinds-Burg. It is said, but it cannot be proved, that Witikind lost his life in 807, in a battle with Geroald, duke of Suabia. His body was interred at Paderborn, whence it was carried to Engers, and subsequently to Herford, near Minden. In 1377 the emperor Charles IV. ordered a monument to be erected to his memory in the parochial church at Engers, and in 1822 his remains were carried from Herford to Engers, and deposited under that monument. (*Conversations Lexicon.*) There is little doubt that a considerable portion of Witikind's hereditary estates were situated in the present duchy of Oldenburg; and among the German princes who claim a descent from the Saxon chief, the house of Holstein-Oldenburg seems to have the best historical title.

(Eginhartus, *Vita Caroli Magni*, ed. Schminck, with the notes of Bessel, Bolland, and Goldast; Poeta Saxo (Anonymous) in Leibnitz, *Scriptores Rer. Brunswic.*; Möser, *Osnabrückische Geschichte*, vol. i., the best work on the subject.)

WITNESS, from the Saxon witan, 'to know.' In the article Evidence the subjects of legal testimony and of the competency of witnesses are so fully discussed as would have rendered needless any further notice of them, if a recent Act, 6 and 7 Victoria, c. 85 (1843), had not made some important alterations in the law. These alterations are in the direction to which the article Evidence mentions that the courts have of late years inclined; they remove from the judicial inquiry after truth many of the obstructions arising from incapacities created by the law, and they enable the tribunal to obtain all possible information, leaving it to 'exercise its judgment on the credit of the witnesses adduced, and on the truth of their testimony.'

This statute enacts that every one, excepting a party named in the record or the wife of such party, shall be competent to give his testimony in any legal proceeding, commenced after the passing of the act, notwithstanding that he may have an interest direct or indirect in the matter at issue; and that no one shall be rendered incompetent to be a witness because he has been previously convicted of some crime. The act further enables a party to a suit in equity to examine a defendant in the suit notwithstanding his interest.

The only exceptions made by the act are in the case of wills, which a party beneficially interested under them is still incompetent to prove: and in the case of actions of ejectment and of replevin. In the first of these the lessor of the plaintiff or tenant of the premises in question, and in actions of replevin the landlord of the defendant may be the real party to the action, though his name does not appear as such upon the record. The testimony of all these parties therefore and of their wives is excluded.

WITNEY. [Oxfordshire.]

WITT, DE, JOHN and CORNELIUS, two of the ablest and most honourable of Dutch statesmen, were so inseparable in their career that the history of their lives must also be one. John, though the younger by two years, played, in consequence of his genial, versatile, and aspiring character, the more prominent part; but it is doubtful whether he could so long have sustained himself without the aid of his brother's solid though less showy parts. Cornelius was one of those rare and invaluable natures who intuitively feel themselves born to perform a secondary part, and are probably, in the persevering unostentatious discharge of their duties, more useful as they are more difficult to find than even leaders of commanding talent. There is something extremely beautiful in the uninterrupted co-operation of two men like Cornelius and John de Witt, each among the very finest specimens of his own class of characters, when the tie of brotherhood strengthens the bands of friendship.

The father of John and Cornelius was a leader in the party opposed to the assumptions of the House of Orange, and a member of the States General of Holland and West Friesland. He was considered by advisers of the Stadtholder of sufficient consequence to be included among the eight citizens imprisoned in the castle of Löwenstein, in 1650. The young De Witts therefore were early imbued with hostility to the pretensions of the family of Orange, and devotion to the Republican and Arminian party; and at the same time encouraged by the position of their father to look forward to public employment.

John de Witt was born at Dordrecht in 1625, and educated at Leyden, where, in addition to the studies necessary for one who aspired to rise in the state, he is understood to have cultivated the mathematical sciences with success. A treatise published at Leyden, in 1650, under the title 'Elementa Linearum Curvarum,' is attributed to him.

The death of William II., prince of Orange, on the 2nd of October, 1650, threw the management of affairs into the hands of the party to which De Witt's father belonged. Cornelius, his eldest son, having been, as will appear in the more particular notice of his career in the sequel of this article, appointed burgomaster of Dordrecht, the family influence obtained for John the office of pensionary of that city. The ability which he displayed in that charge procured for him, two years later (in 1652), when only in his 27th year, the more important appointment of grand pensionary of Holland, which he retained till 1672. During the intervening twenty years, he was, under the modest title of grand pensionary, virtual chief-magistrate of the republic. The period was a critical one for Holland—during the earlier part of it De Witt was called upon to make head against Cromwell, and during the latter against Louis XIV., and he struggled at the same time against the inveteracy of domestic faction.

De Witt on assuming the reins of government found the republic engaged in a war with England. A series of sea-engagements in which, although great skill and bravery were displayed by the Dutch and English commanders, and many lives were lost, victory inclined alternately to each side without declaring very decidedly for either, paved the way for a peace which was negociated by De Witt, and signed at Westminster on the 15th of April, 1654. On the part of the Dutch the honours claimed by the English for their flag in the Channel were conceded. A secret article was appended to the treaty, in which it was stipulated that the Stuart family should receive no support from the United States, and that no prince of the House of Orange, so nearly allied to the Stuarts, should be elected stadtholder, or grand-admiral. This article was at first signed by the representative of Holland alone: the other provinces were as jealous of the ascendancy of Holland as the republican party of the ambition of the House of Orange. This treaty embraced the great outlines of the policy in which De Witt persevered during the whole of his future administration:—Avoiding giving umbrage to the States of Europe by stickling on points of empty etiquette; aiming to preserve peace and the security of its foreign possessions for Holland; balancing the different European powers against each other; and guarding against the establishment of hereditary power in the House of Orange.

Towards the attainment of the last-mentioned object De Witt laboured indefatigably. The republican party preponderated in Holland, but the Orangists were masters in Zealand. The other states hesitated between their fears of being domineered over by Holland or by the prince of Orange. It was not till the year 1667 that De Witt obtained the assent of the States General to the 'perpetual edict,' by which the office of stadthouder was declared to be for ever abolished. There was however no admixture of personal hostility to the prince of Orange in this persevering zeal for the destruction of his house's power. William, prince of Orange, (afterwards William III. of England) was a posthumous child, and the care of his education devolving on the States, had been left almost entirely to De Witt. He discharged this duty conscientiously and sagaciously; and William, notwithstanding the hatred against De Witt which his mother endeavoured to instil into him, and notwithstanding his own ambition, which rendered him ready enough to take advantage of the grand pensionary's unpopularity, always retained and expressed, in his guarded manner, a grateful and respectful sense of the manner in which De Witt behaved towards him during his minority.

The next care of De Witt was to introduce order into the finances of the republic. In this he succeeded so well that the States of Holland presented a formal request to him that he would develop his financial system in writing.

Mutual respect had established a friendship that might almost be termed confidential between Viscount Turenne and De Witt. Turenne, in 1660, had endeavoured to persuade the French government to conclude treaties with
Portugal and the United Provinces, as a check
ambition of Spain, but had been thwarted by M
the death of that minister the viscount renewed
sentations to Louis XIV., who left the affair ent
hands. The price at which Turenne obtained t
cence of the grand pensionary in his scheme w
of commerce between France and the United
concluded in 1661, by which each state conce
subjects of the other entire freedom of comme
respective ports; the States General guaranteed
sion of Dunkerque to France; and the king
guaranteed to the Dutch the right which they
fishing off the coast of Great Britain and Ire
British cabinet made a feeble remonstrance a
last article, but Louis contrived to appease th
time.

But the affront rankled in the public mind o
and the commercial rivalry between that
Holland soon accumulated other grounds of
The mariners and traders of the two countries h
quarrels on the coast of Africa and in the Indie
persisted in representing the other as the aggre
was declared between Holland and England in
Witt invoked the aid of France, but in vain:
only offered his mediation. Admiral Opdam w
by the Duke of York and Prince Rupert off H
forced to seek shelter with the remnant o
in the Texel. On this occasion De Witt gave
instance of the daring self-confidence which a
gency could awaken in him. Antwerp was the
the possession of the republic where the flee
refitted. The pilots refused to take upon them
sibility of navigating the ships from the Texel
by a course which would secure them from the
the English, and yet be free from the danger of
the shallows. De Witt repaired on board the fl
took the responsibility from which skilled profes
shrunk; conveyed the fleet in safety to Antwer
under his energetic superintendence, it again to
in fighting trim in an incredibly short space of t
now declared in favour of Holland, and ostens
orders to his fleet to join that of the United
No junction however took place, and after two
contested battles between the naval forces of H
England, a peace was concluded at Breda, by a
which Denmark and France became parties, b
belligerents, on the 30th of July, 1667.

De Witt endeavoured after the peace to conc
attention upon the internal organisation of th
The perpetual edict and the financial resolut
alluded to were the first fruits of this determina
the conduct of the French king soon interru
labours by drawing his attention to foreign affa
invaded the Spanish Netherlands in 1667, unde
text that they fell by right to his queen on th
her father the king of Spain. Turenne took one
tion after another with his usual rapidity, and
vancing towards Brussels, when the marquis
Rodrigo represented to the States General, that
were allowed to conquer the Netherlands there
main no barrier between it and the United
These representations were backed by those
sent by the English ministry to propose an a
tween Holland, England, and Sweden, with
oblige France and Spain to conclude a peace.
sure coincided with the policy of De Witt, w
danger of irritating France, and the equal da
maining a passive witness of its aggressions.
alliance was resolved upon on the 23rd of Jan
signed on the 7th of February, and ratified on
April. At the same time the forces of the re
secretly augmented by De Witt: 25,000 inf
raised, and quartered in the frontier garrisons, a
of forty vessels put in commission. These
were accelerated by the progress of the Fren
Franche Comté. The treaty disposed France
overtures of peace, as the invasion of Franche
posed the court of Spain; and under the direc
Witt and Temple the peace of Aix-la-Chapelle
on the 2nd of May. Louis dissembled his an
part taken by the United Provinces in these
till an opportunity of avenging himself should

In 1670 Charles II. was persuaded by the i ch court to promise that England would withdraw e Triple Alliance. In 1671 the bishop of Münster eral Roman Catholic princes of the Empire entered ague with France for the purpose of reconquering ntier towns which they alleged had been unjustly bly torn from the Empire by Holland. In Sweden cil of regency appointed to conduct the affairs of ng the minority of Charles XI. was also detached interests of Holland. The inaction of De Witt ese intrigues were carrying on all around him pear unaccountable but for two circumstances ntributed to paralyse him. The first was the l constitution of the republic, in which there was l authority, every province and almost every ning its sovereignty. To raise money or troops nt of an immense number of petty councils was composed of men whom immediate and visible one could convince of the necessity of making st sacrifices. The other circumstance was the rength of the Orange party, to which various causes d: popular fickleness, tired of an administration years' standing; the number of disappointed can- office which had accumulated in the course of rs; the inveterate malevolence of the Calvinistic nst the party of which De Witt was the chief; ural tendency of men to favour the pretensions of real historical greatness. To this combination of fluences must the fact be in a great measure at- hat when the frontiers of Holland were simul- assailed by the forces of Louis XIV. and the princes, in the spring of 1672, the forts were held ons weak alike in numbers and in the inex- and want of discipline of the raw levies which d them.

artisans of the House of Orange seized the op- ty of national alarm and confusion to clamour for eal of the perpetual edict. De Witt and his friends ill strong enough to refuse this demand, but not to t the Prince of Orange from being nominated cap- nd admiral-general on the 25th of February, 1672. caution taken to guard against any advantage Wil- might be inclined to take of his military power rather pitated than delayed the downfall of De Witt. Eight ies were selected from among the members of the General to act as a council to the military and naval anders: Cornelius de Witt, who was one of them, ent on board the fleet of De Ruyter; the other seven ordered to accompany Prince William. As usual, a plicity of councils only embarrassed the commander- ef, and added to the number of reverses which en- De Witt's enemies to raise a storm of public indigna- gainst him.

ice and England declared war against Holland on of April; the elector of Cologne and the bishop of er a month later. In the course of two months the and German armies had occupied the provinces of e, Over-Yssel, and Utrecht, taken fifty cities, and pwards of 24,000 prisoners. At sea the Dutch were fortunate, but the utmost efforts of De Ruyter and e companions in arms were unable to achieve more drawn battle in the encounter with the duke of York bay. The advance-guard of the French army was five leagues of Amsterdam. The cities of Holland abant, to avoid surrendering, were obliged to break kes and inundate the surrounding country. The for the rescinding of the perpetual edict was suc- y renewed at this disastrous crisis. The revocation dict was signed by the magistrates of the principal f Holland and West Friesland.

he beginning of July Louis returned to Paris; e was obliged to draw towards the German frontier succours for Holland which were advancing under tor of Brandenburg; and the duke of Luxembourg in the conquered provinces with a force no more fficient to hold the prince of Orange in check. The ry relief from all-engrossing fear thus afforded to bitants of the unsubdued provinces was employed enemies of De Witt in stimulating the populace him by all kinds of malevolent misrepresentations. ther was arrested on a false accusation, brought Hague, and on the 24th of July tortured and sen- to perpetual exile. He himself was attacked by in the streets of the same city, and dangerously wounded. After the condemnation of Cornelius, John visited him in prison; a mob assembled, uttering violent threats against both brothers. Three companies of cavalry, under Count Tilly, in garrison at the Hague, put in motion by their officers to rescue the De Witts, were ordered to move in another direction by the States of Holland, under the pretext that a body of insurgent peasants were advancing against the town. The brothers thus left without protection were savagely murdered, and their bodies attached to a gibbet. After the mob had dispersed, the bodies were decently entombed by order of the States General; a faint effort was made to preserve appearances by ordering inquiry to be made after the murderers; and medals were allowed to be struck in honour of the murdered.

John de Witt combined an active enterprising disposition with solid judgment; he was a persuasive orator and a dexterous negociator. He was bold in the hour of danger and patient under protracted reverses. For the space of twenty years he frustrated the hostility of all the great surrounding monarchies against the small and ill-organised republic at the head of which he stood. The honour of first introducing regularity into its finances, and in great part the honour of checking the progress of Louis XIV. by the Triple Alliance, and the peace of Aix-la-Chapelle, belongs to him. That he should have fallen under the trying circumstances which attended the close of his career is less to be wondered at than that he should so long have kept head against the anarchy of the Seven United Provinces. The truest mirror of his character is to be found in his works—the 'Mémoires de Jean de Witt, Grand Pensionnaire d'Hollande,' published at the Hague in Dutch, in 1667; in French in 1709; and the 'Lettres et Négociations entre Jean de Witt et les Plénipotentiaires des Provinces Unies aux Cours de France, &c. depuis l'an 1652 jusqu'à 1669,' Dutch at Amsterdam, in 1725; French in 1728. A 'Life' of the brothers was published at Utrecht in 1709, by Madame Zouteland.

Cornelius de Witt was born at Dordrecht on the 23rd of June, 1623. He is said to have served several years in the fleet of the United Provinces in his early youth. His later career however was essentially that of a civilian. On the overthrow of the Orange party in 1650 he was appointed burgomaster of his native town and elected deputy to the States of Holland and West Friesland. Soon after he was chosen inspector of dykes in the district of Putten. Ostensibly he held no higher office during the greater part of his brother's administration; but the confidence which his firmness, probity, business talent, and sound sense acquired from all rendered him in reality the most efficient supporter of his brother's power. As has been mentioned in the preceding sketch, he held a political appointment on board the fleet of De Ruyter in 1672; and in 1667 he had filled a similar post. On both occasions he distinguished himself by his bravery in action. After the battle of Solbay he was obliged to leave the fleet by a violent malady, and retired to Dordrecht. Before his arrival the other magistrates had signed the revocation of the perpetual edict. A tumultuous crowd intruded itself into his sick room, demanding his signature to the document. With great difficulty his friends persuaded him to comply; but he added the initials V. C. (vi coactus) to his name; and refusing to erase them, the mob was only pacified by one of his attendants doing it unknown to him. He was soon after arrested on a false accusation of conspiring to poison the prince of Orange, conveyed to the Hague, and put to the torture. While on the rack he is said to have repeated Horace's ode, which begins 'Justum et tenacem propositi virum.' On the 24th of July he was condemned to perpetual exile, and his subsequent fate has already been narrated.

The authorities for the incidents in the life of Cornelius de Witt are the same mentioned above in the sketch of his brother's career. Some valuable materials are also to be found for the history of both brothers in the works of Sir William Temple and Ramsay's 'Memoirs of Turenne.

WITTE, PIETER DE, or **PIETRO CANDIDO**, as the Italians have translated his name, or he for them, was born at Bruges in 1548. He went early with his parents to Florence, and studied as an historical painter there, in fresco and in oil. He was probably the scholar of Vasari, for he assisted that painter in Florence, and in his works in the Vatican at Rome. He made for the duke of Tuscany many cartoons to be worked in tapestry. He was afterwards invited, while in Italy, by the elector of Bavaria, to go to Munich and enter his service, which he did, and he remained there many years, until his death in 1628, and all works of art produced in his time were executed under his direction. He painted, under the arcade of the long gallery of the Hof-garten at Munich, a series of frescoes, representing the deeds of Otto of Wittelsbach, and the departure of the emperor Ludwig IV. for Rome in 1327. These paintings were whitewashed over; the designs however are preserved in the tapestries which were worked from them, and in the engravings which were made by Amling from the tapestries: the prints are marked with the name of Pietro Candido as the painter. Amling engraved thirteen plates from these tapestries, representing the histories of the emperor Otho, Louis of Bavaria, and Otho of Wittelsbach, according to Huber.

(Van Mander; Heineken; Huber; Fiorillo; Dillis, *Catalogue of the Gallery of Schleissheim.*)

WITTELSBA′CHIA, the name of a genus of plants belonging to the natural order Ternströmiaceæ. The two species referred to this genus are now placed with *Cochlospermum*, which has the following characters:—the calyx of 5 permanent oval-oblong, blunt, unequal, imbricate sepals, the two outer ones of which are smallest, the whole becoming at length reflexed; the petals are 5, permanent, somewhat ovate, emarginate at the apex, unequal-sided, and twisted in the bud; the stamens are numerous, having smooth filiform filaments, and linear 4-celled 4-sided anthers, which are fixed at the base, and open by a single pore at the apex; the style is long, filiform, hooked at the top; the capsules surrounded by the permanent calyx, petals, and stamens, with from 3 to 5 cells, and the same number of valves; the seeds are numerous and covered with wool, and contain a fleshy albumen, in which lies a slender embryo, with the radicle pointing towards the hilum. The species of Cochlospermum are magnificent trees. They have lobed leaves with pointed petioles, and large yellow flowers arranged in panicles.

C. gossypium has 5-lobed entire leaves, which are tomentose beneath, and large yellow flowers. It is a native of the East Indies, where it attains a height of 50 feet. It is the *Bombax gossypium* of Linnæus. The *C. orinocense* has smooth 5-7-lobed leaves, is a native of New Spain, and attains a height of about 20 feet.

C. insigne, the *Wittelsbachia insignis* of Martius, has coriaceous leaves palmately 5-lobed, the lobes coarsely, sharply, and doubly serrated. This tree is about thirty feet in height, and is a native of Minas Novas and Minas Geraes, in Brazil. It is known by the name of *Butua do Curvo*, and a decoction of its roots is used as a remedy for internal pain. It is also given internally in cases of accidents, and as a means of resolving abscesses. The remaining species of *Cochlospermum* is the *Wittelsbachia vitifolia* of Martius. It has smooth leaves, in form like those of the vine.

All the species are handsome trees. They will grow in a soil composed of loam and peat, and may be propagated by cuttings, which should be placed under a hand-glass in a moist heat, or they may be raised from seed.

WITTENBERG, a town in the government of Merseburg, in the Prussian province of Saxony, situated on a level sandy spot on the banks of the Elbe, over which there is a wooden bridge 1000 feet long and 25 feet wide, in 51° 53′ N. lat. and 12° 45′ E. long. Wittenberg is a fortified town, and has three gates. It was formerly a place of great strength, but in 1760 it was besieged by the Imperial army, and bombarded from the 10th to the 14th of October, by which the Prussian governor, Colonel Sakemon, was compelled to surrender. On that occasion 18 public buildings and 104 houses were destroyed. The works were then suffered to fall into decay, but as it had still a rampart and moat, it was fortified in 1813, as well as the time would allow, by Marshal Victor, at the command of Napoleon, on the advance of the Russians. It was subsequently besieged by the Prussians, who, as the French general Lapoype refused to surrender, took it by storm, in January, 1814. In this siege 289 houses were either burnt or pulled down. In the 15th and 16th centuries Wittenberg was the capital of the electoral circle of Saxony and the residence of the court. The University, one of the oldest in Germany, was founded in 1502, by the elector Frederick the Wise, by whom it was very amply
endowed. In 1508 Luther was appointed Pr
Philosophy in the university, and, on the 31st
1517, affixed to the gates of the University C
celebrated 95 theses or propositions against ind
The tombs of Luther and Melanchthon, and of
tors Frederick the Wise and John the Constant,
portraits of Luther and Melanchthon, by Lucas
are in this church. It suffered greatly in the
1760 and 1814, but was restored in 1819, at the
of the king of Prussia. Of the other four chu
most interesting is that which contains the to
ther's faithful friend Buggenhagen (or Pomera
in which there is a celebrated picture, by Crana
Last Supper. The town-hall likewise contains s
ings by the same eminent master. On the cel
the third centenary of the Reformation, in 1817
of Prussia laid the first stone of a monument in
Luther. This monument stands in the ma
and consists of a colossal bronze statue of the
from a model by Schadow, on a pedestal seve
a half high, resting on a block of granite w
tons. About two miles from the town is Lut
and, out of the Elster Gate, Luther's Oak, o
where he burnt the papal bull and the canon
room in which he used to study is still sh
original state, in the Augusteum, now the T
Seminary, which institution, and the Lyceum,
blished in 1817, to indemnify the town in som
for the suppression of the University, which w
rated with that of Halle. Wittenberg has now
habitants (besides the garrison), who have some
tories of woollen-cloth and linen, breweries,
and dyehouses. They likewise cultivate extensiv
and derive considerable profit from the Elbe fish

(Müller, *Wörterbuch des Preussischen Staate*
haus, *Conversations-Lexicon;* Hassel, *Die P*
Monarchie.)

WITTGENSTEIN is the name of a noble G
mily, which is probably descended from one
Frankish nobles upon whom Charlemagne conf
tensive estates in Saxony. This family has ass
name of Sayn-Wittgenstein, although it never
the county of Sayn. The former county of Wit
was situated in the southern corner of Westphal
the sources of the Sieg and the Lahn, a mountain
renowned for its rich iron-mines, and which exp
quantities of scythes and sickles. The counts of
stein were sovereign members of the German
They were early divided into two branches, the
which was subdivided into two under-branches—t
of Sayn-Wittgenstein-Berleburg and those of S
genstein of Hohenstein, both of which acquired t
Prince. The younger of the two branches ab
tioned was raised to the rank of prince in 1834, o
of the military reputation of one of its memb
Adolphus, who was one of the chief command
Russian army in the wars against Napoleon.

Louis Adolphus, count of Wittgenstein, bor
entered the Prussian army, and made his first
against France in 1793. He afterwards ent
Russian service, and fought with great distincti
the French and the Turks. In the campaign of
Prussia and Poland, he commanded under Benni
Russian field-marshal, and was highly disting
the emperor Alexander. Napoleon having
Russia in 1812, Count Wittgenstein was intruste
command of the right wing of the Russian arm
was to cover St. Petersburg, and the head-q
which were at Riga. He defended his position
fully, during the whole war, against Marshal M
whom he finally drove back towards the Prussia
The corps of Wittgenstein having suffered less
rest of the Russians, it was employed as vang
Wittgenstein entered Berlin on the 11th of Mar
Kutusow, the Russian field-marshal, having died
1813, Wittgenstein was appointed commander-in
the combined Russian and Prussian forces. In t
tion he issued those famous but bombastic proc
by which he intended to rouse the German nation
particular, the Saxons, to make common cause
allied powers. He lost the battles of Lützen and
but effected his retreat so well that Napoleon coul
rive any benefit from his victories. When Austri

the coalition (August, 1813), Prince Schwarzenberg was ested with the command-in-chief of the united forces of allies, and Wittgenstein was superseded in his command Barclay de Tolly for the Russian forces, and by Blücher the Prussian army. He nevertheless continued in com- nd of a strong division of the Russian army, and in the ttle of Leipzig (16th-18th October, 1813) was at the head 70,000 men, with whom he occupied the position round villages of Mark-Kleeberg, Wachau, and Liebertwolk- tz. In the campaign of 1814, in France, Wittgenstein, the beginning of February, had penetrated as far as the ighbourhood of Paris, but Napoleon defeated him in the ttles of Mormant and Nangis. After the war with Na- leon was terminated by the two peaces of Paris, exander rewarded him with extensive estates in Po- lia, and put on the count's coat of arms the inscription leine Ehre geb' ich Niemand' ('I give my honour to body'). The merchants of St. Petersburg presented n with the sum of 150,000 silver rubles (30,000*l.*). In 26 Wittgenstein was created a field-marshal, and, in 28, the emperor Nicholas gave him the command-in- ief against the Turks. The first campaign resulted in passage of the Pruth and the Danube, and the con- est of Braila, Isakcha, Varna, and other fortresses, hich were taken by the Russians. These advantages wever were balanced by some severe losses, and gene- lly the result of the campaign did not answer the san- ine expectations of the Russian officers, who would have eferred a bold and enterprising general to a leader whom y believed to be subject to infirmities, which however re less the result of age than of fatigue. Wittgenstein s recalled on the 18th of February, 1829, but the em- ror did not dismiss him without giving him new proofs his esteem and generosity. Wittgenstein retired to his tates in Podolia, where he died in the beginning of the mmer of 1843. In 1834 the king of Prussia conferred on him and his successors the title of prince. The different tories of the wars with Napoleon give a full account of principal military exploits of Wittgenstein; especially n Odeleben, 'Napoleon's Feldzug in Sachsen,' 3rd edit., 1; Von Plotho, 'Der Krieg in Deutschland und Frank- ch in 1813 und 1814,' 4 vols., 1818.

(*Conversations-Lexicon der Gegenwart.*)

WITZLEBEN, KARL AUGUST FRIEDRICH VON, ter known as a writer by his literary pseudonym of Von omlitz, the name of his father's estate near Weimar, ere he was born March 17, 1772. At the age of nine was enrolled among the pages at the court of Weimar, there had Musæus and Herder for his instructors. ving entered very early into the Prussian service he ained advancement in it, and distinguished himself the Rhine campaigns of 1792-95. It was about the e time that he made his first literary attempt, being gaged by a publisher to complete a work entitled 'Avan- en der Deutschen am Rhine,' the author of which lived y to finish the first volume; and he also wrote several itical pamphlets, at that period, and his romance 'Das lle Thal.' Though Schiller encouraged him to cultivate literary talent, that production was his last, until about nty years afterwards, when he again appeared as a iter.

During that interval he was constantly engaged in litary service, of which he experienced a great deal in ious campaigns;—was at the battle of Jena; was taken soner at Prenzlau; became a commander of infantry in army of the grand-duke of Berg (Murat); had a regi- ent in the Peninsular war, in 1811, when he was posted ar Burgos; afterwards entered the allied army against ance; and in 1813 became a colonel in the Russian ser- ce. At the general peace his military career terminated, d he retired to Beuchlitz near Halle, where he followed ming for about the next seven years, when he went to rlin, and at the age of forty-nine made literature his sole upation. He did not however remain at Berlin many rs, but in 1826 removed to Dresden, in which city and neighbourhood he continued to reside till his death, July 839.

hat 'Tromlitz' was both a fertile writer and a favourite with the public, is tolerably evident from three edi- s of his collected tales and novels—two in 36, the last 7 volumes—having passed through the press between 3 and 1840. He distinguished himself chiefly by his orical romances—a species of literature greatly in vogue, and in which he took Scott for his model, and with perhaps as much success as any other of his imitators. Interest of story, cleverness of invention, and an agreeable style of narrative, sufficiently recommended his productions of that class to readers in general, though it has been alleged that they show no very great knowledge of history or deep insight into human nature. Those of most note among them are:—'Die Pappenheimer,' 'Franz von Sickingen,' 'Mutius Sforza,' 'Das Leben des Markgrafen Albrecht von Brandenburg,' and 'Die Carracas.' He also displayed some dramatic talent in his 'Douglas' (1826), but not with such success as to encourage him to pursue that career.

(*Conversations-Lexicon der Neuesten Zeit*; Wolff, *Encyclopädie der Deutschen National Litteratur.*)

WIVELISCOMBE. [SOMERSETSHIRE.]

WOAD (*Isatis tinctoria*) is a plant which was once cultivated in Britain to a great extent for the blue dye extracted from it. It has been greatly superseded by indigo, which gives a stronger and finer blue; but on some soils it might be still cultivated to great advantage, especially as it is said to improve the quality and colour of indigo when mixed with it in a certain proportion.

The woad is a plant of the natural order of the Cruciferæ, classed by Linnæus in the Tetradynamia siliculosa. It has a strong tap-root, which lasts two years. The height of the plant when in perfection is from three to four feet. It throws out many branches from the upper part of the stem. The leaves are alternate and smooth, the lower on footstalks, large and spear-shaped, the upper embracing the stem and arrow-shaped. The flowers are yellow, in panicles at the extremity of the branches. The fruit is a heart-shaped pod, with two valves containing one seed only. It grows well on the borders of the Baltic, and is very hardy.

It is still cultivated to a considerable extent in the south of France and Flanders. It requires a good substantial soil of considerable depth and fertility; for the larger and more numerous the leaves are, the more profit is derived from the plant. A wet clay soil is not at all suited to its growth, nor a loose sandy one. The first would prevent its roots striking sufficiently deep in search of nourishment, and the latter would be too loose, and not keep up a sufficient degree of moisture.

When it was largely cultivated in England, old pastures ploughed up afforded the best soil for the woad to grow in. These were often taken at a very high rent for two years by men who made it their business to cultivate the woad and prepare the colour, and who found it a profitable speculation. In consequence of this practice some proprietors prohibited their tenants from cultivating woad, a short-sighted policy equally injurious to both. To have good woad the land should be naturally very rich, or much manure should be intimately mixed with it some time before; nothing but completely decomposed dung should be used, or compost made on purpose a long time before.

The land, having been prepared by repeated ploughings and perfectly clean, is laid into narrow beds with deep intervals. On these beds the seed is sown in February or very early in March. It is sometimes sown broadcast, and the plants thinned out, but sowing it in drills, two rows on a four-feet bed, is much the best practice. The drills are one foot from the edge, with two feet clear between them; some make five-feet beds, and there is an interval of thirty inches between the rows, which allows of better cleaning, and gives the plants more room to spread. When the plants are come up in the rows, they must be thinned out by hand, leaving the strongest about two feet apart; the leaves will soon fill up the intervals. They begin to ripen in June. They are fit to gather when they begin to droop and become yellowish. This should be done in very dry weather, and after the dew is off. The leaves of the woad are either twisted off close to the stems or cut down with a sickle. Great care must be taken that no dirt or earth adheres to them. Some recommend taking off the lower leaves first, when they appear ripe by drooping and turning yellow, and letting the upper leaves remain till they show the same appearance; then nothing but ripe leaves will be gathered. This stripping may be repeated two or three times as the leaves grow again. The plants destined for seed are only stripped once or twice, for fear of weakening them. It might probably be advantageous not to strip them at all, but to leave the whole strength for the formation of the seed, which will be larger, and produce finer plants the next year.

The first gathering of the leaves is the best; they should therefore be kept separate to obtain the best dye. As soon as the leaves are gathered, the beds should be well and deeply hoed or dug, to give a fresh impulse to the roots.

The leaves are naturally full of sap, and soon begin to decompose if laid in a heap. They should therefore be partially dried, and immediately carried to the mill to be manufactured.

There is a variety of this plant cultivated in Flanders and about Valenciennes, which has seeds of a violet colour and the leaves very smooth; it is larger than the other, and gives a better dye. It is that which is cultivated near Avignon, whence the best woad dye is procured. The leaves are ground in a mill, like an oil-mill, into a paste, which when quite uniform and smooth is laid in heaps under a shed, and pressed with the hands or feet into a mass: each addition is carefully joined to the preceding, so that the whole crop forms a long heap. A fermentation is soon established, by which the blue dye is separated. A black crust is formed all over the heap, which keeps in the gases produced. If any part of this crust is cracked, it must be immediately stopped up with some of the paste. It takes a fortnight to complete the operation. When the disengagement of phosphorated ammoniacal gas ceases, which is soon perceived by the smell, the heap is broken up, the crust is mixed with the inside, and small portions like bricks, of about one pound weight, are made up with the hands by pressure in a mould, which when dry are fit for sale. As great attention is required both in the growing and preparing of the woad, it is best done by those who make a trade of it, and have the necessary experience. When the crop succeeds, the profit is very considerable; but, like all other crops, it is liable to many accidents.

Woad is often shamefully adulterated by mixing earth and other impurities with it; but those who have recourse to such deceit always suffer in the end by the loss of character and the consequent decrease of their trade and profits. In Germany the process of preparing the woad is somewhat different, as appears by a publication on the subject, by Mr. Green. The leaves are first washed, and then put into a tub three-quarters full of water, and kept under water by blocks of wood laid on them. The fermentation soon begins, and is shown by a blue scum on the water. When it has gone on to a certain point, the water is drawn off below, and it comes away of a deep green. It is strained through a cloth, the remaining leaves are washed with fresh water, and this is added to the first. Lime-water is now added, in the proportions of two or three pounds for every ten pounds of leaves used, and the mixture is well shaken for some time; the dye is deposited in the form of a powder, as starch is; the water is decanted off, and the thick part at the bottom is filtered through very fine cloths; the powder which remains is washed repeatedly, till the water comes off without being discoloured. The residue is cut into squares and set to dry. If there is too much water added the dye is inferior; and if not enough, there is less of it. The exact quantity can only be decided by practice and experience.

The seed will vegetate when two years old, but cannot be depended on after that.

Woad is also occasionally sown as food for cattle; and as everything, old and new, has been brought forward by the late renewed zeal for agriculture, it has been recommended for this purpose under its French name of 'Pastel.' Its vigorous growth and hardy nature have recommended it; but it will only grow in very rich soils. There are many other plants as vigorous and hardy, which will thrive well in inferior soils, and therefore are to be preferred. But for its dye this plant is well worthy of the attention of those who have good rich and deep soils.

WOBURN. [BEDFORDSHIRE.]

WODROW, ROBERT, an antiquary and ecclesiastical historian, second son of James Wodrow, professor of divinity in the University of Glasgow, was born in that city in 1679. He studied at his native university, which he entered in 1691. While studying theology under his father, he was appointed librarian of the college, an office very congenial to his pursuits. He was licensed as a preacher in [illegible] l in the summer of that year he was [illegible] of Eastwood in Renfrewshire, a parish situated between Glasgow and Paisley. His history this period to his death is almost entirely that of his lit labours. He felt that the seclusive and light dutie retired and small parish gave him the best chance of l for the accomplishment of his projected works, and th repeatedly invited to accept of more important minis charges, in Glasgow and in Stirling, he spent the re der of his days at Eastwood. He was however an church politician; he punctually attended the eccl tical courts, and had much influence on their deliber He was chosen one of a committee of Presbytery with the commission of the Assembly in Edinburg the protection of the Church of Scotland, on the occ of the Union of 1707. He exerted himself in opp the act of 1712 for re-establishing patronage, the which, after having been for 130 years a source of di in the Church of Scotland, caused the great secessi 1843. Wodrow was the most prominent member committee of five clergymen who, on the accessi George I., were deputed by the General Assembly t ceed to London, and urge the repeal of the obno Patronage Act. Defeated in his object, he became spicuous among his brethren, in recommending su sion to the law as it stood, and in giving a beneficial to its operations. Yielding however on this point, h one of those clergy who steadily resisted the impositi the oath of abjuration; a test which gradually fel desuetude, as those who refused to submit to it the same time among the best friends of the Hanov cession. Though he objected to the tendering of involving a principle of civil government, to churc he was a zealous supporter of the principle of subs articles of faith—that is to say, the articles of faith own church: and he conducted a long and laborious controversy on the subject with the supporters of th pendent principle in England and Ireland.

He died on 21st March, 1734. It remains to cursory notice of his literary labours. His 'History Sufferings of the Church of Scotland, from the Rest to the Revolution,' was published in two volumes, fol 1721-1722. A few years ago it was a scarce and h priced book, and in 1829 it was republished in volumes, 8vo., with a memoir of the author, by the Robert Burns of Paisley. Wodrow contemplated a plete History of the Church of Scotland, in a series of of individuals conspicuously connected with it. The of this large work, not finally corrected for the pres in the library of the University of Glasgow. A consi able number of the Lives have been printed by the M land Club, and a portion of the work is among the cations of the Wodrow Society.

Wodrow was a zealous and minute historian. In ting the persecutions of the Presbyterian nonconform during the reign of Charles II., he undertook a subje relation to which the bitterest feelings of indignation still alive in the circle of society to which he belon The book is written in a purely partisan spirit. It tains a good deal of gossiping scandal; pays little respe the characters of individuals of the Episcopal party, invariably adopts the very worst view of their motives. is generally admitted however to be faithful as a narr of public occurrences, and few strictly party narrative be so safely relied upon as the 'history of the troubles is singular that the calamities he had to record had taught the author the principles of pure toleration. byterianism he looked upon as the truth; oppressing considered equivalent to making war on the Deity the toleration of any other form of worship he v as something only a degree less wicked. 'The softness,' he says, speaking of James VI. of Scotlan to Papists, and his carelessness to execute the law only against them, but against every branch of wicke now abounding, brought him into great contempt every one did according to his own eyes, as if there been no king or settled government.' (*Life of Bru* 25.) In the Advocate's Library there are six closely ten volumes called 'Wodrow's Analecta;' a diary collection of anecdotes, commencing with the year It is partly written in a secret hand, which has ho been deciphered. This curious work has been print the Maitland Club. It exhibits a mind deeply tinged a sort of dubious superstition—many spectral and phetic stories such as the following are given, not as e which the narrator 'pledges his belief,' yet always as him by some person worthy of credit: 'Mr. John [illegible] was preaching at a conventicle, and ther was one [illegible] loafe at him when preaching. Mr. Welsh stoped, [illegible] them he knew not the person that had done soe, was persuaded ther would be moe persons at that [illegible] death then ther wer hearing him preach that [illegible] everybody knowes what a confluence ther was [illegible] Stainfield's execution for murdering his father, [illegible] Philip was the person that thus mocked Mr. [illegible] his youth.' Of course all the miraculous inter-[illegible] and special providences act in favour of the nar-[illegible] side in church politics. The 'Wodrow MSS.' [illegible] Advocate's Library amount to several hundred [illegible] They are the collections made by the historian for [illegible]cution of his intended works. Many of them are [illegible] state-papers and letters, English and Scottish, [illegible] in volumes, with contents in Wodrow's hand-[illegible] Others are copies taken by himself of documents [illegible] the originals in many cases are not now to be [illegible] his collection, with his printed works, and many of long letters on ecclesiastical matters, are a [illegible]ustration of his zeal and untiring industry. In [illegible], the 'Wodrow Society' already referred to was [illegible] for the publication of the works of the fathers [illegible] writers of the Reformed Church of Scotland.' [illegible] referred to.)

[illegible]FL, JOSEPH, a composer and a performer on [illegible]forte, who much distinguished himself by his during his short life, was born at Salzburg, in 1772. He received instructions from Leopold Mozart, father [illegible] illustrious Wolfgang, and from Michael Haydn, [illegible]er of the no less illustrious father of modern symphony. [illegible] a short musical tour he reached Vienna in 1795, and [illegible] successfully produced his first opera. He then visited [illegible]den, Berlin, Hamburg, &c., and arrived in London in [illegible], where he remained, composing and giving lessons, [illegible] years, then proceeded to Paris, and in all those cities [illegible]xcited great admiration by his powers of execution. He [illegible]urned to England in a few months, and resided in its [illegible]apital till his death, which took place in 1811.

As a pianist, Woelfl exhibited very extraordinary powers. His hands, which were of gigantic dimensions, enabled him [illegible]o do, by means of their capacious grasp and strength, [illegible]hat none of his contemporaries could accomplish, thus [illegible]aking him, as it were, the precursor of the living Thalberg; [illegible]d his profound knowledge of harmony qualified him to [illegible]rn to the best advantage the prodigality of nature, if it [illegible]y be so considered. His compositions are numerous, ex-[illegible]nding to nearly every branch of the art, and all prove him [illegible]have been a thorough-bred musician, though many were [illegible]itten principally with a view to sale, and several are [illegible] elaborate and too difficult to be popular. Nevertheless, [illegible]d he not indulged to excess in that habit which in his [illegible] was so prevalent with his countrymen, and which [illegible]ught his life to a close at the premature age of thirty-[illegible]e, he probably would have made a reputation little in-[illegible]ior to that of the great musical triumvirate of modern [illegible]many.

WOIDE, CHARLES GODFREY, was a native of Hol-[illegible]d, or of Poland according to Lefebvre-Cauchy, in the [illegible]ographie Universelle,' who also says that he was born [illegible]725, and that he studied at Frankfort-on-the-Oder and Leyden. In 1770 he was invited to England, being ap-[illegible]nted preacher at the German Royal Chapel, St. James's, [illegible]re he afterwards became reader also. In 1782 he was [illegible]ointed assistant-librarian at the British Museum, in the [illegible]artment of natural history, and soon afterwards in the [illegible]rtment of printed books. The university of Copen-[illegible]en conferred upon him the degree of D.D., and in 1786 [illegible] university of Oxford the degree of Doctor in Civil Law. [illegible]788 he was chosen a fellow of the Royal Society. On [illegible]6th of May, 1790, he was seized with an apoplectic fit [illegible]he house of Sir Joseph Banks, and he died on the fol-[illegible]ng day, in his apartments in the British Museum. Dr. [illegible]de left two daughters by his wife, who died in 1782. [illegible] principal literary productions are:—1, 'Mathurin [illegible]ssière la Croze, Lexicon Aegyptiaco-Latinum ex ve-[illegible]ns illius Linguae Monumentis, quod in Compendium [illegible]git Christianus Scholtz; Notulas quasdam et Indicem [illegible]it C. G. Woide,' e Typographia Clarendon. Oxford, [illegible] 4to. This is a dictionary of the Coptic language, [illegible]h was made at the beginning of the eighteenth century by the learned French refugee La Croze, who published his preface to it in 1722, in the 'Bremer Ephemeriden.' The work however remained in MS., which was revised, abridged in some places, and completed in others by Scholtz. The revised MS. became the property of the library of Leyden, where it was examined by Woide, who conceived the idea of publishing it. It is said that there was then no printing-office in this country provided with Coptic characters, and the university of Oxford liberally undertook to bear the expense. Part of the work was already printed, when Woide was requested to make some additions to it, which he could only do for the three last letters of the Coptic alphabet: he also added an index. 2, 'Christianus Scholtz, Grammatica Aegyptiaca utriusque dialecti, edita à C. G. Woide,' Oxford, 1778, 4to. This was a MS. of the learned Scholtz, who had revised the dictionary of La Croze: it was very voluminous, and Woide abridged it so as to come into one printed volume in 4to. He also made additions, and that part of the grammar which relates to the Sahidic dialect of the Coptic language is entirely by Dr. Woide. 3, 'Novum Testamentum Graecum, à Codice MS. Alexandrino qui Londini in Bibliotheca Musei Britannici asservatur, descriptum à C. G. Woide,' &c., ex Prelo Joannis Nichols, Typis Jacksonianis, 1786, fol. The Alexandrine MS. of the Bible in the British Museum (King's MS., 1, D. viii.) is of great value. [ALEXANDRINE CODEX.] As Dr. Woide required the collations of the Vatican and other MS. made for Dr. Bentley, he addressed himself to the doctor's son, the Rev. Dr. Richard Bentley, rector of Nailston near Ashby in Leicestershire, who was in possession of those collations, and who allowed Woide to collate them during a fortnight in the house of the Rev. J. C. Gallaway, the vicar of Hinckley. Dr. Woide transcribed the part of the Alexandrine MS. which he intended to publish with his own hand, and he collated it twice with the original: Dr. John Butler, the bishop of Oxford, assisted him in the transcription, and Mr. Harper, of the British Museum, in the collating. Woide wrote a Latin preface to this work, in which he gives a critical investigation of the history and merits of the Alexandrine MS.

(John Nichols, *Literary Anecdotes of the Eighteenth Century*, vol. ix., p. 9-14.)

WOKEY CAVERN. [SOMERSETSHIRE.]

WOKINGHAM. [BERKSHIRE.]

WOLCOTT, JOHN, better known by his assumed name of Peter Pindar, was born at Dodbrooke in Devonshire, about the beginning of 1738. His father, a substantial yeoman, died about the time his son attained his eleventh year. John received the rudiments of his education at the free-school of Kingsbridge, a neighbouring market-town; and was, after his father's death, placed under the Rev. Mr. Fisher, master of a grammar-school at Bodmin. He described himself, in after life, as having been a dull scholar, but as having showed even at that early age a turn for versifying.

On leaving school he was removed to Fowey in Cornwall, to the house of an uncle, who was a medical practitioner. This gentleman sent his nephew to reside for a year in Normandy, with a view to attain a command of the French language. On his return John Wolcot became his uncle's apprentice for seven years. At the termination of his apprenticeship he completed his medical education by the usual attendance in a London hospital. He appears to have applied himself with sufficient diligence to obtain a knowledge of his future profession; but he much annoyed his uncle and two aunts by his cultivating his talents for versifying and painting.

In 1767 Sir William Trelawney was appointed governor of Jamaica, and Wolcot, who had some connection with the family, was invited to accompany him. Before leaving England, Wolcot procured the degree of M.D. from the University of Aberdeen. His hopes of obtaining a lucrative practice in Jamaica were soon dispelled. The white population was not numerous, and the coloured could not pay. The incumbent of a valuable living in the island being dangerously ill, the governor suggested to his young friend that he might obtain preferment in the church. Wolcot upon this hint proceeded to England, and was ordained by the bishop of London; but on his return the clergyman whom he was to succeed had recovered, and he was obliged to remain contented with the curacy of Vere. His clerical duties he is said to have utterly neglected: his real employment was officiating as master of ceremonies to the governor. After the death of Sir William Trelawney, in 1768, Wolcott accompanied his widow to England, and never returned to the West Indies.

The next twelve years of his life were spent in attempting to establish himself as a physician at Truro, Helstone, and other towns in Cornwall. In this he uniformly failed, apparently on account of an invincible propensity to live as a practical humorist and satirise his neighbours. During his residence at Truro, some songs of his composition were set to music by Mr. W. Jackson, of Exeter, and first introduced him to general notice. In 1778 he published his first composition in that peculiar style which not long after obtained for him such a high and continued popularity—'The Epistle to the Reviewers.' It was during Wolcott's residence at Truro too that he detected the talents of the self-taught artist Opie. With this protégé he, in 1780, transferred his residence to the metropolis. Wolcott's own account of this adventure is as follows:—'At length I proposed to him to go first to Exeter and afterwards to London, and having lost an income of 300*l.* or 400*l.* by the change of scene, entered into a written engagement, by which it was agreed we should share the joint profits in equal divisions. We actually did so for a year; but at the end of that time my pupil told me I might return to the country, as he could now do for himself.' That his pupil, as he terms him, should have done so is scarcely to be wondered at, for it does not appear that Wolcott contributed anything to the 'joint profits;' or that he really sustained any pecuniary loss by his change of residence.

No opening offering itself in the metropolis, either in physic or divinity, Wolcott was obliged to betake himself to his pen for support. His satirical and artistical tastes suggested the subject of his first publication: 'Lyric Odes to the Royal Academicians for 1782, by Peter Pindar, Esq., a distant relation of the Poet of Thebes, and Laureate to the Academy,' took the town by surprise. The justice of many of his remarks, the reckless daring of the personalities, the quaintness of the style, were something so entirely new that the work obtained immediate popularity. Encouraged by success the author returned to the attack in 1783, 1785, and 1786. But he soon discovered that, in order to keep alive the first impression, he must vary his themes; and that the more daring he was in the selection of his objects of attack, the more would his works be run after, and the less would he incur any real danger. The king, ministers, opposition leaders, and authors, were assailed in succession. The latest public gossip was sure to be versified by Peter Pindar, and to be sought after with avidity. Partly by real talent, and partly by the most licentious personality, his works, as they issued in succession from the press, continued to be run after for a period of nearly forty years. A collected edition of them was published in 1812, but it is defective, for they were so numerous that the author himself could not retain them all in his memory. An imperfect list of Dr. Wolcott's works printed at the end of his life in the 'Annual Biography' for 1819 enumerates no less than sixty-four.

There is a fashion in the burlesque poetry of every age that is palatable to the public of that age only. The subjects of Wolcott's verses were ephemeral: they are now forgotten except by the students of the memoirs, pamphlets, and forgotten literature of his time. These circumstances will prevent their continuing generally popular. But the few curious inquirers who have a taste for the obsolete will acknowledge that Wolcott's popularity was not entirely earned by his audacious personalities. His versification is nervous, though not varied in its modulation; his language is racy and idiomatic; his wit, though sometimes forced, is often genuine; and through all his puns and quaintnesses there runs a vein of strong manly sense.

The personal character of Wolcott is not an amiable one. His attempt to support himself by the labours of Opie has already been noticed. After all his biting satires on George III. and Pitt, he accepted a pension from the administration of which Pitt was the head—not to laud it (for praise was not in his nature) but to vituperate its opponents. He took orders and even officiated as a clergyman, though an avowed and profane unbeliever. He had a shrewd intellect; a just taste in the arts of design and music (a series of his landscapes was engraved by Alken, and published in 1797 under the title 'Picturesque Views;' and some of his tunes have attained a permanent popularity); and his literary compositions have the finish of an artist. But his utter selfishness rendered these intellectual tastes scarcely more elevated in him than his sensual appetites, which were equally regulated by taste and judgment. He was the perfection of a self-indulgent voluptuary both in physical and intellectual respects.

Wolcott's constitution was probably naturally strong, for he attained to the advanced age of eighty-one. But for many years previous to his death he was the victim of asthma, very deaf, and almost entirely blind. His mind however retained its full powers. He lived only for himself; declined dinner invitations 'to avoid the danger of loading his stomach with more than nature required;' lay in bed the greater part of his time, because 'it would be folly in me to be groping around my drawing-room,' and because 'when up and in motion I am obliged to carry a load of eleven or twelve stone, while here I have only a few ounces of blankets to support;' and when out of bed he amused himself with his violin, or examining, as well as his sight permitted, his crayons and pictures. He showed no aversion to receive notoriety-hunters who came to see and hear 'Peter Pindar,' but evinced no desire for society. He left a considerable property to his relations. John Wolcott died on the 14th of January, 1819, and was interred in the churchyard of St. Paul's, Covent Garden.

(*The Annual Biography and Obituary* for 1820.)

WOLF, *Canis lupus*, Linn. Lieutenant-colonel Hamilton Smith makes *Lupus* the first section of his first subgenus, *Chaon*, of the *Diurnal Canidæ* or Canine group furnished with a round pupil of the eye.

In this section he comprises the common Wolf, *Lupus vulgaris;* the Black Wolf, *Lupus lycaon;* the Dusky Wolf, *Lupus nubilus*, Wied; and the Wolf of the Southern States of North America, *Lupus Mexicanus*, Smith.

In the second section, *Lyciscus*, or, as he terms the group, the Lyciscan Dogs, he places the North American Wolf, *Lyciscus latrans:* and the Caygotte of Mexico, *Lyciscus cagottus*, Smith.

With regard to the American Wolves, Colonel Smith remarks that whether they be distinct from those of the eastern hemisphere, or primeval varieties, is not as yet satisfactorily established. The high authority of Dr. Richardson, he observes, leans towards the opinion that they are different species; while Prince Maximilian of Wied, perhaps still more practically conversant with the races of both continents, thinks that they are not specifically distinct. To this last-mentioned opinion Colonel Smith states that his own somewhat extensive researches lead him to subscribe; but he qualifies this statement by observing that while our ideas respecting the characteristics of species remain unsettled, the difference of conclusion is, perhaps, only formular.

In M. Lesson's *Manuel*, the following existing wolves appear as distinct species,—the Common Wolf, *Canis lupus*, Linn.; the Mexican Wolf, *Canis Mexicanus*, Desm.; the Red Wolf, *Canis jubatus*, Desm.; the Prairie Wolf, *Canis latrans*, Harl.; and the Dusky Wolf, *Loup odorant*, *Canis nubilus*, Say.

Geographical Distribution of the Wolves.—Colonel Smith observes that the typical Wolf of Europe and Asia and the varieties belonging to this tribe in America, may be described as animals occupying the two continents from within the Arctic circle on the north, to Spain, and perhaps to Marocco on the west side of the Old Continent, to Syria, and beyond the Crishna in India; and to near the isthmus of Panama in the New World. Farther south in the last-mentioned part of the globe, they are, he remarks, replaced by an aberrant canine, the Red Wolf of Cuvier; and in the first, by hyænas, the Painted Lycaon or *Canis pictus*, and perhaps by other species not as yet fully developed. 'In China,' says Colonel Smith, 'wolves abound in the province of Xantung[Changtung?]; but how far they are found to the south is not known. Buffon, from the account of Adançon (Adanson), asserts the existence of a powerful race of wolves in the Senegal country, hunting in company with the lion; but the name is most likely applied to an hyæna, a lycaon, or one of the red chrysean group.' (*Naturalist's Library.*)

The following must be the passage alluded to: Adanson states that one night a lion and a wolf (loup) entered together in the court of the house where he slept; they raised themselves by turns by placing their feet on the timber-work of the roof (comble), as he could easily hear, and carried off their provision. In the morning the occu-s of the dwelling were satisfied, from the well-marked ressions of their feet in the sand, that the animals came ether, and perceived the place whence they had taken y two fish: doubtless, says Adanson, each took his . This theft, he adds, was moderate for two such car- rous animals, but they did not choose the smallest. lo not know,' continues the French traveller, 'that it been before observed that the wolf goes (fraye) with lion; nevertheless the fact is not extraordinary; there daily proofs of it in this country, and every evening the may be heard howling at the side of the lion. I have essed the same thing a hundred times in all my voy- on the Niger*, and I know, without possibility of doubt, the wolf is often found with the lion without having hing to fear. It is not that the size of the African , which is much superior to that of the wolf of Europe, es any impression on the lion; it is only because the of the former is no temptation to the latter: and confirms me in this opinion is that I never saw the lions which were kept in the middle of the village of gal attack the dogs which were exposed to them, or h they met when they were unchained; whereas they upon the first horse or child which came in their '

Vaillant and the French generally call the Spotted ena *Loup tacheté;* and the terms *Tigre* and *Tigresse* used generally for any large spotted cat. Thus we an account of the 'Hardiesse du tigre' in Adanson's next sentence, where he says—'Some days after this of the lion with the wolf, we received one from a ess which came to the same place with her young one also carried away two fish.' In the 'New History of iopia, being a full and accurate Description of the gdom of Abessinia, vulgarly, though erroneously, called Empire of Prester John. In four books. By the ned Job Ludolphus, author of the Ethiopic Lexicon. de English by J. P. Gent. Folio, London, 1682,'—is following passage:—'Tygers and panthers are much e cruel and fierce then lyons, for they never spare kind; yet they covet the Ethiopians before white men, more accustomed to that sort of dyet. These two beasts er only in colour; for the panthers are brown, spotted h black; the tigers gold-coloured, with fine black spots five-leaved grass: they are beasts of a dreadful cele- and boldness; by night they break into villages, and e doleful massacres among the poor innocent cattle; Alvarez affirms that these butcheries never happen in ra-Bahrà.' It is almost superfluous to add, that the er, properly so called, does not inhabit Africa.

EUROPEAN WOLVES.

he Common Wolf.—Yellowish or fulvous grey. Hair h and strong, longest below the ears and on the neck ticularly the throat), shoulders, and haunches. Muzzle k: cheeks and parts above the eyes ochreous,—grey in old subjects. Upper lip and chin white. Eyes oblique. not curling. A blackish streak or band on the fore about the carpus. Height at the shoulder from 27 to nches.

ariety white: either as an albino, or, according to the nch writers, from the effect of the northern climate in winter. Colonel Smith is of opinion that the white ves occurring sometimes among the races of middle ope are mere cases of albinism.

his is the wolf that more commonly infests the western ntries of Europe. Cuvier states that it is found from pt to Lapland and seems to have passed over into erica. Colonel Smith remarks that the French wolves generally browner and somewhat smaller than those of many; that the Russian race is longer and appears e bulky and formidable from the great quantity of long se hair on the cheeks, gullet, and neck; their eyes are y small and their whole aspect peculiarly savage and ster; that the Swedish and Norwegian wolves are simi- to the Russian in form, but appear heavier and deeper the shoulder, lighter in colour than the Russian race, in winter totally white; that the Alpine wolves are wnish-grey and smaller than the French; those of Italy to the eastward towards Turkey, fulvous.

his is the variety, most probably, which formerly lurked he uncleared woody districts of the British islands; for wolves were once numerous here is as clear as that the Bear once prowled in Scotland and Wales. [BEAR.] It would be a waste of paper and space to detail the documentary evidence, and that to be derived from ancient coins, gems, and sculptures, which prove that the *Lupus* of the Roman historians and poets, and the *Lupa* which was fabled to have suckled *Romulus* and *Remus* was the same animal with the antient British Wolf. Whatever the Romans might have done to put down these ferocious but cowardly beasts of prey, they left enough for their Saxon and Norman successors to do. Edgar applied himself to their extirpation in earnest, enlisting English criminals in the service by commuting the punishment awarded for their crimes to a delivery of a given number of wolves' tongues, and liberating the Welsh from the payment of the tax of gold and silver on condition of an annual tribute of three hundred wolves. But the vast wild tracts and deep forests of antient Britain were holds too strong even for his vigorous measures. What the numbers and consequent danger had been may be imagined from the necessity that existed in the previous reign of Athelstane (A.D. 925) for a refuge against their attacks. Accordingly a retreat was built at Flixton in Yorkshire, to save travellers from being devoured by these gaunt hunters. The Saxon name for the month of January, Wolf-moneth, in which dreary season hunger probably made the wolves most desperate, and the term for an outlaw, 'Wolfshed,' implying that he might be killed with as much impunity as a wolf, also indicate the numbers of these destructive beasts and the hatred and terror which they inspired.

That Edgar failed in his attempts at extirpation is manifest from a *mandamus* of Edward I. to all bailiffs, &c. to give their assistance to his faithful and beloved Peter Corbet, whom the king had enjoined to take and destroy wolves (lupos), 'cum hominibus, canibus, et ingeniis suis modis omnibus quibus viderit expedire,' in all forests and parks and other places in the counties of Gloucester, Worcester, Hereford, and Salop, where they could be found. King John, in his grant, quoted by Pennant from Bishop Lyttelton's collection, as being in the possession of the dean and chapter of Exeter, mentions the wolf (lupum) among the beasts of chace which the Devonshire men are thereby licensed to kill.

In Derbyshire certain tenants at Wormhill held their lands by the duty of hunting and taking the wolves (*Wolve hunt*) which harboured in the county. Even so late as 1577 the flocks of Scotland appear to have suffered from the ravages of wolves, which do not seem to have been rooted out of that portion of the kingdom till about the year 1680, when Sir Ewen Cameron's hand laid the last wolf low. In Ireland, wolves must have lingered as late as the year 1710; about which time the last presentment for killing them in the county of Cork was made.

The Black Wolf.—This variety is most frequent in Southern Europe, and particularly in the Pyrenees and to the south of those mountains, where they are more common than the ordinary or last-mentioned wolf, which the Black Wolf equals in stature and, if anything, exceeds in strength. Cuvier says that it is found, but very rarely, in France. Col. Hamilton Smith relates an anecdote illustrative of its great size and weight. One of these wolves at a battue in the mountains near Madrid came bounding towards an English gentleman who was present at the sport through the high grass and bushes, so large that the sportsman took it for a donkey. Seven were slain, and this gentleman, though active and in the flower of life, could not lift one entirely from the ground. The specimen figured by the colonel came from the banks of the Tagus, and he describes it as equal to the largest mastiff, of a very dark brown colour, with ears larger and the muzzle thicker than the common wolf, but withal resembling a very large and shaggy wolf-dog.

'The Spanish Wolves,' says Col. Smith, 'congregated formerly in the passes of the Pyrenees in large troops, and even now the *lobo* will accompany strings of mules as soon as it becomes dusky. They are seen bounding from bush to bush by the side of travellers, and keeping parallel with them as they proceed, waiting an opportunity to select a victim; and often succeeding, unless the muleteers can reach some place of safety before dark, and have no dangerous passes to traverse. Black wolves occur again in the mountains of Friuli and about Cattaro.'

The Vekvoturian Mountain-wolf of Russia, described by Pallas, belongs to the black variety. Col. Smith thinks that the *Rossomak* of the Lenas in Siberia, with shining black valuable fur, is probably the same.

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* He means the Senegal. See ADANSON, M., vol. i.

Habits, &c.—The period of gestation and that during which the young remain blind will be found, with other particulars relating to the habits of the Wolf, in the article Dog. The female produces four or five at a litter; and although it is said, that until the young can see the female carefully hides them from the male, for fear he should devour them, it is certain that he hunts for them and brings them food, consisting for the most part of the smaller quadrupeds, partridges, moor-game, &c., after they have the use of their eyes, and that both parents take their offspring out to teach them to hunt as soon as they are strong enough.

The Common Wolf.

Mr. Bennett has well described the general habits of this sinister animal:—'Entirely dependent upon rapine for his subsistence, the nose of the wolf is fully equal to that of the sharpest-scented hound. The size and speed of the elk and of the stag are insufficient to protect them from his violence; he pursues them with equal swiftness and cunning, and when he has succeeded in running them down, finds little difficulty in rendering them his prey. To effect this purpose with the greater certainty, he frequently unites himself with a numerous train of his fellows, who are however bound together by no other tie than the common object of their pursuit; and when this is once attained, immediately separate and proceed each to his own retreat, whence they again emerge to reunite in the common cause whenever the necessary stimulus is supplied. In inhabited countries he seldom ventures to show himself openly or in packs, but sleeps away the greater part of the day in the shelter of the forest, and only prowls abroad by night when impelled by the cravings of his appetite. The sheepcote and the farmyard become then the scenes of his ravages; and such is his ingenuity, and so great the rapidity of his motions, that he will frequently carry off his prey almost before the eyes of the shepherd, although the warning voice of the watchful dog had given timely notice of the approach of the marauder. His ferocity is sometimes carried to such a pitch that he becomes dangerous to man; and when hard pressed by famine, to which, in spite of all his skill in the chace, and his sagacity in the pursuit of meaner rapine, he is by no means a stranger, he will fall at unawares upon the solitary and unprotected traveller; or, prowling about the habitation of the villager, carry off from it his unsuspecting and defenceless children.' (*Tower Menagerie.*)

ASIATIC WOLVES.

The Wolves of Asia Minor are fulvous, but the colour is more predominant and has more red in it than that of the Italian Wolves.

Of the Indian Wolves, one, the *Beriah*, is described as being of a light fox-colour inclining to dun, not larger than a greyhound, slenderly made, but bony; the head and ears long, like those of a Jackal, and the tail long but not
very hairy. The other, which is smaller, Col. Smi
to his lyciscan group. The last-named zoologist
black *Derboun* of the mountains of Arabia and the
Syria to the Wolf.

AMERICAN WOLVES.

Dr. Richardson, in the 'Fauna Boreali-America
serves that the Common Wolves of the Old
World have been generally supposed to be
species—the *Canis lupus* of Linnæus. The
naturalists have indeed, he remarks, described som
northern kinds of wolf as distinct; but it never
have been doubted that a wolf possessing all the ch
of the European Wolf exists within the limits of the
States. Dr. Richardson goes on to point out that
to which these characters have been ascribed seem
the *large brown wolf* of Lewis and Clark; and ac
to them it inhabits not only the Atlantic countr
also the borders of the Pacific and the mountains
approach the Columbia river, between the great
rapids, but is not found on the Missouri to the
of the Platte. Dr. Richardson remarks that he h
none of these Brown Wolves; but if their resembl
so close to the European Wolf as Colonel Smith,
fith's 'Cuvier,' states it to be, the Doctor has no he
in saying that they differ decidedly from the wol
inhabits the countries north of Canada.

In the 'New Description of Virginia' (1649) wo
mentioned among the beasts found there; and
notices the Wolf in Carolina, and thus describes
'The Wolf of Carolina is the dog of the wood
Indians had no other curs before the Christian
amongst them. They are made domestic. Wh
they are neither so large nor fierce as the Europe
They are not man-slayers, neither is any creature
lina unless wounded. They go in great drove
night to hunt deer, which they do as well as the b
of hounds: nay, one of these will hunt down
They are often so poor that they can hardly run.
they catch no prey, they go to a swamp and fill th
full of mud; if afterwards they chance to get any
flesh, they will disgorge the mud and eat th
When they hunt in the night, that there is a gre
together, they make the most hideous and fright
that ever was heard. The fur makes good mu
skin, dressed to a parchment, makes the best dru
and if tanned makes the best sort of shoes for the
countries.'

Catesby says:—'The Wolves in America are
of Europe in shape and colour, but are somewhat
They are more timorous and not so voracious as
Europe; a drove of them will fly from a single
in very severe weather there have been some ins
the contrary. Wolves were domestic with the
who had no other dogs before those of Europe we
duced, since which the breed of wolves and
dogs are mixed and become prolific. It is re
that the European dogs that have no mixture o
blood have an antipathy to those that have, a
them whenever they meet. The wolf-breed act
fensively, and, with his tail between his legs, en
to evade the other's fury. The wolves in Car
very numerous, and more destructive than any o
mal. They go in droves by night, and hunt d
hounds, with dismal yelling cries.' (*Carolina.*)

But to return to Dr. Richardson, who, while att
the northern expeditions, passed through thirty d
latitude and upwards of fifty of longitude on the
continent, and, in the course of seven years, trav
wards of twenty thousand miles, during the whole
time he had almost daily opportunities of obse
form and manners of the wolves; but he saw no
had the gaunt appearance, the comparatively long
tapering nose, the high ears, long legs, slender
narrow feet of the Pyrenean Wolf.

In some of the districts traversed by the exped
wolves were very numerous, and varied great
colour of their fur, some being white, others tota
but the greater number were mixed grey and wh
or less tinged in parts with brown. These var
colour however not being attended with any diffe
form nor peculiarity of habits, Dr. Richardson
them to be no more characteristic of proper

permanent varieties than colour would be in the tic dog. All the northern wolves, he observes, ver their colours are, have certain characters in com- herein they differ from the European race; and he hat the Indian report of the extreme variations of being occasionally observed in wolves of the same trengthens his opinion.

Richardson then gives a minute description of the *lupus occidentalis*, or *American Wolf*, the *Missouri* of Lewis and Clark, and states that he does not to assert that the differences existing between it and ropean congener are sufficiently permanent to con- them, in the eye of the naturalist, distinct species. ame kind of differences, he observes, may be traced en the foxes and native races of the domestic dog of ew World and those of the Old; the former possess- ner, denser, and longer fur, and broader feet, well ated for running on the snow. These remarks were d from Dr. Richardson by a comparison of living nens of American and Pyrenean wolves; but he ot an opportunity of ascertaining whether the Lap- nd Siberian wolves, inhabiting a similar climate with of America, had similar peculiarities of form, or er they differed in physiognomy from the wolf of outh of Europe. He therefore considered it unad- e to designate the northern wolf of America by a dis- specific appellation, lest he should unnecessarily add e list of synonyms. The word *occidentalis*, which is d to the Linnean name of *Canis lupus*, is, he tells us, e considered as merely marking the geographical ion of that peculiar race of Wolf.

ographical Distribution, Habits, &c.—Very common ghout the northern regions, but more or less abundant fferent districts. 'Their foot-marks,' says Dr. Richard- 'may be seen by the side of every stream, and a tra- r can rarely pass a night in these wilds without hearing howling around him. They are very numerous on andy plains which, lying to the eastward of the Rocky ntains, extend from the sources of the Peace and atchewan rivers towards the Missouri. There bands em hang on the skirts of the buffalo (bison) herds, prey upon the sick and straggling calves. They do under ordinary circumstances, venture to attack the rown animal; for the hunters informed me that they see wolves walking through a herd of bulls without ing the least alarm; and the marksmen, when they towards a buffalo for the purpose of shooting it, ionally wear a cap with two ears, in imitation of the of a wolf, knowing, from experience, that they will ffered to approach nearer in that guise. On the n-grounds through which the Coppermine River flows more than once an opportunity of seeing a single n close pursuit of a rein-deer; and I witnessed a chace oint Lake when covered with ice, which terminated fine buck rein-deer being overtaken by a large white and disabled by a bite in the flank. An Indian, who oncealed on the borders of the lake, ran in and cut leer's throat with his knife, the wolf at once relin- ing his prey and sneaking off. In the chace the poor urged its flight by great bounds, which for a time ex- d the speed of the wolf; but it stopped so frequently ze on its relentless enemy, that the latter, toiling on "long gallop" with its tongue lolling out of its mouth, ally came up. After each hasty look the poor deer bled its efforts to escape; but, either exhausted by ue or enervated by fear, it became, just before it was aken, scarcely able to keep its feet.'

e same author observes that the wolves destroy many , which they easily run down if they perceive them on n at any distance from their hiding-places; and he s that, in January, 1827, a wolf was seen to catch an c fox within sight of Fort Franklin, and although diately pursued by hunters on snow-shoes, it bore off ey in its mouth without any apparent diminution of eed. The same wolf, he adds, continued for some to prowl in the vicinity of the fort, and even stole rom a sledge which two dogs were accustomed to home from the nets without a driver. As this kind predation could not be allowed to go on, the wolf aylaid and killed. It proved to be a female, which nted, Dr. Richardson remarks, for the sledge-dogs ving been molested.

Richardson further states that the buffalo-hunters would be unable to preserve the game they kill from the wolves, if the latter were not as fearful as they are rapacious. The simple precaution of tying a handkerchief to a branch, or of blowing up a bladder and hanging it so as to wave in the wind, is sufficient to keep herds of wolves at a distance. At times however he says that they are impelled by hunger to be more venturous, and that they have been known to steal provisions from under a man's head in the night, and to come into a traveller's bivouac and carry off some of his dogs. 'During our residence at Cumberland House in 1820,' continues Dr. Richardson, 'a wolf, which had been prowling round the fort, and was wounded by a musket-ball and driven off, returned after it became dark, whilst the blood was still flowing from its wound, and carried off a dog from amongst fifty others, that howled piteously, but had not courage to unite in an attack on their enemy. I was told of a poor Indian woman who was strangled by a wolf, while her husband, who saw the attack, was hastening to her assistance; but this was the only instance of their attacking human life that came to my knowledge. As the winter advances and the snow becomes deep, the wolves, being no longer able to hunt with success, suffer from hunger, and in severe seasons many die. In the spring of 1826 a large grey wolf was driven by hunger to prowl amongst the Indian huts which were erected in the immediate vicinity of Fort Franklin, but not being successful in picking up aught to eat, it was found a few days afterwards lying dead on the snow near the fort. Its extreme emaciation and the emptiness of its intestines showed clearly that it died from inanition.'

We learn from the same excellent authority that the American Wolf burrows, and brings forth its young in earths with several outlets like those of a fox. Dr. Richardson saw some of their burrows on the plains of the Saskatchewan, and also on the banks of the Coppermine River. The number in a litter he states to vary from four or five to eight or nine. After referring to the instances recorded in the narratives of Captain Parry and Captain Franklin of the association of the female wolves with the domestic dog, Dr. Richardson relates that he was informed that the Indians endeavour to improve their sledge-dogs by crossing the breed with wolves, and he adds, that the resemblance between the northern wolves and the domestic dog of the Indians is so great, that the size and strength of the wolf seem to be the only difference. 'I have more than once,' says he, 'mistaken a band of wolves for the dogs of a party of Indians; and the howl of the animals of both species is prolonged so exactly in the same key, that even the practised ear of an Indian fails at times to discriminate them.'

The habits of the wolves of Melville Peninsula and the mode of capturing them by the Esquimaux are well described by Captain Lyon. Their boldness and ferocity must have been great. 'A fine dog,' says Captain Lyon, 'was lost in the afternoon. It had strayed to the hummocks ahead without its master; and Mr. Elder, who was near to the spot, saw five wolves rush at, attack, and devour it in an incredibly short space of time; before he could reach the place the carcass was torn in pieces, and he found only the lower part of one leg. The boldness of the wolves was altogether astonishing, as they were almost constantly seen amongst the hummocks, or lying quietly at no great distance in wait for dogs. From all we observed I have no reason to suppose that they would attack a single unarmed man, both English and Esquimaux frequently passing them without a stick in their hands; the animals however exhibited no symptoms of fear, but rather a kind of tacit agreement not to be the beginners of a quarrel, even though they might have been certain of proving victorious.'

Again, Captain Lyon thus notices their increased hardihood:—'The wolves had now grown so bold as to come alongside; and on this night they broke into a snow-hut, in which a couple of newly purchased Esquimaux dogs were confined, and carried them off, but not without some difficulty, for in the day-light we found even the ceiling of the hut sprinkled with blood and hair. When the alarm was given, and the wolves were fired at, one of them was observed carrying a dead dog in his mouth, clear of the ground, at a canter, notwithstanding the animal was of his own weight. Before the morning they tore a quantity of canvas off the observatory and devoured it.'

The same voyager gives the following account of the

Esquimaux wolf-trap. It is made of strong slabs of ice, long and narrow, so that a fox can with difficulty turn himself in it, but a wolf must actually remain in the position in which he is taken. The door is a heavy portcullis of ice, sliding in two well-secured grooves of the same substance, and is kept up by a line which, passing over the top of the trap, is carried through a hole at the furthest extremity: to the end of the line is fastened a small hoop of whalebone, and to this any kind of flesh-bait is attached. From the slab which terminates the trap, a projection of ice, or a peg of wood or bone, points inwards near the bottom, and under this the hoop is lightly hooked; the slightest pull at the bait liberates it, the door falls in an instant, and the wolf is speared where he lies.

The following varieties of North American Wolf are enumerated by Dr. Richardson :—

Variety A. Common Grey Wolf, *Lupus griseus*, the *Mahaygan* of the Cree Indians, and the *Amarok* of the Esquimaux.

Variety B. The White Wolf, *Lupus albus*.

Variety C. The Pied Wolf, *Lupus sticte*.

Variety D. The Dusky Wolf, *Lupus nubilus*, *Canis nubilus* of Say.

The Dusky Wolf.

Variety E. The Black American Wolf, *Lupus ater*, *Canis lycaon* of Harlan.

The Prairie Wolf, *Canis latrans* of Say, *Lyciscus latrans* of Smith.

The animals which are thus distinguished have been long known, as Dr. Richardson remarks, to voyagers on the Missouri and Saskatchewan, as distinct from the Common Wolf. They are the *Small Wolves* of Du Pratz; the *Prairie Wolf* of Gass; the *Prairie Wolf* and *Burrowing Dog* of Lewis and Clark, and of Schoolcraft; the *Cased Wolves* of the Hudson's Bay Company's lists; and the *Meesteh-chaggoneesh* of the Cree Indians.

Geographical Distribution, Habits, &c.—Dr. Richardson states that the northern range of the Prairie Wolf is about the fifty-fifth degree of latitude, and that it probably extends southwards to Mexico. It associates, according to him, in greater numbers than the Grey Wolf of the same districts; it hunts in packs, and brings forth its young in burrows on the open plain remote from the woods. Dr. Richardson further relates that on the banks of the Saskatchewan these animals start from the earth in great numbers on hearing the report of a gun, and gather round the hunter expectant of the offal of the animal which he has slain. They are much more fleet than the Common Wolves. Dr. Richardson was informed by an experienced hunter who had resided for forty years on the Saskatchewan, that the only animal on the plains which he could not overtake, when mounted on a good horse, was the Prong-horned Antelope, and that the Prairie Wolf was the next in speed.

The *Coyotl* or *Vulpes Indica* of Hernandez ('Hist. Quadr. Novæ Hisp.,' c. xiii.) appears to be the *Caygotte* of the Mexican Spaniards, and is, 'most probably,' the *Lyciscus cagottis* of Smith. This appears to be the animal mentioned by Mr. Bullock, in his 'Six Months in Mexico.' 'Near Rio Frio,' says that traveller and assiduous collector, 'we shot several handsome birds,
and saw a cayjotte or wild dog, which in size ne
proached the wolf. He stood looking at us at
distance from the road, and it was not till a gun w
at him that he deliberately moved off.'

With regard to this encounter, Col. Smith says
Bullock was informed by muleteers that the Caygo
very fierce kind of wolf, and that the individu
Bullock saw were in size equal to a hound, of a
ish rusty-grey, with buff-coloured limbs, and n
scanty brush. This description, Colonel Smith adds
coincides with a similar animal he had met on th
coast of South America, only the tail was dark
with a white tip, and the under parts and feet w
white. The Indians named it *Aguarra*, a name,
Smith observes, applied to several species.

'This lyciscus,' says Colonel Smith, 'measure
twenty-four inches at the shoulder, resembled a
wolf, but had a muzzle and the ears propor
shorter; the body appeared to be rather long and
compared with the height; the nose, cheeks, a
to the carpus and tarsus, were buff; the forehea
and back, clear grey; all the hair rather har
touch; the rest as before stated. In the "Anim
dom," Baron Cuvier describes as a wolf, under t
of "The Mexican," one that can be no other
species; and we have little doubt but that the
'Jackal Fox' of Captain Belcher, observed by
the banks of the Sacramento River, in Califor
37° 43′ north, and 122° west, is again the sam
notwithstanding that the compound name of j
given to it seems to imply a smaller species.'

Hernandez describes the Coyotl to be a
unknown to the Old World, with a wolf's he
large, and pallid eyes, small and sharp ears, a l
and not thick muzzle, muscular legs, crooked
claws, a very rough and thick tail, a noxious
proaching in form to the Fox, to which genus it
to be referred, and intermediate between it and
in size; for it is twice the size of the fox and les
wolf, wherefore it is said to attack and kill not
and similar animals, but stags, and sometimes
It is covered with brown and white long hair, is
in hunting and vulpine in its manners, and so p
an avenger of wrongs, and so mindful of the abs
its prey, that it will recognise the robber after n
will follow him, and sometimes set upon him wit
its own kind, &c. It is however grateful to its b
It lives in many places of New Spain, and es
those which are colder. It feeds upon the weak
maize and other frumentaceous vegetables, a
cane.

The *Aguara Guazu* of D'Azara is the *Canis*
Cuvier, the *Loup rouge* of the French, the *C*
pestris of the Prince de Wied, and the *Mane*
Chrysocyon jubatus, of Smith.

D'Azara thus describes this *Red Wolf*, to
Payaguas Indians give the name of *Paraepag*
Chilians that of *Culpeu*. In Moxos, he says,
goes by the appellation of *Ocorome*.

Length of an adult male exactly five feet, t
tail nineteen inches, the hairs being four in
Height in front two feet ten and a half inch
two feet elven inches; circumference close t
legs wanting half an inch of two feet, of the mi
neck a foot, and of the head, before the ear
three inches; the ears six inches high, in thei
part four, erect, but not exactly sharp, and
From the tip of the muzzle to the ears, nine inc
fourths, and to the inner angle of the eye five in
whiskers two inches and a half long, and bl
upper jaw projecting an inch: the canine teeth
long, although they were very much worn;
and somewhat sunk; from the eye forwards
of almost equal thickness to the tip. Under
great white spot: long hair within the ears an
half of tail white also. Fore and hind feet to
lower jaw from the corner of the mouth for
extremity of upper jaw black: rest of the
yellowish-red. Mane commencing at the oc
continuing erect till beyond the shoulder, five i
three-fourths long, red in the first half of each
black in the remainder towards the tip. Hai
the body, including the belly, except the low

fore-legs, very long, and on the extremity of the ne four inches and a half. D'Azara observes that it either completely flattened nor very rough, and would ke very good carpets. Hair of the tail rather bushy of the same length as on the body.

abits, Food, &c.—D'Azara caught four males at dif- nt times, which were identical, the smallest towards the of September, which appeared to him to have been lped at the end of July or the beginning of August. zara's friend Noseda caught another about two ths old; and, in the hope of domesticating it, fed it on beef, which it was unable to digest, and which caused leath. D'Azara and Noseda caught another after- ds, about three months old, and gave it raw beef but om: when it was given however the animal threw it and to prevent this its meat was cooked, but still it was digested. This aguara got loose from its chain and aped. During its short captivity, if anybody approached, rowled and barked like a dog, but more vehemently confusedly. It drank by lapping, and when feeding on the flesh, which it tore to pieces with its teeth. s animal was fond of rats, sugar-cane, oranges, eggs, small birds, but its attention did not appear to be at- ted by the poultry, which sometimes passed within its ch without its attempting to pounce upon them.

'Azara further states that in a wild state they do not mit havoc on the herds or smaller flocks; and as they bit only the extensive lowlands and marshes of Para- y as far as the river Plata and near its mouth, he has doubt that they feed on rats, guinea-pigs, small birds, certain vegetables, if these fall in their way; but fly on snails, toads, frogs, and other reptiles, and on land-crabs which are abundant in the plains and sand- ks. They walk with very long paces, run much, and D'Azara adds, great plunderers, although they always rom man, and even from dogs. They are solitary in r habits, and are said to swim well, and in their wild e to utter no sound but *gouaa*, which they often and lly repeat so as to be heard at a great distance. The s have no very marked difference.

he Aguara dogs, *Dusicyon* of Smith, are a distinct ; and so are the Aguara Foxes, *Cerdocyon* of the e author.

OLF-DOG. More than one variety of the dog is wn by this name.

he *Wolf-Dog of Spain* is nearly as large as a mastiff. nose is pointed, the ears are erect, the coat long and , the tail bushy or feathered, and curling over the back. colour is generally white with large fulvous or brown hes. Sometimes the coat is closer.

he *Black Wolf-Dog of the Indians of Florida* is de- bed by Bartram as not differing from the wolves of the try excepting in its bark. That this animal is saga- s and trustworthy, appears from the fact that one was ed to watch and keep together horses without any an help.

he *Irish Wolf-Dog* is now very rare; and, indeed, the d had been so crossed, that latterly two were seldom alike.

f the *Levinarius* or *Lorarius*, the *Leviner* or *Lyemmer*, h was led in a *lyemme* or thong, and slipped at the e, and was, according to Dr. Caius, a dog that hunted by scent and sight, and, in form, between the hound the gre-hound, Pennant states that it is probably the known to us by the name of the *Irish Gre-hound*, a when he wrote, extremely scarce in that kingdom, then late king of Poland having procured from thence any as possible. 'I have,' says Pennant, 'seen two or e in the whole island: they were of the kind called by de Buffon *Le Grand Danois*, and probably imported e by the Danes, who long possessed that kingdom. r use seems originally to have been for the chace of ves, with which Ireland swarmed till the latter end of seventeenth century. As soon as those animals were rpated, the number of the dogs decreased; from that od they were kept only for state.'

he dog here mentioned is the *Canis graius hibernicus*. a very old print now before us, a forester is repre- ed leading one of these Lyemme dogs. It is smooth greyhound-like in its form, but very high on the legs, stout in proportion. One that we have seen was also oth, as was the drawing of another. The figure in vick is smooth; but the fine representation in the *Sportsman's Cabinet* is rough, like a Highland greyhound or deerhound.

Bewick says that it is the largest of the dog kind, and its appearance the most beautiful and majestic, as in truth it is. He speaks of it as only to be found in Ireland, and as having been formerly of great use in clearing the country from wolves. 'It is,' says he, 'now extremely rare, and is kept rather for show than use, being equally unserviceable for hunting either the stag, the fox, or the hare. These dogs are about three feet high, generally of a white or cinnamon colour, and made somewhat like a greyhound, but more robust; their aspect is mild, and their disposition gentle and peaceable: their strength is so great, that in combat the mastiff or bull-dog is far from being equal to them. They mostly seize their antagonists by the back, and shake them to death, which their great size generally enables them to do with ease.'

The author of the *Sportsman's Cabinet* (1804) remarks that the Irish greyhound is so rarely to be seen, that it is a matter of doubt whether one of the pure and unmixed breed is to be found even in the most remote part of the country from whence they are supposed to have derived their name. It is affirmed, he adds, by the best and most respected authorities, that the Danish dog, the Irish greyhound, and the Common greyhound of this country, though they appear so different, are but one and the same race of dog.

Next to this in size and strength Bewick places the Scottish Highland greyhound or wolf-dog, used by the chieftains in their great hunting parties, and of which Sir Walter Scott's Maida appears to have been a noble modern example. This is probably the race to which Boethius alludes as 'genus venaticum cum celerrimum tum audacissimum,' praising its boldness not only in attacking wild beasts, but enemies and robbers.

Colonel Hamilton Smith, speaking of the Irish greyhound, *C. Hibernicus*, remarks (1840) that this antique race was originally, we may presume, the same as the Scottish; and, according to some opinions, was not found in Ireland in its greatest development until the Danes began to infest the coasts. After observing that no such race is recorded to have existed anciently in Scandinavia or Denmark, and that its earliest colour was buff or pale ochry, in that respect also approximating the breeds of the East, and that the mystical bitch in Druidical lore appears to refer to this species, both in Britain and Ireland, he expresses an opinion that the antient race, like the Scottish, may have been crossed with the great Danish dog by the Northmen, and, under favourable circumstances, may have increased to the great stature since so much admired.

'Of the specimens we have seen,' says Col. Smith, 'and the figures published, no two appear now exactly alike in structure or colour, so that mastiff, stag-hound, and blood-hound may likewise have been crossed with the antient species; and from this circumstance, no doubt, arises the difference in qualities ascribed to them. Still this dog is the largest in Western Europe; and the extirpation of wolves in Ireland may, in part at least, be justly due to its exertions. The bitch kept by Buffon killed the male wolf she was bred up with, which proves that one was more than a match for that fierce animal. Lord Altamont is said to have kept the last dogs of this race, and it was one of his that Mr. Lambert describes in the *Linnean Transactions*. But we heard that Lord O'Neil likewise had some; and, still later, that Mr. Hamilton Rowan used often to appear in Dublin with a couple of these majestic dogs.' (*Naturalist's Library*.)

WOLF, HIERO'NYMUS, a German scholar of the sixteenth century, was born on the 13th of August, 1516, at Dettingen, and belonged to a noble but reduced family. From his early youth he showed a great inclination to study, but his father, whose means were very limited, and who also thought the delicate constitution of his son unsuited for a studious life, tried to dissuade him from it. His son at last gave way, and resolved to become a soldier; but some books which chance threw in his way again changed his determination, and he accordingly went to the university of Tübingen, where he became a pupil of Camerarius and J. Schegk. As his father could not supply him with money, he was obliged to become a sort of literary servant (famulus) to one of the professors. He was however soon tired of this situation, and went to Wittenburg, where he got a place as clerk in the bishop's office. Here too he did not remain long. He resigned his post and went to Wittenberg, where he attended the lectures of Melanchthon and others, and also began to translate some Greek authors into Latin, which was his favourite occupation. In 1539 he went from Wittenberg to Nürnberg, where he acted for a time as assistant-master in a public school, until, in 1543, he was appointed rector of the gymnasium at Mühlhausen, on the recommendation of Melanchthon: but his restless disposition did not allow him to remain there more than two years; he resigned his office and returned to Nürnberg. After having stayed here for some time, during which he maintained himself by giving private lessons, he went to Strassburg. The next few years he spent partly at Strassburg and partly at Basle, being all the while zealously engaged in preparing his editions of Isocrates, Demosthenes, and Aeschines. From Strassburg he accompanied some young men whom he instructed in Greek, to Paris, and after a short stay there he returned to Basle. He now took his degree of Master of Arts, and then went to Augsburg, where he at length found a resting-place. Anton Fugger received him into his house, made him his librarian, and employed him in carrying on his Latin correspondence. After having been in this situation for six years, from 1551 to 1557, he was appointed professor of Greek in the gymnasium of Augsburg. Soon after he was promoted to the rectorship of the same institution, and obtained in addition to it the office of librarian of the public library of the city of Augsburg. These offices he held until his death, on the 8th of October, 1580.

Hieronymus Wolf was a man of very extensive learning, and particularly distinguished for his knowledge of Greek, which he is said to have written with greater facility than Latin. Some of his works have Greek prefaces, which show that he possessed a perfect knowledge of Greek. His Latin translations from the Greek are more faithful and correct than elegant. He was a man of a very discontented disposition, and was often in a state of melancholy. He had scarcely any friend, and was never married. He was fond of astrological speculations. Among his editions and translations of Greek writers the following deserve to be mentioned, and some of them are still of great value, as he made good use of MSS. :—1, An edition of Nicephorus Gregoras, with a Latin translation and notes, Basle, 1552, fol.; 2, An abridged edition of Suidas, with a Latin translation, Basle, 1581, fol.; 3, An edition of Demosthenes and Aeschines, with a Latin translation, the commentary of Ulpian, Greek scholia, various readings and notes, Basle, 1572, fol.; 4, A very good edition of all the works of Isocrates, with a Latin translation and notes, Basle, 1570, fol. The edition of these three Attic orators is the best among his editions of antient authors; 5, An edition of Zonaras, with a Latin translation, for which he collated five MSS., Basle, 1557, fol.; 6, The first edition of Nicetas Acominatus, with a Latin translation, Basle, 1557, fol. He also wrote notes on several works of Cicero, which however are not of much value, and some original treatises, such as 'Dialogus de Usu Astrologiæ,' and several others.

(Brucker, *Miscellanea Historiae Philosophicae;* Jöcher, *Allgemeines Gelehrten Lexicon;* Fr. Passow, *Vermischte Schriften,* Leipzig, 1843, 8vo.)

WOLF, JOHANN CHRISTOPH, a learned Lutheran divine, was born on the 21st of February, 1683, at Wernigerode, where his father was ecclesiastical superintendent. In 1695 the family removed to Hamburg, where the father died three months after his arrival; but young Wolf found a friend in Johann Albert Fabricius, who received him into his house, allowed him the use of his extensive library, and also gave him great assistance in his studies. The young man availed himself of these opportunities, and before he had attained his twentieth year, and before he went to the University, he had not only read the most important among the antient writers, but also the whole Commentary of Eustathius upon Homer, and conjointly with Peter Zorn he drew up a list of the authors mentioned in that commentary. This list is printed, with a few improvements, in Fabricius's 'Bibliotheca Graeca' (vol. i., p. 457-501). Subsequently he made a similar list of authors referred to in the Scholia on Apollonius Rhodius, which is likewise printed in Fabricius (vol. iv., p. 279-286). Having obtained a scholarship, which enabled him to continue his studies, he went in 1703 to the University of Wittenberg.

He took his degree of M.A. the year after, an
he began lecturing at Wittenberg on philosop
jects, but as the disturbances then caused by the
northern Germany drew away many of the stud
left Wittenberg in 1707, and returned to Ham
the same year he was appointed conrector of the g
at Flensburg, but he employed the year 1708 in
through Holland and England, and spent the g
of the time in examining the libraries of these
especially the Bodleian library. On his return
his office at Flensburg, and after having visite
in 1710, and the University of Copenhagen, h
Wittenberg, where he again commenced the c
academical teacher, as professor extraordinary
losophical faculty. His lectures were favourabl
but a few years after he accepted the offer of th
ship of Oriental languages at the gymnasium of
and being soon after promoted to the rector
same institution, he also obtained with it th
preacher in the cathedral. In 1716 he was appo
tor in the church of St. Catherine, and he hel
until his death, on the 25th of July, 1739.

J. C. Wolf was never married: his unwearied
his love of books, which he seems to have imb
Fabricius, left no room for any other attachment
collected an immense number of Oriental and
works, both printed and manuscript, and
amounted to upwards of 25,000 volumes, which
he bequeathed to the city of Hamburg, where it
Wolf did for Jewish and Rabbinical literature
bricius did for Greek and Roman literature, and
on those subjects are still indispensable to those
that branch of literature. His principal wor
department are—1, 'Bibliotheca Hebraica, sive n
auctorum Hebraeorum cujuscunque aetatis, t
torum, quae vel Hebraice primum exarata vel ab
versa sunt,' Hamburg, 1715-33; 4 vols. 4to.
ment to this important work was published by H.
under the title 'Nova Bibliotheca Hebraica,'
and 1784, 2 vols. 4to. 2, 'Historia Lexicorum
corum,' Wittenberg, 1705, 8vo. Besides these
several treatises on Hebrew, on the history of
cheans, and on the use of the Rabbinical litera
also translated Lardner's 'Credibility' into La
merits as a classical scholar are not much infe
merits as a rabbinical scholar. The following li
his most important works connected with class
ture, and his editions of antient authors: 1, '
epistolica, qua Hieroclis in aurea Pythagora
commentarius nuper in Anglia editus (by Need
tim illustratur et partim emendatur,' &c., Lei
8vo.: 2, 'Origenis Philosophumena,' Hamb
8vo.: 3, 'Libanii Epistolae,' with notes and a L
lation, Amsterdam, 1738, fol. This is still the b
of the Letters of Libanius, and contains about o
letters which are not in any previous edition.
Wolf had before edited separately. 4, 'Anecd
sacra et profana, ex codicibus manu exaratis nu
in lucem edita, versione Latina donata et notis
Hamburg, 1722 and 1723, 4 vols. 8vo.

(Seelen, *Commentatio de Vita et Scriptis J.*
Moller, *Cimbria Literata;* Götte, *Jetzt lebende*
Europa, Braunschweig, 1735, &c.)

WOLF, FRIEDRICH AUGUST, the greatest
German scholars, was born on the 15th of Febr
at Hainrode, a village in the county of Hohen
Nordhausen, where his father was organist,
whence he was afterwards removed to Nordh
appointed teacher at one of the schools of the
to his seventh year, when he entered the gym
Nordhausen, Wolf's education was conducted
care and strictness by his parents. Under th
of Hake, the head of that institution, Wolf
that love of antiquity which never forsook
the same teacher also implanted in his mi
which characterises his whole literary life, th
thinking and judging for himself without being
any authority, and of pursuing only one thing
By following this system, and making conscient
his time, Wolf, even before he went to the univ
read all the most important antient, as well
French, English, Italian, and Spanish writers.
intention was to make him, as well as his brot

Friedrich, a professional musician; and after he himself had given him all the theoretical and practical instruction he was capable of, he sent both sons to the learned organist Schröter, who also instructed them in mathematics, a science o which Friedrich August had an aversion throughout ife. But old Wolf's plan was adopted only by Georg Friedrich; for although Friedrich August was fond of music, sang and played several instruments, yet he regarded the art only as an elegant amusement, and was resolved to follow the course of study which he had commenced at the gymnasium. In 1777 he accordingly went to the university of Göttingen to study philology exclusively. He always prized private study more than any other; and in consequence of this he was highly irregular in his attendance in the lecture-rooms. Heyne observed this inclination in Wolf, and on one occasion when Heyne was going to lecture on Pindar, and Wolf wanted to enter his name as one of his hearers, Heyne refused to admit him. From this moment Wolf avoided Heyne, and did not even attempt to become a member of the philological seminary, though in a financial point of view it would have been a material assistance to him. But Wolf nevertheless lived happy and retired at Göttingen, and he made up the deficiencies in his finances by giving private lessons to other students in Greek and English; and it is a curious fact, that in order to have an English book which he might read with his pupils, he published, in 1778, an edition of Shakspere's 'Macbeth,' with explanatory notes. Heyne was at the time a man of paramount influence in all scholastic matters in Germany, and Wolf before leaving the university presented to him a dissertation on Homer, in which he explained some points on which he ventured to differ from Heyne; but Heyne peremptorily refused to ead it.

In 1779 Wolf left Göttingen, and was immediately after appointed teacher in the paedagogium at Ilfeld. Here he made himself first known to scholars by his edition of Plato's 'Symposium' (Leipzig, 1782, 8vo.; a second edition appeared in 1828), with notes and a valuable introduction n German. The manner in which Wolf treated his author met with general approbation, and attracted the attention of the Prussian minister, Baron von Zedlitz. In consequence of this publication Wolf was appointed, in 1782, rector of the public school at Osterode, at the foot of the Harz mountains. In the year following he received two invitations, one to the office of rector of the gymnasium at Gera, and the other to that of ordinary professor of philosophy in the university of Halle, and rector of the paedagogical institute, which was then connected with the university. Although the post at Halle was less lucrative than that at Gera, Wolf preferred it, because it opened to him a wider and more satisfactory sphere of action. His mode of teaching at Halle was so different from that which had been customary, that in the first years he was little understood and appreciated by the students, and he gradually discovered that he must descend to the capacity and knowledge of his hearers. From the time that he adopted this plan his lecture-room was always crowded, and the greatest zeal prevailed among the students. With he assistance of Baron von Zedlitz, Wolf succeeded in ransforming the paedagogical institute of Halle into a philological seminary, similar to that which Heyne conducted at Göttingen. As an academical teacher Wolf folowed his own way, and being thoroughly convinced that here is no fitter means of educating men for the higher purposes of life than the study of the antient languages and antiquity generally, his great object was to train a number of able teachers, who were to diffuse sound principles of education throughout Germany, and counteract he numerous empirical schemes which were then afloat and threatened to undermine all sound mental training. Wolf always regarded it as his peculiar vocation to work as a teacher; literary labours and reputation were matters of secondary importance with him. To give the reader ome notion of his extraordinary activity as a teacher, we may mention the fact, that during the twenty-three years of his professorship at Halle he delivered upwards of fifty courses of lectures on different subjects of antiquity, independent of what he did in conducting the philological seminary. In order to supply a suitable text of Hesiod for the purpose of a course of lectures on mythology, he published, in 1784, an edition of Hesiod's 'Theogony,' with a preface and some notes. About this time his attention was drawn to the Homeric poems by the request of a publisher to prepare an edition of them. Many years however passed away before this plan was realized. In 1789 he published his celebrated edition of Demosthenes' oration against Leptines, together with the declamation of Aelius Aristides on the same subject. The learning displayed in the introduction, the excellent commentary, and the ingenious emendations of the text established his reputation as a first-rate scholar and critic. In 1795 he at length published the results of his Homeric studies in the celebrated 'Prolegomena ad Homerum,' in which he developed his views on the original form of the 'Iliad' and 'Odyssey,' explained the history of these poems, and pointed out in what manner their original form might be restored. With extraordinary sagacity and learning he here endeavours to show that the 'Iliad' and the 'Odyssey' in their present form are not the work of Homer, but the works of several rhapsodists, which were subsequently put together and made up into the present two epics bearing the name of Homer. This work created a great sensation all through Europe, and gave rise to numerous historical and antiquarian investigations. Several scholars, and among them Heyne, endeavoured to diminish Wolf's merits by asserting that they had entertained similar ideas respecting the Homeric poems; and Heyne went so far as to say that Wolf had done nothing but strung together the notions which he had gathered at Göttingen. This unfounded assertion provoked Wolf to publish a series of letters addressed to Heyne, 'Briefe an Heyne, eine Beilage zu den neuesten Untersuchungen über Homer' (Berlin, 1797, 8vo.), the first three of which are models of a learned controversy and exquisite irony. Wolf's 'Prolegomena' have unquestionably had greater influence than any other learned production of modern times; and although the results at which the author had arrived are now almost universally regarded as untenable, or are at least greatly modified, yet the work begot that spirit of critical investigation which has ever since characterized the best among the learned works of Germany. It was Wolf who gave this impulse. In the years 1801 and 1802, in which his literary activity was greatest, he published—1, Five orations of Cicero ('Post reditum in senatu,' 'Ad Quirites post reditum,' 'Pro domo ad pontifices,' 'De Haruspicum responsis,' and 'Pro Marcello'), and he endeavoured to prove that these orations are spurious, that they are mere declamations of later rhetoricians, and altogether unworthy of Cicero; 2, His edition of Suetonius, in 4 vols. 8vo. (Leipzig, 1802), with the notes of Ernesti, Isaac Casaubon, and some of his own. This edition contains also the fragments of the 'Monumentum Ancyranum,' and of the 'Fasti Praenestini.' 3, A collection of his smaller essays and occasional orations delivered at Halle, 'Vermischte Schriften und Aufsätze in Lat. und Deutscher Sprache,' Halle, 1802, 8vo. During this period Wolf received several honourable invitations from other universities; in 1796 an invitation to a professorship at Leyden; in 1798 another as chief manager of all the learned schools in Denmark; and in 1805 a third invitation to Munich. But he declined all these flattering offers, and was rewarded for it by the Prussian government with a considerable increase of his salary and the title of privy councillor (Geheimer Rath). During the time from 1804 to 1807 he was engaged in the publication of his text of the Homeric poems (Leipzig, 4 vols. 8vo.). A second and still better edition is that of 1817, in 4 vols. 12mo. It was reprinted, with a preface by G. Hermann, Leipzig, 1825, in 2 vols. 8vo., and 1828, in 4 vols. 12mo. Wolf had not finished his edition of Homer when, after the disasters of 1806, the university of Halle was closed. As Wolf had no property, he was for a time in considerable difficulties. In 1807 he went to Berlin, where he found an opportunity of devoting his energy to the Academy of Sciences of that capital, of which he was a member. Here he also took a most active part in the establishment of the university of Berlin. For himself he wished to have the general superintendence of all the schools at Berlin, and the management of a philological seminary which was to be connected with the new university and the gymnasia of Berlin, and for which he drew up an excellent plan. In the meantime he also obtained a high office in the ministry for public instruction; but as he could not realize his plans, and as the duties of his several offices engrossed a great deal of his time which he would have preferred to devote to teaching—his favourite occupation

—he withdrew from public service, but being a member of the Berlin academy, he reserved to himself the right of lecturing in the university on such subjects as might be most agreeable to him. During the period of leisure which now followed, he devoted nearly all his time to literary labours. From 1807 to 1810 he edited, together with Buttmann, the 'Museum der Alterthumswissenschaft' (Berlin, 2 vols. 8vo.): the first volume contains Wolf's celebrated treatise 'Darstellung der Alterthumswissenschaft nach Begriff, Umfang, Zweck und Werth,' which was reprinted at Leipzig, 1833, 8vo., together with a select number of his smaller essays, by S. F. W. Hoffmann. This treatise is the first in which Philology, or the Alterthumswissenschaft (a word for which an equivalent is much wanted in English), was treated as and raised to the rank of a science. In 1812 he edited three dialogues of Plato ('Euthyphro,' 'Apologia Socratis,' and 'Crito'), Berlin, 1 vol. 4to., with an elegant Latin translation. From 1817 to 1820 he edited a periodical, 'Literarische Analekten' (Berlin, 4 vols. 8vo.), perhaps the best philological journal that has ever been published. He gave it up suddenly in 1820, on account of the restrictions imposed upon the press by government, to which he was unwilling to submit. Some years after this he began to suffer from ill health. In April, 1824, he travelled to the south of France for the purpose of restoring his health, but he never returned to his country: he died at Marseille, on the 18th of August, 1824.

An interesting volume compiled from the papers which Wolf had left on matters of education, was edited by W. Körte, Wolf's son-in-law, under the title 'Ueber Erziehung, Schule, Universität (Consilia Scholastica),' Quedlinburg und Leipzig, 1835, 8vo. After the death of Wolf several of his former pupils set about editing some of his most important courses of lectures, but the haste and carelessness with which the task was undertaken have left much to be desired. These lectures are—1, 'Encyclopaedie der Philologie,' edited by Stockmann, Leipzig, 1830, 1 vol. 8vo.; 2, 'Vorlesungen über die Alterthumswissenschaft,' edited by Gürtler, Leipzig, 1831-35, 5 vols. 8vo.; 3, 'Vorlesungen über die vier ersten Gesänge von Homer's Ilias,' edited by Usteri, Bern, 1831, 3 vols. 8vo.

(Hanhart, *Erinnerungen an Fr. A. Wolf*, Basel, 1825, 8vo.; W. Körte, *Leben und Studien Fr. A. Wolf's, des Philologen*, Essen, 1833, 2 vols. 8vo.; S. F. W. Hoffmann's *Preface to* Fr. A. Wolf's *Darstellung der Alterthumswissenschaft*.)

WOLFE, JAMES, was born at Westerham in Kent, on the 15th of January, 1726. His father, Edward Wolfe, was an officer in the British army; some biographers call him lieutenant-general; his son's monument at Greenwich styles him only colonel.

A commission was obtained for James at an early age. In 1747 he was present at the battle of Lafeldt, and had the good fortune to distinguish himself by his presence of mind at a critical juncture. The treaty of Aix-la-Chapelle restored peace to Europe in the course of the next year; but Wolfe found means to keep alive the favourable impression he had made on the minds of his superior officers in action by the skill and attention which he evinced in the irksome routine duties of training and preserving discipline. The precision with which the six British battalions of infantry performed their evolutions on the field of Minden (1759), and the firmness with which they kept their ground when exposed in consequence of Lord George Sackville's dilatoriness in bringing up the cavalry, were in a great measure attributed to the exertions of Wolfe during the peace. During the seven years of peace which succeeded 1748, he gradually rose to the rank of lieutenant-colonel.

Hostilities re-commenced between France and Great Britain in 1755, and in 1757 Wolfe was appointed quarter-master-general to the forces, under Sir John Mordaunt, intended to attack Rochfort. While the military and naval commanders of that mismanaged expedition were wasting time in idle controversy, Wolfe landed one night and advanced two miles into the country. His report of the absence of any obstacles to a descent, and his urgent recommendations that it should be made, were disregarded, but they became known to Pitt, and were the main reason of his afterwards selecting Wolfe to command in Canada.

In 1758 Wolfe was sent, with the rank of brigadier-general, on the expedition against Cape Breton, in which Boscawen commanded the sea and Amherst the land forces. The brunt of the French fire in landing before Louisbourg was borne by the left division under Wolfe; the attacks by the centre and right divisions being mere feints to distract the enemy. The after operations of the siege were also in a great measure conducted by Wolfe; and it was an honourable trait in the character of Amherst that, in his dispatches, he allowed his brigadier the full credit of his actions. The landing was effected on the 8th of June: Louisbourg surrendered on the 26th of July. Wolfe soon afterwards returned to England.

In 1759 an expedition was fitted out against Quebec by Pitt, who had resolved to deprive the French crown of its most important settlements in America. The command of the sea-forces was intrusted to Saunders; the command of the land-forces (7000 men, including provincials) to Wolfe. The embarkation arrived at the Isle of Orleans on the 26th of June: the fort of Niagara had been surrendered to the English under Amherst the day before. In August Wolfe issued a proclamation to the Canadian peasants, informing them that his forces were masters of the river, while a powerful army, under General Amherst, threatened their country from the interior, calling upon them to observe a strict neutrality during the struggle between the French and English crowns, and promising to protect them in their possessions and the exercise of their religion. Montcalm had concentrated all the forces he could raise in the province in Quebec, which he had fortified in a masterly manner. The months of July and August were spent in repeated unsuccessful attempts to drive the French from their advantageous post at the mouth of the Montmorenci. On the night between the 12th and 13th of September Wolfe landed his troops immediately above Quebec, and, favoured by the night, ascended the hills which command that city from the west. Montcalm, when he learned that the English were in possession of these heights, saw at once that nothing but a battle could save the town, and took his measures accordingly. The battle was strenuously contested, but the French at length gave way. Montcalm and Wolfe fell in the action, and their seconds in command were both dangerously wounded, and obliged to leave the field before the fate of the day was decided. Five days after the action Quebec surrendered, and Canada was lost to France.

The feature of Wolfe's character most dwelt upon by his contemporaries was his ardent and fearless spirit of enterprise. His skill as a disciplinarian however, the pains he took to ascertain the real state of affairs at Rochfort, and the arguments by which he supported the proposal of a descent, and, above all, his letter addressed to the prime minister from his head-quarters at Montmorenci, on the 2nd of September, show that this quality was combined with an observant and deliberate mind. Enterprise was with Wolfe the result of perfect and laboriously attained knowledge of his position.

It is to be regretted that the correspondence of Wolfe which is known to exist has not been given to the world. It would be instructive to the military men, for his character as a soldier was almost perfect, though the field in which his talents were developed was a narrow one. The task was undertaken by Southey and afterwards by Gleig; but relinquished by both from unexplained difficulties which intervened. Michaud, jeune, is in error when he says, in the 'Biographie Universelle,' that the 'Life and Correspondence of Wolfe' was published at London in 1827; it was only announced. The author of the article 'Wolfe, James,' in the 'Encyclopædia Americana,' has, without acknowledgment, copied Michaud's sketch, and this mistake with the rest. The only materials for the Life of Wolfe are contained in the first three volumes of the 'Annual Register' (edited by Burke); in a very shallow 'Life of General James Wolfe,' 'attempted according to the rules of eloquence,' by a writer who designates himself 'J. P.,' published in 1760; and in the gazettes.

The death of Wolfe made a deep impression in England. The most touching instance is mentioned by Burke:—'A little circumstance was talked of at that time, and it deserves to be recorded, as it shows a fineness of sentiment and a justness of thinking in the lower kind of people that is rarely met with, even amongst persons of education. The mother of General Wolfe was an object marked out for pity by great and peculiar distress; the public wound pierced her mind with a peculiar affliction, who had expeienced the dutiful son, the amiable domestic character, whilst the world admired the accomplished officer. Within a few months she had lost her husband; she now lost his on, her only child. The populace of the village where he lived unanimously agreed to admit no illuminations or ireworks, or any other sign of rejoicing whatsoever near her house, lest they should seem, by an ill-timed triumph, o insult over her grief. There was a justness in this, and whoever knows the people knows that they made no small acrifice on this occasion.'

James Wolfe fell in his thirty-fourth year. His remains were interred at Greenwich. A monument was erected to is memory, in 1760, by the gentlemen of his native arish: a public monument in Westminster Abbey was oted by the House of Commons in 1759, and opened to he public in 1773: a marble statue was voted by the Assembly of Massachusetts.

WOLFE, REV. CHARLES, was born at Dublin, 14th December, 1791, and was the youngest son of Theobald Wolfe, Esq. of Blackhall, in the county of Kildare (of the ame family with General Wolfe). The death of his father while Charles was still a child occasioned the removal of he family to England. After being at several schools he as finally sent to Winchester college, where, under Mr. Richards, senr., he distinguished himself by his rapid progress in classical knowledge and especially by the talent he howed for Greek and Latin versification. In 1809 he entered the university of Dublin, where at the usual period he btained a scholarship, and became a most active college utor. Most of his poems, his biographer tells us, were written within a very short period, during his abode in ollege. He took his degree of B.A. in 1814, and soon fter commenced the task of reading for a fellowship; but lthough he is said to have evinced a decided genius for athematics, his habits of study were always impulsive and desultory, and he soon flagged in this attempt. A disappointment in love which he met with at last determined im, in 1817, to give it up altogether; the income of the cholarship would have enabled him to marry the lady to whom he was attached; 'but, unhappily,' says his biographer, 'the statute which rendered marriage incompatible with that honourable station had been lately revived.' It s stated however that this circumstance had no influence in determining the choice of his profession; that the prevailing endency of his mind had always been towards the minis- ry. Accordingly, he took holy orders in November, 1817, and immediately entered upon the duties of the curacy of Ballyclog in the county of Tyrone, from which however in he course of a few weeks he removed to the extensive parish of Donoughmore, where he officiated in the same apacity. Here Wolfe devoted himself with activity and eal to his spiritual calling, and soon acquired in an extraordinary degree the attachment of his parishioners of all enominations. But his exertions, and, still more perhaps han his attention to the welfare of others, his neglect of is own health and comfort, speedily began to wear him own; a consumptive tendency in his constitution, of which some symptoms had appeared while he was at college, was confirmed; a hurried journey which he made to Scotland in May, 1821, (in the course of which he spoke at public meeting held in Edinburgh to receive a deputa- ion from the Irish Tract Society,) brought his malady sud- enly to a height; and immediately after his return home e was obliged to leave his parish and place himself under edical treatment at Dublin. There for a short time he ontinued to preach occasionally with his usual energy; ut he gradually got worse; as winter approached it was hought advisable that he should go to the south of France, ut after being twice driven back to Holyhead he gave up he attempt, and fixed himself near Exeter; on the return f summer he came back to Dublin; in August he made a oyage to Bordeaux; in November, as a last remaining ope, he removed to the shelter of the Cove of Cork; and ere he expired on the morning of the 21st of February, 823, in the commencement of his thirty-second year.

His literary compositions were collected and published 1825 by his friend the Rev. John A. Russell, M.A., rchdeacon of Clogher, under the title of 'Remains of the ate Rev. Charles Wolfe, A.B., Curate of Donoughmore, Diocese of Armagh.' From this small volume, which has een very popular (the edition before us, printed in 838, is called the Seventh), the above facts have been aken. An interesting sketch of Wolfe's history is also given in a 12mo volume entitled 'College Recollections,' published at London in the same year with Archdeacon Russell's work, but we believe some months before it. The 'Remains' (filling 368 pp.) consist principally of Fifteen Sermons, an appendix of miscellaneous thoughts and other fragments, and some juvenile poems, some letters, and other compositions inserted in the Memoir, which, including these, occupies nearly half the volume. Wolfe's literary reputation rests on his famous ode entitled 'The Burial of Sir John Moore,' which he composed in 1817, on reading Southey's prose narrative in the 'Edinburgh Annual Register,' and which first appeared soon after with his initials, though without his knowledge, in the 'Newry Telegraph,' from which it was immediately copied into the London papers, and from them into those of Dublin. The poem, which in the pathos of a noble simplicity has rarely been surpassed, drew much attention from the first; but its authorship remained unknown, except to a small circle of Wolfe's friends or associates, until the question came to be publicly discussed in consequence of a high encomium stated in Captain Medwin's 'Conversations of Byron' (published in 1824), to have been passed upon it by his lordship. The lines were attributed to various writers; and claimants to the honour of having produced them have started up from time to time, some even within the last three or four years; but none of these attempts to defraud the true author of his rights have been persisted in. There are some lines of Wolfe's written to the popular Irish air 'Gramachree,' which in their kind are little inferior in merit to those on the burial of Moore.

WOLFENBÜTTEL is one of the six circles of the duchy of Brunswick, comprising an area of about 230 square miles, and 50,000 inhabitants. Wolfenbüttel, the capital, is situated in 52° 9′ N. lat. and 10° 32′ E. long., in a low marshy spot on the banks of the river Ocker, which flows through the city. It was formerly well fortified, but the works having fallen into decay are for the most part demolished, and are converted into public walks. It is divided into three parts, viz. the citadel, or formerly fortified part, and two suburbs, containing altogether about 10,000 inhabitants. The town is, on the whole, well built, and has broad, and for the most part, straight streets, all well paved. Till 1764 it was the residence of the dukes, in whose palace there was a manufactory of tapestry and a theatre. Opposite the palace stands the fine building erected by Duke Augustus in 1723, on the model of the Pantheon at Rome, containing on the ground-floor the Ducal Riding-school, and above it the celebrated library, which was rendered still more famous by 'The Wolfenbüttel Fragments,' published by its librarian, the learned G. E. Lessing, to whom a monument is erected. This library contains a great number of the earliest impressions and 10,000 MSS. It seems that no good catalogue has been made, for some accounts say that it consists of 270,000 volumes, others of 200,000, while others again reduce it to 110,000: among them there is a large collection of Bibles. The town has four churches, of which that of St. Mary is remarkable for its size; an antient arsenal, now used as barracks; a large poor-house; an orphan asylum; a good gymnasium; and several schools. The inhabitants have a considerable trade in yarn, and they also manufacture linen, leather gloves, japanned wares, paper-hangings, silk, diaper, tobacco, liqueurs, and vitriol; there are likewise some tanneries and distilleries. Wolfenbüttel is the seat of several public offices, for the whole duchy, of the consistory and of the supreme court of appeal for Waldeck, Lippe, and Brunswick. The pretty country seat Antoinettenruh, having fallen into decay, has been pulled down. Near the town are the two villages Ober and Niederdahlum, where the beautiful ducal palace of Salzdahlum formerly stood. It is now totally destroyed. The fine gallery of paintings which it contained (sixty of the most valuable of which were carried away by the French in 1806, but restored, we presume, in 1815) has been removed to Brunswick, where it is deposited in the arsenal, together with the museum of antiquities and other works of art.

(Brockhaus, *Conversations Lexicon*; Hassel, *Handbuch der Geographie*, vol. v.; Stein, *Handbuch*, by Hörschelmann; Cannabich, *Lehrbuch*; Stein, *Lexicon*.)

WOLFF, JOHANN CHRISTIAN VON, a celebrated German mathematician and philosopher, was born at Breslau, January 24, 1679, and at an early age showed a taste for the acquisition of knowledge. His father, who was a brewer, strongly encouraged in him this disposition; he became his first preceptor, and, having instructed him in the Latin language, he sent him to the public school of the town, in order that he might have the benefit of the best masters which it afforded. The youth there studied diligently the philosophy of the age, and he acquired such a facility in the practice of disputing, that he is said to have become the rival of his tutors; but before he was twenty years of age, having obtained information of the revolution which the writings of Descartes had begun to produce in the schools, he was actuated by a strong desire to become acquainted with them. The result of his application to the Cartesian philosophy was a determination to cultivate mathematical science for the purpose of founding on its principles a system of metaphysics. With this object in view he passed through a course of mathematics at the University of Jena, and he afterwards went to Leipzig, where he resided during three or four years. Here, in 1703, he began to deliver lectures; and in the same year he published two tracts, one entitled 'De Rotis Dentatis,' and the other 'De Algorithmo Infinitesimali Differentiali.' The ability displayed in these dissertations procured for Wolff the esteem and friendship of the learned men of his country; he became intimate with Tschirnhausen and Leibnitz, and by them he was encouraged in his views of giving to Germany a national philosophy which might replace that of Aristotle as then understood. He at first intended to enter the church as a profession, but he was finally induced to seek an appointment in fulfilling the duties of which he might continually advance his knowledge of the sciences. He became therefore a candidate for a professor's chair, and in 1707 he was appointed to give instruction in pure and mixed mathematics in the University of Halle. It was while he held this post that he wrote his tract entitled 'De Methodo Mathematica,' and his 'Elementa Matheseos Universæ,' of which last work an enlarged edition was published at Geneva between the years 1732 and 1741, in five volumes, 4to. The first volume contains the following subjects :— 'Commentatio de Methodo Mathematica; Arithmetica; Geometria; Trigonometria plana et sphærica:' the second, 'Mechanica cum Statica; Hydrostatica, &c.:' the third, 'Optica; Perspectiva atque Astronomia:' the fourth, 'Geographia; Chronologia; Gnomonica; Pyrotechnia et Architectura:' and the fifth, 'Commentatio de Præcipuis Scriptis Mathematicis, &c.' He also published at Leipzig and Frankfort, in 1728, 'Tabulae Sinuum atque Tangentium tam naturalium quam artificialium, una cum Logarithmis numerorum vulgarium, &c.' Being made a member of the Philosophical Society at Leipzig, he wrote several memoirs relating to mathematics and physics, which were inserted in the 'Acta Eruditorum,' and in 1710 he was elected a Fellow of the Royal Society of London.

But the life of Wolff was almost wholly devoted to the study of metaphysical and moral philosophy; and between the years 1712 and 1723 he wrote his 'Thoughts on the Powers of the Human Mind; on the Deity and the Universe; on the Operations of Nature; on the Search after Happiness;' and, as a sequel to the last, 'Thoughts on Society as a means of advancing Human Happiness.' These works were published separately in the German language, a medium till then unemployed in treating such subjects, but the circumstance produced the best effects by promoting in that country the study of philosophy. At a later period he published in the same language a Dictionary of Mathematics.

While thus employed, and while his talents were procuring for him invitations to occupy the chairs of philosophy at Wittenberg, Leipzig, and St. Petersburg, a serious opposition to his person and writings began to manifest itself in the University of which he was so distinguished a member. This is supposed to have arisen from the intrigues of the theological professors, one of whom conceived a violent dislike to Wolff because the latter, who held the post of dean of the faculty of theology, declining to receive his son on the ground of incapacity, had appointed Thümmig, one of his own pupils, to be his assistant. In such circumstances subjects of accusation are not long wanting, and Wolff was charged with endeavouring to subvert the proofs of the existence of the Deity, and to disturb the religious belief of the students in the University, while his metaphysical principles were violently criticised by Stahler in a work which was published at Jena. It happened also that Wolff, in one of his lectures, had spoken highly in favour of the moral precepts of Confucius, which had then recently been made known to the people of Europe through the researches of the Jesuit missionaries in the East; and this approbation of the doctrines of a heathen philosopher was considered as a crime, though Wolff was so far from being aware of giving cause of offence, that, as he states in his letter to the minister at Berlin, he intended to publish the discourse at Rome with the consent of the Inquisition. The king of Prussia, being instigated by some of the military authorities, who represented that the sentiments of Wolff might become dangerous to the state by holding out to the soldiers an excuse for desertion, suddenly deprived the professor of his appointment, and issued an order that he should quit the kingdom in two days. Wolff accordingly, November 3, 1723, left Halle and went to reside at Cassel, where he was kindly received by the landgrave, who conferred on him the title of councillor, and appointed him professor of mathematics and philosophy at Marburg. Here he resided about eighteen years, and during that time he published his metaphysical works. The first and greatest of these is entitled 'Philosophia Rationalis, sive Logica methodo scientificâ pertractata,' 4to., 1728. The others are, 'Psychologia Empirica, &c.,' 4to., 1728; 'Philosophia prima, sive Ontologia, &c.,' 4to., 1730; 'Cosmologia generalis,' 4to., 1731; 'Psychologia Rationalis,' 4to., 1734; Theologia Naturalis,' 4to., 1737; 'Philosophia Practica Universalis,' 4to., 1738-9; and 'Philosophia Moralis, sive Ethica,' 4to., 1732.

Amidst these labours Wolff found time to write in defence of his doctrines, and by degrees the violence of his antagonists began to abate. Among them there were many who disapproved of the strong measures which had been adopted against him, and there were some who desired his return in the hope of promoting a revival of metaphysical science in Prussia. Frederick the Great, when he ascended the throne, appointed commissioners to examine Wolff's writings and inquire into the cause of his banishment, and the report being favourable, he was in 1733 invited back to Halle; the invitation was repeated six years afterwards, but it was not till 1741 that it was accepted. Wolff had been, in 1725, appointed an honorary professor of the Academy at St. Petersburg; and in 1733 he was elected a member of the Académie des Sciences at Paris.

On his return to Halle he was made privy-councillor, vice-chancellor, and professor of international law; the king afterwards made him Chancellor of the University, and by the elector of Bavaria the dignity of a Baron of the Empire was conferred upon him. It is said however that Wolff had the mortification to perceive that his lectures were not well attended; either age had diminished his powers, or, as it is supposed, his numerous writings being in the hands of all the German students, his oral instructions were no longer necessary. Being attacked by the gout in the stomach, he died, having borne his sufferings with fortitude and Christian piety, April 9, 1754, in the 76th year of his age.

The merit of Wolff consisted in a correct and methodical arrangement of the subjects of philosophical science, rather than in discovery. He borrowed freely from his immediate predecessors, Descartes and Leibnitz, and even from the writers of the Aristotelian school; and, having an earnest desire to combine utility with truth, he endeavoured to reduce the apparently heterogeneous elements under one system. That he completely succeeded in this difficult task it is too much to say; entertaining the project of introducing in philosophical investigations the precise methods which are employed in mathematics, he appears to have overlooked the want of homogeneity in the elements of the former branch of science, which renders it impossible to arrive at conclusions by purely abstract reasonings. In stating a philosophical proposition which perhaps is self-evident, he often exhibits a tedious demonstration in order that he may show its dependence on some more general theorem which precedes it; and his developments are remarkable for their extraordinary prolixity.

Wolff divides human knowledge into three parts, historical, philosophical, and mathematical: in the first he includes everything relating to material as well as immaterial being, that is, whatever is cognizable by the senses ternal conviction. The second he considers as ending the reasons of things; and he states its be the explanation of the reason that what is may be realized. His third division constitutes the re of quantity. He divides psychology into two ich are designated rational and empirical, and the distinguished from the latter as the science of ossible relatively to the soul only. He defines a general, the facultyof demonstrating.

pears to have formed but an imperfect idea of the on of the sciences, his taste leading him to seek nds of their connection only in their being deduced t principles, which he conceived to exist in the nderstanding; and his criterion of truth consisted ng predicated being in accordance with the idea ubject. His dissertations on the employment of ses, and on the deductions drawn from experience, developments of a few general maxims, very just and his views on the liberty of philosophizing d, though, at the time they were written, they appeared too bold.

etaphysical theory maintained its ground in Germany from the death of Leibnitz to the time when the of Kant was formed. He is considered as the disnd commentator of the former philosopher; and he ted a sort of pre-established harmony from whence s the conformity of the operations of the soul with of the body, but he differed from his master in conering that harmony not as a result of the will of the eity, but of the changes which are continually in operation in the universe: the latter he considered as a piece of mechanism set in motion by its first cause. He demonstrates at length the existence of God, taking care at the same time to separate the idea of the Divine Being from that of the soul of the world; and he maintained the opinion that the Author of the universe being all-perfect must have necessarily created the best of all possible worlds. Asserting also the perfect freedom of man's will, he admits that this freedom is limited to the power of choosing what appears to be the best under existing circumstances.

His general rule of morality is, that each man should, as much as depends on himself, do what may render his own condition and that of others as perfect as possible. While acknowledging that God is the source of all morality, he considers that man is in some respects a law to himself; that an action is good or bad in itself, independently of divine precepts, and that the conduct of man ought not to be influenced merely by the fear of punishment or the hope of reward. Natural law is, in his mind, identical with morality, and he makes both to depend on the obligation man s under to advance constantly towards perfection.

Wolff's political science is founded on the principle hat everything should be done for the public benefit and he maintenance of public security: he considers a limited monarchy as the most favourable for the attainment of hese ends, though he admits that this is not without some nconveniences. He leaves to the prince the right of determining what is best for the public good, but he makes him ubject to the laws of his country. He inquires into the auses of the wealth of nations, but his views on this subect are confined chiefly to the state of society in his own ge, and want the generality which is consistent with the resent state of this branch of science.

His political works are, 'Jus Naturæ,' Francofurti et Lipsiæ, viii. tom. 4to., 1732; and 'Jus Gentium,' Halle, 1752.

(Ludovici, *Vita, fata et scripta, Ch. Wolffii*, Leipzig; *Biographie Universelle.*)

WOLFF, PIUS ALEXANDER, one of the most distinguished German actors of the present century, was born n 1782, at Augsburg. His parents designed him for one of the learned professions, but his own inclination, as well as his natural talents, led him to the stage. In 1804 he was one of the actors engaged at Weimar, the theatre of which place was then regarded as the model for all Germany. Schiller and Göthe were themselves actively engaged in conducting the theatre and training the actors. As Wolff was a man of much greater talent than the majority of actors, Göthe took especial trouble with him, trained him on sound artistic principles, and afterwards declared that Wolff had become an actor quite to his mind. Wolff devoted himself especially to the performing of tragic characters and youthful heroes, which he acted to perfection. His performance of Hamlet, the Marquis Posa, Max. Piccolomini, Weisslingen, Orestes, and Tasso, made such an impression in Germany, that to this day he is considered the standard by which other actors are measured. At a later period he occasionally also acted comic and humorous characters, in which he was much admired, though tragedy was at all times his peculiar field, in which he was unsurpassed. In 1816 he became a member of the royal theatre of Berlin.

He died at Weimar in 1828. During the latter years of his life he wrote several dramas, which were well received, and some of which are still favourite plays in Germany. Three of them, 'Caesario,' a comedy, 'Pflicht um Pflicht,' and 'Preciosa,' form the first volume of a collection which he published under the title 'Dramatische Spiele,' Berlin, 1823, but the collection was not continued, and his other plays appeared separately at different times. 'Preciosa' has become celebrated by being taken by C. M. von Weber as the text for one of his most popular operas. His other plays are—'Der Hund des Aubri,' a farce, (Berlin, 1822); 'Der Mann von fünfzig Jahren' (Berlin, 1830); 'Treue siegt in Liebesnetzen,' and 'Der Kammerdiener' (Berlin, 1832).

(Gervinus, *Neuere Geschichte der Poet. National-Literatur der Deutschen*, ii., p. 559; Brockhaus, *Conversations-Lexicon*.)

WOLFRAM VON ESCHENBACH, a Minnesänger, who lived in the first part of the thirteenth century, was the best German poet of his time. He was probably born at a castle called Eschenbach, which seems to have been situated in the Upper Palatinate, and he was descended from a noble family. After having been made a knight, he led the life of a warlike troubadour, and the princes of the empire received him with equal satisfaction in their camp and at their court. He was present at the famous poetical festival on the Wartburg. Towards the end of his life he retired to his native country: he died in 1220.

Wolfram von Eschenbach was a very fertile poet. Of his numerous productions the greater part however are lost, but his principal poem has most luckily been preserved in MS. at St. Gallen and at some other places. This poem is entitled 'Parzival:' the subject of it is partly taken from French and Provençal models—the holy Gral being the marvellous object which the hero of the poem, Parzival, pursues in a long course of adventures. He at last becomes king of the Gral, and thus enjoys the purest happiness and perfection which man can attain. There is an epical tendency in the poem, but it would be incorrect to call it an epic; full of deep thoughts on the destiny of man, on the mysterious nature of his soul, on his religious and moral duties, it belongs to a class of poems which are peculiar to German literature, and of which Göthe's 'Faust' may be considered as the most striking specimen. The 'Parzival' was written about 1205. It was first printed in 1477, fol., in an incorrect and mutilated edition, which was reprinted and somewhat corrected in the first volume of 'Sammlung Altdeutscher Gedichte,' by Müller, who collated the MS. of St. Gallen. The other extant works of Wolfram of Eschenbach are, 2, 'Titurel,' first printed in 1477, 4to., a fragment of an introductory poem to Parzival, and in Gervinus's opinion the finest specimen of antient German poetry, which must not be confounded with another poem, likewise called 'Titurel,' which was once incorrectly attributed to Wolfram; 3, 'Willehalm von Orangis' (William of Orange), in Manesse's collection of Minnesängers, where there are also several of the author's minor lyrical poems. An excellent critical edition of all the extant productions of Wolfram von Eschenbach was published by Lachmann, Berlin, 1833, 8vo., who has added a valuable introduction to the Life and Works of the author. Wolfram, according to contemporary writers, was a very learned man; his style is simple, clear, and elegant, and the difficulties which exist are rather due to the mystical tendency of the author and his transcendental ideas, than to a want of those qualities which constitute a great writer.

(Gervinus, *Geschichte der Poetischen National-Literatur der Deutschen*, vol. i., p. 407-433.)

WOLFRAM. [TUNGSTEN.]

WOLGA. [VOLGA.]

WOLGEMUTH, MICHAEL, a celebrated old German painter and engraver on copper and in wood, was born at Nürnberg in 1434. He was the first German artist who attained any degree of excellence in painting, and he has the additional honour of having been the master of Albert Dürer. Wolgemuth's wood-cuts are the oldest prints of that class in Germany of which the artist is known, and they are extremely scarce. Wolgemuth's paintings are likewise scarce; there are two in the Augustine church at Nürnberg, another in Our Lady's chapel, and a Last Judgment in the town-house of the same place; and one in the church of Schwabach for which he was paid, in 1507, 600 florins, for that period a very great sum: some years after this the celebrated Amberger charged the emperor Charles V. for his portrait only 35 florins. There is also a valuable work by him in the Imperial Gallery of Vienna, painted in 1511; another in the Louvre at Paris; and in the Pinakothek at Münich there are five pieces by Wolgemuth. He died in 1519, aged 85.

The king of Bavaria possesses a portrait of Wolgemuth, painted in 1516, in his 82nd year, by his pupil Albert Dürer; this is inscribed upon the back of the picture.

Wolgemuth's style has the defects of the works of art of his age, especially in design; his works however are carefully finished, exhibit much expression, and in the draperies are superior to the works of many of the eminent German painters who succeeded him.

Wolgemuth and Pleydenwurff cut in wood the illustrations of a curious and celebrated old work in folio, known as the 'Nürnberg Chronicle' of Hartmann Schedel, a physician. It was published first in Latin, in 1493, eight years after the death of its author, and was translated into German in the following year. The cuts consist of views of towns and portraits of eminent men. The Latin edition is the better; the title commences—'Liber Chronicorum per viam Epitomatis et Breviarii compilatus,' &c.

There are several old prints and wood-cuts marked W, which have been attributed to Wolgemuth, but from their inferiority it is very doubtful whether he was the author of them: two other old engravers, Wenceslaus and J. Walch, marked their prints with a W, but it is not known that Wolgemuth ever did.

(Doppelmayer, *Historische Nachricht, &c.*; Fiorillo, *Geschichte der Zeichnenden Künste, &c.*)

WOLKONSKOIT. Amorphous. Structure compact. Fracture imperfect, conchoidal. Hardness 2·5. Colour light emerald-green. Streak bluish-green and shining. Opaque. Nearly dull. Specific gravity 2·2. It is so extremely fragile that it readily falls to pieces on a slight blow. It is found at Perm in Russia.

Analysis by Berthier—

Oxide of chromium .	34·0
Oxide of iron . .	7·2
Silica . . .	27·2
Magnesia . .	7·2
Water . . .	23·2
	98·8

WOLLASTON, WILLIAM, author of 'The Religion of Nature Delineated,' was born at Coton-Clanford in Staffordshire, on the 26th of March, 1659. He was descended from an old and considerable Staffordshire family, but belonged to a younger and a poor branch of it. 'When he was in the tenth year of his age, a Latin school was opened at Shenston in Staffordshire, where his father, a private gentleman of a small fortune, then resided: and Mr. Wollaston was immediately sent to the master of it for such instruction as he was capable to give him, and continued near two years under his care. Afterwards he was sent to Litchfield school, in which a great confusion soon after happened, and the magistrates of the city turned the master out of the schoolhouse. Many scholars followed the ejected master; and Mr. Wollaston amongst the rest. He remained with him till he quitted his school, which was about three years; and then, the schism being ended, he returned into the free-school, and continued there about a year. This was all the schooling Mr. Wollaston ever had.' (Clarke's *Life of Wollaston*, prefixed to his edition of the 'Religion of Nature,' 8vo., 1750, p. v.) On the 18th of June, 1674, he was entered a pensioner at Sidney Sussex College, Cambridge, where he resided almost without interruption until the 29th of September, 1681, by which time he had taken his Master of Arts' degree and deacon's orders. He was disappointed in not obtaining a fellowship in his college, for which he had laboured with great diligence, and in the hope of obtaining which he had submitted to much inconvenience from poverty during his residence in the university. On leaving college he took the situation of assistant-master at Birmingham school, and shortly after he joined the school he obtained a lectureship in a chapel two miles out of Birmingham. After having filled the situation of assistant-master for about four years, he was appointed second master of the school, which had three masters and two assistant-masters, and at the same time took priest's orders. This mastership was worth only 70*l.* a year. Out of his small income he was able to give assistance to two brothers who had got into difficulties. 'In the good offices which he did them at that time,' says the biographer who has been already quoted, 'he seems rather to have overacted his part, for he indulged his affection for them more than was consistent with a due regard to his own welfare, as he was then circumstanced.'

In August, 1688, the poor schoolmaster suddenly found himself in affluence by the death of a second cousin, the head of his own branch of the Wollaston family, Mr. W. Wollaston of Shenton, in Leicestershire, who greatly to his own surprise made him his heir. This gentleman had not long before his death lost his only son, and not choosing to give his estate to his daughters, proceeded to settle it on the uncle and father of the subject of this sketch. But a further acquaintance with his younger relative, and the high character which he heard of him, led him before his death to revoke this settlement and make another. 'His cousin at Shenton was used to employ persons privately, to observe our author's behaviour, who little suspected any such matter. And his behaviour was found to be such, that the stricter the observations were upon it, the more they turned to his advantage. In fine, Mr. Wollaston became so thoroughly satisfied of our author's merit, that he revoked the before-mentioned settlement and made a will in his favour.' (Clarke's *Life*, p. xi.)

Wollaston now went to reside in London, and on the 26th of November, 1689, married a daughter of Nicholas Charlton, a citizen of London, who brought another accession of fortune. He now devoted himself entirely to the enjoyment of domestic happiness and the pursuit of learning. 'He may most truly be said,' observes his biographer, 'to have settled in London, for he very seldom went out of it. He took no delight in unnecessary journeys, and for above thirty years before his death had not been absent from his habitation in Charter House Square so much as one whole night.' (p. xiv.) His studies were principally directed to the antient languages, and morals and theology, and embraced mathematics and natural philosophy, and the Arabic language. In 1690 he published a paraphrase of a part of the 'Book of Ecclesiastes,' and in 1703 he composed and printed, but only for private circulation, a small Latin grammar. The 'Religion of Nature Delineated' was published in 1724, but a very short time before his death. A number of other works, which he had written during his four-and-thirty years' studious residence in London, were committed by him to the flames a short time before his death. The following is a list of manuscripts which were found after his death, and which his biographer supposes escaped the same fate only by their being forgotton:—1, A Hebrew Grammar; 2, 'Tyrocinia Arabica et Syriaca;' 3, 'Specimen Vocabularii Biblio-Hebraici, literis nostratibus quantum fert Linguarum Dissonantia descripti;' 4, 'Formulæ quædam Gemarinæ;' 5, 'De Generibus Pedum, Metrorum, Carminum, &c. apud Judæos, Græcos, et Latinos;' 6, 'De Vocum Tonis Monitio ad Tyrones;' 7, 'Rudimenta ad Mathesin et Philosophiam spectantia;' 8, 'Miscellanea Philologica;' 9, 'Opiniones of the Antient Philosophers;' 10, ''Ἰουδαϊκα, sive Religionis et Literaturæ Judaicæ Synopsis;' 11, 'A Collection of some Antiquities and Particulars in the History of Mankind, tending to show that Men have not been here upon this Earth from Eternity,' &c.; 12, 'Some Passages relating to the History of Christ, collected out of the Primitive Fathers;' 13, 'A Treatise relating to the Jews, of their Antiquities, Language, &c.' Besides these there was a numerous collection of sermons found. From the titles it may be supposed that many of these manuscript works were composed to assist his own studies. 'What renders it the more probable,' says Dr. Clarke, 'or indeed almost beyond doubt, that he would have destroyed these likewise if he had remembered them, is that several of those which remain undestroyed are only rudiments or rougher sketches of what he afterwards reconsidered and carried a much farther, and which soon after such revisal he nevertheless committed to the flames, as being still, in his opinion, short of that perfection to which he desired and intended to bring them.' (p. xxiii.)

Wollaston died on the 29th of October, 1724, in his sixty-sixth year. The immediate cause of his death was a fracture of the arm, which happened when he was in a state of health. His wife had died four years before. They had lived most happily together for thirty years, and had borne him eleven children, of whom seven survived their father. He was buried by the side of his wife in the church of Great Finborough in Suffolk, where one of his estates lay, and where his eldest son afterwards resided.

The 'Religion of Nature Delineated' is, as the name implies, an exposition of man's various moral duties and the principles of them, independently of revelation, and of so much as may be learnt without revelation of the divine government of the world. The chief peculiarity of Wollaston's system of morals is that he refers all duties to truth as the fundamental principle, defining truth to be the expression of things as they are, and extending the definition by the remark that 'a true proposition may be denied, or things may be denied to be what they are by deeds as well as by express words, or another proposition.' As an instance, theft would be interpreted by Wollaston as a denial of the true owner's property in the goods stolen. On this somewhat fanciful foundation the whole range of human duties, with the exception of course of those arising out of revealed religion, is built up by Wollaston with great ingenuity and skill. The work is not complete: the author sets out with proposing to himself three questions to be answered:—1, 'Is there really any such thing as natural religion, properly and truly so called?' 2, 'If there is, what is it?' and, 3, 'How may a man qualify himself, so as to be able to judge for himself, of the other religions professed in the world; to settle his own opinions in disputable matters; and then to enjoy tranquillity of mind, neither disturbing others, nor being disturbed at what passes among them?' Only the first two of these three questions are answered. Wollaston had begun to answer the third question, but had made little progress, when death overtook him.

The work was very popular on its first publication; ten thousand copies of it, according to Dr. Clarke, having been sold in a very few years. The best edition is the seventh and last, to which is prefixed the biographical sketch, by Dr. Clarke, whence this account has been principally derived, and which was edited by him at the request, as he states in an advertisement, of Caroline, the wife of George II.

WOLLASTON, WILLIAM HYDE, M.D., a distinguished cultivator of natural science, was born August 6th, 1766. He was the second son of the Rev. Francis Wollaston, of Chiselhurst in Kent, who from his own observations made an extensive catalogue of the northern circumpolar stars, which, with an account of the instruments employed and tables for the reductions, was published under the title of 'Fasciculus Astronomicus' in 1800.

Having gone through the usual preparatory course of education, he was sent to Caius College, Cambridge, where he applied himself diligently to the studies immediately relating to the medical profession, for which he was intended, and where he took the degree of Doctor in Medicine in 1793: in the same year he was elected a Fellow of the Royal Society, to whose 'Transactions,' during his life, he contributed many papers of the highest importance, and in 1806 he was chosen one of its secretaries. He was also appointed one of the vice-presidents of the Geological Society.

Dr. Wollaston entered into practice as a physician, and for a time resided at Bury St. Edmunds: he afterwards removed to London, and it might have been supposed that in this city his talents would procure for him an extensive reputation; but either because his success was not equal to his expectations, or in consequence of the disappointment which he felt in not obtaining the post of physician to St. George's Hospital, Dr. Pemberton having been on this occasion preferred to him, he determined to quit the profession, and devote himself wholly to the pursuit of natural philosophy.

The researches of men of science, however important they may have been to mankind by the improvements to which they have led in arts and manufactures, have seldom been productive of immediate benefit to those who first conducted them: some more fortunate person, by seizing on an original idea already propounded, and bringing it down to the level of a practical application, has thereby acquired both fame and fortune; while the original discoverer has remained unnoticed, and perhaps even his name has been forgotten. This was not the fate of Dr. Wollaston, in whom were combined the genius of the philosopher and the skill of the artist; since from his different discoveries, and particularly from that of a method of manufacturing platinum, he is said to have acquired a considerable fortune. No one however could have better deserved the rewards due to genius and industry; for not only were the qualities of his mind of a high order, but his application to philosophical investigations and experiments was unremitting: even when near his last moments, though suffering under a painful malady, he had the fortitude to dictate an account of his most recent discoveries, in the benevolent hope that a knowledge of them might thus be preserved for the benefit of mankind.

He died of an effusion of blood in the ventricles of the brain, on the 22nd of December, 1828.

In giving a biographical sketch of Dr. Wollaston, it will be proper to allude more particularly to some of the memoirs which he contributed to the 'Transactions' of the Royal Society: we cannot, we believe, more effectually perform this duty than by quoting what has been said of his varied labours by Mr. Brande and Dr. Thomson: the former remarks that the promulgation of the theory of definite proportions 'in this country is chiefly to be attributed to Dr. Wollaston, whose admirable suggestion of a synoptical scale of chemical equivalents was brought before the Royal Society in November, 1813. Many years previous to this he had established the important doctrine of multiple proportions, in a paper 'On Super-acid and Sub-acid Salts,' printed in the 'Philosophical Transactions' for the year 1808: he now showed the important practical applications of which this theory was susceptible, and by connecting the scale of equivalents with Gunter's sliding rule, has put into the hands of the chemist an instrument infinite in its uses, and equally essential to the student, the adept, and the manufacturer.'

'Dr. Wollaston's first contribution to the "Transactions of the Royal Society" was in June, 1797, being an essay 'On Gouty and Urinary Concretions,' in which he made known several new compounds connected with the production of those maladies, in addition to the uric combinations previously discovered by Scheele: these were,—phosphate of lime; ammonia-magnesian phosphate, a mixture of the two forming the *fusible* calculus; oxalate of lime; and more lately he added cystic oxide to the list of his previous discoveries. (*Phil. Trans.*, 1810.) In 1804 and 1805 he made known palladium and rhodium, two new metals contained in the ore of platinum, and associated with osmium and iridium, discovered about the same time by Mr. Tennant. In 1809 he showed that the supposed new metal tantalum was identical with columbium, previously discovered by Mr. Hatchett; and shortly before his death he transmitted to the Royal Society the Bakerian lecture, in which he fully describes his ingenious method of rendering platinum malleable.' (*Manual of Chemistry*, p. 102.)

In his 'History of Chemistry' (vol. ii., p. 248) Dr. Thomson remarks:—'Dr. Wollaston had a particular turn for contriving pieces of apparatus for scientific purposes. His reflective goniometer was a most valuable present to mineralogists, and it is by its means that crystallography has acquired the great degree of perfection which it has recently exhibited. He contrived a very simple apparatus for ascertaining the power of various bodies to refract light. His camera lucida furnished those who were ignorant of drawing with a convenient method of delineating natural objects. His periscopic glasses must have been found useful, for they sold rather extensively; and his sliding rule for chemical equivalents furnished a ready method for calculating the proportions of one substance necessary to decompose a given weight of another. Dr. Wollaston's knowledge was more varied and his taste less exclusive than any other philosopher of his time, except Mr. Cavendish; but optics and chemistry are the two sciences for which we are under the greatest obligations to him.' 'To him we owe the first demonstration of the identity of galvanism and common electricity; and the first explanation of the cause of the different phenomena exhibited by galvanic and common electricity.'

Without entering further into an account of the various papers by Dr. Wollaston which appear in the 'Philosophical Transactions,' we shall conclude with the following general remarks on his scientific character, by a profound judge of its excellence, the late Dr. Henry:—'Dr. Wollaston,' he observes, 'was endowed with bodily senses of extraordinary acuteness and accuracy, and with great general vigour of understanding. Trained in the discipline of the exact sciences, he had acquired a powerful command over his attention, and had habituated himself to the most rigid correctness, both in thought and language. He was sufficiently provided with the resources of mathematics to be enabled to pursue with success profound inquiries in mechanical and optical philosophy, the results of which enabled him to unfold the causes of phenomena not before understood, and to enrich the arts connected with those sciences by the invention of ingenious and valuable instruments. In chemistry he was distinguished by the extreme nicety and delicacy of his observations, by the quickness and precision with which he marked resemblances and discriminated differences, the sagacity with which he devised experiments and anticipated their results, and the skill with which he executed the analysis of the fragments of new substances, often so minute as to be scarcely perceptible by ordinary eyes. He was remarkable too for the caution with which he advanced from facts to general conclusions; a caution which, if it sometimes prevented him from reaching at once to the most sublime truths, yet rendered every step of his ascent a secure station, from which it was easy to rise to higher and more enlarged inductions.'

WOLLASTONITE. *Tubular Spar. Silicate of Lime.* Occurs crystallized and massive. Primary form an oblique rhombic prism. Cleavage parallel to the terminal plane and horizontal diagonal. Fracture uneven. Hardness, scratched by phosphate of lime. Colour white, grey, yellow, red, and brown. Streak white.

Lustre vitreous. Translucent, transparent. Specific gravity 2·805. The amorphous varieties are composed of columnar crystals lying in all directions, or fibrous, the fibres being either parallel or divergent.

Before the blow-pipe on charcoal the edges are melted into a semitransparent colourless glass; but it requires a very great heat to fuse it perfectly; with borax it readily melts in large quantity into a transparent glass.

It is found in very perfect crystals at Vesuvius, at Capo di Bove near Rome, in the Bannat, Ceylon, North America, Sweden, &c.

It has been repeatedly analysed, and from various places with but little difference in the results; No. 1 is the analysis of a specimen from Cziklowa in the Bannat, by Stromeyer, and No. 2 of a specimen from Pargas in Sweden, by Bonsdorff.

	(1)	(2)
Silica . . .	51·44	52·58
Lime . . .	47·11	44·45
Magnesia . .	0·00	0·68
Oxide of iron .	0·40	1·13
	98·95	98·84

WOLLIN is an island at the mouth of the Oder, and forms part of the circle of Usedom and Wollin, in the government of Stettin, in Pomerania. It is surrounded by the Frische Haff, the rivers Swine and Divenow, and the Baltic. It is nearly 100 square miles in extent, and the population is 6000. It is well wooded, and has good pastures. Pritter, a village near the Swine, is celebrated for its fine eels, of which great quantities are exported.

WOLLIN, the chief town of the island, is situated on the river Divenow, is defended on the side next the continent by walls and palisades, has two suburbs, three gates, two churches, and 3470 inhabitants, whose chief means of subsistence are ship-building, agriculture, the fishery, and the timber trade. They also manufacture some coarse stuffs. The town is connected with the continent by three bridges over the three arms of the Divenow. Here, or in the immediate vicinity, stood the town of Julin, which, in the tenth, eleventh, and twelfth centuries was a very populous place, the entrepôt of the Baltic trade, but which was totally destroyed by Waldemar, king of Denmark, in 1170.

(Hassel, *Handbuch*; Müller, *Wörterbuch des Preussischen Staates*; Hübner's *Zeitungs-Lexicon*; Stein's *Lexicon*.)

WOLLSTONECRAFT, MARY. [GODWIN.]

WOLSEY, THOMAS, the celebrated cardinal of that name, was born at Ipswich, in the county of Suffolk, in 1471. The tale that he was the son of a butcher is probable, though it does not rest upon any sure foundation. It appears that Robert and Joan Wolsey, his parents, were poor but reputable persons, and possessed of sufficient means to provide a good education for their son. After having received some preparatory instruction, he was sent to Magdalen College in Oxford; where he graduated at the age of fifteen, gaining by his early advancement th[illegible] nickname of 'the boy bachelor.' (Cavendish's *Life of* [illegible]) He was made fellow of his college, appointed tea[illegible] school in connection with it, and was ordained. [illegible] school were three sons of the marquis of Do[illegible] whom Wolsey became acquainted, and throu[illegible] patronage Wolsey enjoyed his first ecclesiastic[illegible]ment, the living of Lymington in Somersetshire. [illegible] now twenty-nine years of age, and possessed [illegible] address, which, combined with great natural a[illegible] a keen and rapid judgment of character, great[illegible] his promotion. We cannot follow him through [illegible] of his progress, even at the beginning of his caree[illegible] he was not always discreet, it is apparent that h[illegible] friendships and obtained confidence in each pl[illegible] he resided. It is said that while he lived at [illegible] he got drunk at a neighbouring fair; for some [illegible] it is certain that Sir Amias Poulet put him into t[illegible] a punishment for which we find that he subse[illegible] venged himself. Still he had wherewithal to coun[illegible] his errors. Through his intimacy with a Som[illegible] gentleman of some importance, he shortly afte[illegible] tained two appointments. This person was Sir [illegible] John [illegible]fant, treasurer of Calais, who not only named [illegible] him [illegible] deputy in that office, to which he was personally incapacitated from attending by age and sickness, but by his influence at court procured for Wolsey a nomination as king's chaplain, and introduced him to Henry VII., in whose favour he soon gained a prominent place. Wolsey's insinuating manners and ready ability were not lost upon the king. These were days in which the clergy were barred from no office, ecclesiastical or otherwise. An ambassador was sought to go to Flanders with a message concerning the marriage of the king; despatch was necessary, and the king intrusted the business to Wolsey, who travelled with such rapidity as to return to London before his master knew of his departure, and acted in such a manner upon imperfect instructions as to give the king great satisfaction: the credit that he gained by this service contributed to procure him the valuable deanery of Lincoln, to which he was appointed in February, 1508. In the following year the king died, and was succeeded by Henry VIII., whose age and character, widely different from his father's, raised a general expectation of an entire change of counsellors and favourites.

Up to this time Wolsey had had no opportunity of playing a great part. He had risen indeed, and risen very rapidly; but he was an obscure person, of low birth, and sufficient time had not elapsed for him to gain any very great elevation. But in the changes to be made at the accession of the new king, it soon became evident that Wolsey's power would be materially increased. Many circumstances favoured his promotion: he was in the prime of life; he was accustomed to the court, for which his manners and address peculiarly fitted him; and he likewise held an important place in the church. The position of public affairs moreover contributed to secure him a place near the person of the king. There were animosities between the earl of Surrey, the lord-treasurer, and Fox, bishop of Winchester, who held the important offices of privy seal and secretary of state. Fox, desirous of strengthening his influence, sought to place near the king one of his own friends and adherents. For this purpose he made Wolsey the king's almoner, trusting that his active spirit, his acuteness, and insinuating address would make the favourite of the father the still greater favourite of the son. The adroit courtier did not disappoint his patron: he rose so quickly in the king's good graces, that he soon did nearly what he pleased. He had no religious scruples to deter him from encouraging

king's humours and pleasures; on the contrary, he pro-
ed his careless gaiety, knowing well that the more time
king employed in its pursuit, the more necessary he would
d it to have some active favourite to supply him with the
ormation which he needed, and to proceed with the busi-
ss which he omitted to transact. Thus, though the king
ver wholly neglected his affairs, the conduct of them
iefly devolved upon the favourite. The success of his
neral management was soon proved by the gifts that were
owed upon him. Before the year of the king's ac-
on had passed he had been made lord-almoner, and
been presented with some valuable lands and houses
parish of St. Bride's, Fleet Street, which Empson
rfeited to the crown. In 1510 he became rector of
ton; in 1511, canon of Windsor and registrar of
er of the Garter; in 1512, prebendary of York; in
ean of York, and bishop of Tournay in France; in
ishop of Lincoln, and in the same year archbishop
In 1515 he was made a cardinal, and succeeded
as chancellor. In 1516 the pope made him
latere, a commission which gave him great wealth,
ost unlimited power over the English clergy: he
farmed, for the foreign bishops who held them, the
of the dioceses of Bath, Worcester, and Hereford,
them fixed stipends far below the annual pro-
ich were collected; he had also in commendam
ey of St. Albans; while the enormous revenues
derived from these sources were further increased
nds received from the kings of France and Spain
doge of Venice. Thus Wolsey had the whole
the state, both civil and ecclesiastical, and derived
eign and domestic sources an amount of income to
no subject has ever approached: his wealth and
e were almost an encroachment on the dignity of
wn. His ambition however was not satisfied; his
for the papacy was avowed; nor did his expecta-
gaining it appear extravagant; for at the death
imilian (1519) both the kings of France and Spain
to the empire; and each, eager to secure the
ice of so powerful a minister as Wolsey, promised to
him in his designs. At the death of Leo X., in 1522,
gain in the following year, at the death of Adrian VI.,
ey sought the vacant throne, but in neither instance
he chosen. 'His foreign policy seems to have been
sed by his disappointment, which he attributed to
rles V., whom he ever afterwards held in aversion.'
have other instances of the continuance of his resent-
nt and his inability to forgive. He had taken offence at
duke of Buckingham's conduct towards him: that
bleman's indiscretions afterwards subjected him to an at-
nder for treason; Wolsey prosecuted the case with great
erity; and though there were no public reasons for such
shness, instigated his execution. An outcry was raised
inst him for his want of leniency towards this popular
urite: it soon subsided however, for his power made
feared, and his magnificence admired.

obody could vie with Wolsey in display: his retinue on
Field of the Cloth of Gold was more numerous and
ndid than that of any subject; and during each foreign
ion on which he was employed, he was attended with
aordinary pomp. At York Place (now Whitehall) his
lence was furnished with every luxury; and he built
imself at Hampton Court a noble palace, of which he
tually made a present to the king. His dress was
eous, his manner of living sumptuous, and his house-
consisted of more than five hundred persons; there
among them many people of rank, the earl of Derby,
Henry Percy, and others. He had 'a steward' (says
biographer Cavendish, who was his gentleman-usher)
ich was always a dean or a priest; a treasurer a
ht; and a comptroller an esquire; which have always
in his house their white staves.' 'In his privy kitchen
ad a master-cook, who went daily in damask, satin, or
et, with a chain of gold about his neck.' The pro-
s of his rapacity were thus lavished away. In justice
ever it must be added that he promoted learning with
istent liberality: the university of Oxford is indebted
im for its Cardinal's, now Christ Church College; and
several professorships, which, with the college he
ded in his native town of Ipswich, had only a short
tence: he likewise encouraged learned persons by
onage and gifts. He was himself no mean scholar,
he is said to have assisted the king, by his intimate
knowledge of the works of his favourite author, Thomas Aquinas, and other theological writers, when he composed his treatise against Luther. He drew up, in 1528, the Latin rules for his school of Ipswich, which are extant: they are printed in the 'Essay on a System of Classical Instruction' (London, John Taylor, 1825), and contain the course of Latin instruction which Wolsey prescribed for the eight classes into which he divided the school.

The see of Durham, to which he had been recently appointed, Wolsey resigned for that of Winchester. It does not appear that he encouraged any change of doctrine among his clergy: his adherence to the Roman Catholic Church was never shaken. The Reformation indeed made little progress, though many of its seeds were sown in his time. His abuse of ecclesiastical revenues and duties gave convincing evidence of the necessity of change: such rapid translation from dignity to dignity, so large a number of offices held continually in the same hands, while their duties were for the most part neglected, were evils that could not long be tolerated. The exercise of his legatine powers with regard to the examination and suppression of the monasteries, his conduct likewise in the matter of Queen Catherine's divorce, gave strength to the dawning Reformation.

To circumstances connected with the divorce Wolsey's fall is mainly attributable: he advised the king to put away Catherine, but not to marry Anne Boleyn, and thus he offended both the actual queen and the queen elect. An oppressive and illegal taxation had made him unpopular with the multitude; while at court there were powerful enemies labouring continually to poison the king's mind against the favourite, whom he had treated with such unlimited confidence, and trusted with such unparalleled authority. The dukes of Norfolk and Suffolk, and Lord Rochford, Anne Boleyn's father, united in their efforts to overthrow him. 'They insinuated,' says Dr. Lingard, 'that he had never been in earnest in the prosecution of the divorce, and had uniformly sacrificed the interests of his sovereign to those of the king of France.' At length Anne Boleyn induced the king to promise that he would speak to him no more. At the commencement of the Michaelmas term, 1529, two informations were filed against him in the Court of King's Bench, charging him with having, as legate, transgressed the statute of præmunire. Wolsey admitted the charge, 'of which he was technically guilty, inasmuch as he had received bulls from the pope without a formal licence.' (Sir J. Mackintosh, 'Hist. Eng.,' vol. ii., p. 166.) 'The court pronounced their sentence, that he was out of the protection of the law, that his lands, goods, and chattels were forfeited, and that his person was at the mercy of the king.' He was ordered to retire to Esher, a country-house belonging to the see of Winchester; and was so closely shorn of all magnificence, as nearly to be wanting in the ordinary comforts of life. Many of his friends deserted him: Johnson's celebrated words ('Vanity of Human Wishes')—

> 'The train of state
> Mark the keen glance and watch the sign to hate.
> Where'er he turns, he meets a stranger's eye;
> His suppliants scorn him, and his followers fly'—

are true, save in their reference to his followers, who showed most flattering attachment to their master in his distress. He sank into a state of the most abject dejection (Lingard, vol. vi., p. 209), until even his enemies could not help pitying him. His capricious master temporarily reinstated him in the following year (1530). 'He was restored to the see of Winchester and the abbey of St. Albans, with a grant of 6000*l.*, and of all other rents not parcel of the archbishopric of York. Even that great diocese was afterwards restored. He arrived at Cawood Castle about the end of September, 1530, where he employed himself in magnificent preparations for his installation on the archiepiscopal throne.' His popularity in the north was increased by his hospitality and an affability which circumstances had taught him. His enemies at court however were bent upon his ruin; and the king's determination to cast off the pope favoured their design, for under these circumstances it was evidently little desirable that a cardinal should fill the principal offices in the state. The earl of Northumberland received orders to arrest him for treason, and to bring him to London to stand his trial. With what particular act he was charged we are not informed. He proceeded towards London on his mule, but by the way he was attacked with a dysentery.

As he entered the gate of the monastery at Leicester, he said, 'Father Abbot, I am come to lay my bones among you;' and so the event proved: the monks carried him to his bed, upon which, three days afterwards, he expired (November, 1530). Shakspere has little altered the words he used on his deathbed, though they were spoken to Kyngston, the lieutenant of the Tower, and not, as in the play, to Cromwell:—

> 'Had I but served my God with half the zeal
> I served my king, he would not in mine age
> Have left me naked to mine enemies.'
> *Henry VIII.*, Act iii., sc. 2.

'The king,' says Hume, 'much regretted his death, and always spoke favourably of his memory: a proof that humour more than reason or any discovery of treachery had occasioned the last persecutions against him.'

Wolsey attained his elevation by a winning address, combined with shrewdness, talent, and learning; his ambition and rapacity were unlimited; he was revengeful, arrogant, and overbearing, and extremely fond of splendour and parade. There can be no doubt that he used his influence abroad as well as at home for his own aggrandisement; but upon the whole he was a valuable minister, enlightened beyond the age in which he lived, diligent in business, and a good servant to the king: for when his authority was established he restrained many of the king's caprices, and kept his passions within bounds: the latter part of Henry's reign was far more criminal than that during which the Cardinal presided over his counsels. 'His part in the death of the duke of Buckingham,' says Sir J. Mackintosh, 'was his most conspicuous crime: the circumstance most favourable to him is the attachment of dependants.'

At this period the standard of morality was but low, and there was little in Wolsey's character which tended to raise it. Had there been a doubt that Thomas Winter was his natural son, it would have been almost removed by his conferring eleven benefices upon him. He is said to have had two other children, but the fact is not accurately proved.

(Cavendish, *Life of Wolsey*; his *Life*, by Piddes; Grove, *Life and Times of Wolsey*; more modern *Lives*, by Galt, in Lardner's *Cyclopædia*, and in the *Lives of Eminent Persons*, published by the Useful Knowledge Society; Hume's and Lingard's *Histories*.)

WOLSINGHAM. [DURHAM.]

WOLVERHAMPTON, a large manufacturing town and parliamentary borough in Staffordshire, 128 miles northwest from London by the Birmingham and Lancaster railway, and about 13 miles north-west from Birmingham.

Wolverhampton is situated on rising ground, and consists in general of substantial and well-built houses, mostly of brick; the streets are somewhat irregularly laid out, and not very well paved, but are well lighted with gas. There is a neat theatre and a public subscription library, over which is a suite of rooms used for concerts and assemblies. There are four churches; the oldest is that of St. Peter, a spacious structure, capable of accommodating 1600 persons. The pulpit is formed of a single stone elaborately sculptured, and there is a font of great antiquity, with curious bas-relief figures of saints. In the churchyard is a column twenty feet high, with rude sculptures in compartments, supposed to be of Saxon or Danish workmanship. The church is collegiate, and the college consists of the dean, who holds the prebend of Wolverhampton, and seven other prebendaries. By a grant of Edw. IV., confirmed by subsequent grants, the deanery and prebend of Wolverhampton were annexed to the deanery of his free chapel of St. George, within the castle of Windsor. The net revenue, on an average of three years ending 1831, is 641*l.* The dean receives the whole revenue. The living is a perpetual curacy, in the patronage of the dean of Windsor, and of the average net annual value of 193*l.* The other churches are modern, and all perpetual curacies: St. John's, in the patronage of the Earl of Stamford and Warrington, of the net annual value of 203*l.*; St. George's, in the patronage of the dean of Windsor, of the net annual value of 155*l.*; and St. Paul's, of which the value is not given in the Report on Ecclesiastical Revenues. All the chief denominations of dissenters have places of worship. A dispensary was established in 1821, and the present commodious building was erected in 1826. A union-mill was built in 1813, at an expense of 14,000*l.*, for the purpose of grinding grain at a cheap rate for the poor. We authorities which state whether it continues to be that purpose. There is now a union workhouse, 1841, contained 204 persons.

According to the Education Returns of 1833, t four infant schools and eighteen daily schools. daily-schools, one was a free grammar-school, by endowment, with 70 male scholars; the sal head master was 400*l.*; of the second master, 2 of the third master, 120*l.* There is also a Blue-co supported partly by endowment and partly by subs which, in 1833, educated 100 male scholars and scholars. There was at the same date a nation with 450 children of both sexes daily and 240 on Besides these schools there were two boarding-sc three or four Sunday-schools supported by differe of dissenters.

Wolverhampton was made a parliamentary bo the Reform Act, and returns two members to pa The boundary of the parliamentary borough inc townships of Wolverhampton, Bilston, Willenh nesfield, and the parish of Sedgley, and containe a population of 67,508; in 1841, of 92,943. T ber of parliamentary electors on the register i was 2643, all 10*l.* householders.

The population of the town has increased sinc a remarkable manner: 1801, 12,565; 1811, 14,8 18,380; 1831, 24,732; 1841, 36,382. The popu the entire parish of Wolverhampton, in 1831, wa in 1841 it was 70,370.

The district in which Wolverhampton is situated in mines of coal, iron, limestone, and other mine the manufactures consist chiefly of fire-irons, tin japanned iron-ware, locks and keys, guns, files, scr a variety of other articles of hardware. Besides way-communication with London, Birmingham, L Manchester, and other towns on the same line, nected by canal-navigation with most of the gre of England—London, Hull, Birmingham, Derby, ham, Chester, Liverpool, &c.

A monastery was founded at Wolverhampton i Wulfrana, sister of King Edgar. The monastery rendered to Hubert, archbishop of Canterbury, and was afterwards annexed by Edward IV. to th of Windsor. The town was named Wulfrana after the foundress of the monastery, which by co and corruption has become Wolverhampton.

(*Boundary Reports*, 1832; *Education Enqui Ecclesiastical Revenues of England and Wales; tion Returns.*)

WOLVERINE. [GULO.]

WOMAN. [MAN.]

WOMBAT. [MARSUPIALIA, vol. xiv., p. 464.]

WOOD, in the widest sense, is all that part o that exists between the pith and the bark; in a sense, it is applied only to those bundles of tis are called woody. In the latter sense it is most f made use of by botanists, but in the former sense i generally used, and is then synonymous with tim all the materials made use of by man for the sup artificial and acquired wants, there are none mo sively employed or of greater utility than wood. H ships, furniture, machinery, and many of the com luxuries of life could not be formed without it. knowledge of its physical properties is a matte importance. Although a general knowledge of t perties exists, yet it is surprising how few accura vations have been made on the density, tenaci bility, and other properties of wood which render for the purposes of practical application.

Amongst the various kinds of wood yielded b ferent families, there are great differences of depending on the mode and rapidity of its growth of the fibres of which it is composed, and their re the medullary rays which pass through them, an the character of the secretions deposited in it. great classes of plants, Exogens and Endogens, y different kinds of wood from the manner in wh fibres are deposited. Endogens have no bark generally hollow in the middle, and their wood permit of being worked into many shapes, but lindrical form affords great facility for constr great variety of utensils, and for application to t

nan in tropical climates. It is in the tro-
e find an Endogenous vegetation most abun-
here where the uses of its wood are greatest.
emperate climates, where the powers of man
most developed, and his wants are greater, he
ogenous vegetation to supply his need. The
cogens are solid, and the older the tree becomes
olid is the wood. Hence a distinction is made
e centre of the wood of the trunk and its cir-
, the one being called heart-wood, the other
The heart-wood is the seat of the deposition of
r secretion of the tree, and is frequently sepa-
the sap-wood by a distinct line. It is the secre-
heart-wood that renders it darker, harder, and
ole than the sap-wood, and for practical pur-
f importance to distinguish between one and
There is much difference between the relative
ultimate woody fibres of which wood is com-
the durability and tenacity of a wood frequently
the fineness of its fibres.

e secretions deposited in the wood, probably
to the fibres themselves, that wood is indebted
ng degrees of density. The quantity of cellular
e medullary rays, and also the more or less com-
r in which the woody fibres are arranged, will
considerable effect. Thus although it has been
that woody fibre itself has a specific gravity of
water being 1, yet there are many woods whose
vity is lighter than water on account of the
hich their fibres are arranged. The specific
oak, fir, beech, water being 1, as ascertained
chinson, are as follows:—

Fir-wood . . .	0·4262
Oak-wood . . .	0·5697
Beech-wood . .	0·7442

ucting power of wood in relation to heat is a
nportance in the construction of buildings and
ses. In some experiments performed by Dela-
Candolle on prisms of different kinds of wood,
their power of conducting heat, they found
ction of the fibres materially interfered with their
power. Thus it appeared that the obstruction
age of caloric was greater when the current
ht angles to the woody fibre than when it
gitudinally in the direction of the fibres. This
lso appeared to increase in proportion as
as a bad conductor of heat. The conducting
the two directions may be represented very
e following numbers:—

	Longitudinally.	* Across the fibres.
Nut-wood . .	5 . .	3·46
Oak	5 . .	2·83
Fir	5 . .	2·05

on found in his researches on the conducting
eat of building materials, that taking the con-
wer of fir-wood as 100, beech-wood was 83·19,
od 134·10. But if the woods were com-
late as 100, their conducting power would be
—

Fir-wood . . .	27·72
Oak-wood . . .	37·17
Beech wood . .	23·06

ng power of these woods is another important
his is not at all in relation to their conducting
fir-wood being 100, the cooling power of oak-
y 30·38, whilst that of beech-wood is 120·2.
vith slate as 100, the cooling power of the woods
ws:—

Oak-wood . . .	55·60
Fir-wood . . .	69·16
Beech-wood . . .	83·19

mportant point of inquiry with regard to the
operties of wood, as to its value in building,
elation to moisture. If the specific gravity of
is 1·50, we should expect that the less the
vity of the wood the greater would be its ca-
noisture; and Hutchinson found, on immersing
of each of the following woods for nineteen
ter, that such was the result, for they had gained
—

	Grains.
Fir-wood . . .	622·75
Oak-wood . . .	224·75
Beech-wood . .	185·5
Moulmain-teak . .	82·50

The secretions of plants that are most important to man are not often deposited with woody tissue, and therefore the wood of trees is not often employed as food or medicine. Animals however are found capable of digesting the lignine of which woody tissue is composed, and thus wood forms a part of the diet of some, and even for man himself lignine may be treated chemically in such a way as to render it a nutritious article of diet. It is the peculiar resinous, gummy, oily, or other secretions, that give to the various woods their different colour, smell, and taste. The colouring matter is sometimes deposited in such abundance as to render it useful for dyeing, as seen in logwood, red sanders-wood, and other woods used as dyes. Some woods have volatile oils deposited in them, which, being constantly slowly given out, renders them odoriferous; and this is the case with sandal-wood, rose-wood, the wood of cedar, fir, and other trees. Frequently bitter and other secretions are deposited in wood, giving it a peculiar taste, and rendering it useful in medicine. The wood of the quassia, as well as of the sassafras, are examples of this kind of use. The wood of trees frequently contains in small quantities the secretions which are deposited in other parts of the plant.

If wood be submitted to destructive distillation, it is decomposed, and the consequence is the production of acetic acid and an oil, which pass off, and the leaving a certain quantity of charcoal. The following is a table of the products of the distillation of one pound of different woods dried at 86° Fahrenheit:—

	Weight of wood acid.	One ounce saturates of carbonate of potash.	Weight of oil.	Weight of charcoal
	ounces.	grains.	ounces.	ounces.
White birch . .	7	44	1½	3¾
Red beech . .	7	44	1½	3½
Large-leaved linden	6¾	41	2	3¾
Red or scarlet oak .	7	40	1½	4¼
White beech . .	6½	40	1¾	3¾
Common ash . .	7½	34	1½	3½
Horse-chestnut .	7½	31	1⅝	3½
Italian poplar .	7¼	30	1½	3¾
Silver poplar . .	7¼	30	1¼	3¾
White willow .	7¼	28	1½	3½
Sassafras laurel .	6¾	29	1¾	4¼
Wild service-tree .	7	28	1¾	3½
Basket-willow .	8	27	1½	3½
Dogberry-tree .	7	27	2	3½
Buckthorn . .	7½	26	1½	3½
Logwood . .	7¾	26	1½	4
Alder . . .	7¼	22	1½	3½
Juniper . . .	7¼	23	1¾	3½
White fir (deal) .	6½	23	2¼	3⅛
Common pine .	6⅞	22	1¾	3⅛
Savine . . .	7	20	1¾	3¾
Red deal . .	6½	18	2½	3¾
Guiac-wood . .	6	16	2½	4¼

The woods that are used by the cabinet-maker for furniture of a more delicate kind are called fancy-woods. The use of these has become much more general since the introduction of the art of veneering; and now that this is done by machinery, instead of hand, a number of woods are used for furniture and other purposes, which, on account of their scarcity, could have been formerly used only to a very limited extent. [VENEERING; SAW-MILL.] The most common of the fancy woods and that which is used most by the cabinet-maker is *mahogany*. This wood is the produce of the *Swietenia mahogani*. [SWIETENIA.] Next in point of importance and use to mahogany is the *Rose-wood*. This wood obtains its name from its fragrance, and is the produce of a mimosa from the forests of Brazil. In veneering it affords about eight plates to the inch. *King-wood* is a beautiful wood much in use; it is brought from Brazil in logs four feet long and about five inches wide. It is used only for delicate articles, and is said to be the produce of a species of Baphia, a genus of leguminous plants. *Beef-wood* is a very heavy wood, of a pale red colour, and is brought from New Holland in logs nine feet long and thirteen or fourteen inches wide. The tree from which this is obtained is unknown to botanists, as well as most of those producing the fancy-woods of commerce. *Tulip-wood* is brought into the market in very small pieces, not more than four feet long and five inches in diameter, so that probably it is the production of a shrub. It is clouded with red and yellow colours, and is used for bordering and making small articles, such as caddies and work-boxes. *Zebra-wood* is the production of probably a large tree, as it is cheap enough to be made into tables, pianofortes, &c. It is coloured brown on a white ground, and clouded with black. *Satin-wood* is of a brilliant yellow colour, with delicate glowing shades. It is the produce of a plant called *Chloroxylon Swietenia*, and is a native of India. It is one of the trees that yield the wood-oil of India, and it belongs to the natural order Cedrelaceæ, the same order in which the mahogany is placed. It is found in the market in logs two feet wide and seven or eight feet long. *Sandal-wood* is the produce of a species of *Sandoricum* belonging to the family Meliaceæ. The wood is of a light brown colour, with golden-coloured waves. *Ebony* and *Iron-wood* are the names given to some very hard woods, the produce of the natural order Ebenaceæ. These woods are mostly brought from India, although some of the species are found in Europe and America. There are several other woods occasionally used amongst cabinet-makers, and of which little is known either with regard to the places they come from or the trees to which they belong. *Canary-wood* has a deep yellow colour; *Purple-wood* has a purple colour, without veins; *Snake-wood* is of a deep red colour, with black shades; *Calamander-wood* is a handsome, cheap wood, taking a high polish, and is brought from Ceylon. Other woods are called from the places they come from, as Coromandel wood, Amboyna wood, &c.

The practice of staining wood is sometimes had recourse to for the purpose of making the more common woods resemble in colour the fancy-woods. A method has lately been proposed of doing this by introducing into the tree during its growth various colouring agents, so that during the course of the ascent of the sap the colouring matter is taken up and deposited in the woody tissue. Some of the woods thus treated have been made to assume very remarkable colours, but as the trees on which it can be practised are too soft and coarse for fine work, it is not likely that this method will at all supersede the use of the naturally beautiful fancy-woods.

For further information concerning wood consult the articles Exogens; Endogens; Lignin; Lignite; Vegetable Kingdom: Tissues, Vegetable: for information respecting the wood of particular trees, see the name of the genus, as elm, Ulmus; oak, Quercus, &c.: for laws relating to wood, see Timber and Timber-Trade.

(Meyen, *Pflanzen Physiologie;* Hutchinson, *On the Conducting Power, with regard to Heat, of Building Materials;* Ure's *Dictionary of Arts and Manufactures;* Don's Miller; Lindley's *Natural System; Encyclopædia Americana.*)

WOOD, or A' WOOD, ANTHONY, was born in the city of Oxford, Dec. 17, 1632. His father was a gentleman of independent property. Anthony was sent to a private Latin school in 1640, and in 1641 was removed to New College, Oxford, but in 1644, in consequence of the civil disturbances, was sent to a school at Thame. In 1646 his mother placed him under his brother Edward, in Trinity College, Oxford, and he went to him once or twice a day to receive instruction. On the 26th of May, 1647, he was matriculated in the University of Oxford as the son of a gentleman, and entered Merton College, Oct. 18, 1647. About 1650 or 1651 he began to learn to play on the violin, at first without instruction, but afterwards under a teacher. He seems to have attained to great skill on the instrument, and was for many years a member of a musical club in Oxford, in which concerted pieces were performed, both vocal and instrumental, by men of some eminence as musicians. Painting was also another of his favourite pursuits, but there seems to be no evidence of his skill in that art. He graduated A.B. in 1652. Heraldry, which also became one of his studies, was perhaps better suited to his antiquarian tastes; his sedulous study in the public library of the University attracted the attention of Dr. Thomas Barlow, the head keeper of the library, who treated Anthony with much kindness, gave him every assistance in his power, and even allowed him to take books and manus to his home.

In December, 1655, Wood took the degree of Dugdale's 'Antiquities of Warwickshire' came out in and was read by Wood with great delight and admir His fondness for the study of antiquities was confi and he now began to transcribe the monumental in tions and arms in the parish churches and college c of the city and university of Oxford. After the Re tion he obtained leave from Dr. Wallis, in 1660, to c the University registers, monuments, and other docu in the Schools Tower. This was a valuable fund fo and here he may be said to have laid the foundation 'History and Antiquities of Oxford.' In 1667 Wood to London with a letter of introduction from Dr. Bar Sir William Dugdale, by whose influence he obtained to peruse the manuscripts in the Cotton Library a records in the Tower.

Wood having completed his 'History and Antiqui Oxford,' the University offered him 100*l*. for the cop which he accepted in October, 1669, and the payme made in March, 1670. This purchase was made w intention of having the work translated into Latin use of foreigners, which was done under the inspe Dr. Fell, and the work was published at Oxford in 2 vols. folio, with the title of 'Historia et Anti Universitatis Oxoniensis.' Wood complained hi this translation; and Dr. Thomas Warton, who supposed to be a less prejudiced judge, remarks, omit the opportunity of lamenting that Dr. Fell posed a translation of Wood's English work, whi have been infinitely more pleasing in the plain dress of its artless but accurate author. The tran in general is allowed to be full of mistakes: it is al and unpleasing, perpetually disgusting the reader wi affected phraseology.'

In 1691 Wood published his 'Athenæ Oxonien exact History of all the Writers and Bishops who have their education in the University of Oxford from 15 1695, to which are added the Fasti or Annals of the University,' London, folio, 2 vols. in one. The wor written in very slovenly English, but it contains a valu fund of materials, selected with care, though not alw with judgment and without prejudice.

He was prosecuted in the vice-chancellor's cour the University for some remarks in the 'Athenæ Oxon ses,' on the character of the late earl of Clarendon, received a sentence of expulsion. He was also atta by Bishop Burnet, and replied in a 'Vindication,' &c., 1693.

Wood died Nov. 29, 1695, aged 65. He was a large strong man. He retained his faculties to the last, just before he died gave directions for the burning great mass of manuscripts, and left his books and suc his manuscripts as he considered of value to the Uni sity of Oxford: they were deposited in the Ashmo Museum.

In 1721 a second edition, 'corrected, and enlarged the addition of above 500 new lives from the author's ginal manuscripts,' was published in London, 2 vols. Philip Bliss published at Oxford 'Wood's Athenæ nienses continued to 1800,' 4to. 2 vols., 1813: to the volume, published in 1817, was added 'Fasti Oxonie or Annals of the said University, with Notes and tions,' 4to.

The Rev. John Gutch, M.A., registrar of the Univ of Oxford, published in 1786-94, at Oxford, 'The Hi and Antiquities of the University of Oxford, now first lished in English from the original Manuscripts i Bodleian Library, by Anthony Wood; with a Continu to the present time, by the Editor,' 3 vols. 4to.

(*Biographia Britannica;* Watt's *Bibliotheca B nica.*)

WOOD, JOHN, commonly spoken of as 'Wo Bath,' was an architect of considerable repute and in the time of George II., in ability and taste little if inferior to any of his contemporaries, although he h tained less notice from architectural and biogra writers than some of them have done. In fact very can now be collected relative to him beyond what he self has incidentally told us in his 'Description of That city is indebted to him for its architectural fam he may be considered as having there introduced a architecture till then quite unknown in this by combining a number of private houses into al design; and although such mode of producing s facades was afterwards adopted by the Adams, wed by Nash, and has since become very general, ll continues to be nearly the first in point of he is of date.

about the end of 1726 that he began his Bath ments,' which he carried on uninterruptedly for nty years, within which time he entirely changed itectural character of the place, and conferred ven a degree of magnificence, at least as displayed arts as the Parades, the Circus, the Royal Cres- en Square, and some of the public edifices, and e of these would have been superior to what they hey been executed entirely according to the ori- gns. If not altogether proof against criticism, at any rate free from the sneering reproach gainst many later works of the kind, as being th and plaster;' and if Smollett has spoken of y depreciatingly in his novel of 'Humphrey others have been even prodigal of praise. Among is the author of the 'Principles of Design in ure' (Mitford), who says, 'With all its faults in ust reckon the Crescent at Bath among the finest uildings at this day (1809) existing in the world;' urther laments the large decay of architectonic ath since Wood's time.

e did therefore at Bath alone would justly entitle an eminent place in the history of English archi- nd not least of all for the very reason which has occasioned him to be passed over with mere notice, inasmuch as he distinguished himself the founder of a system of improvement than as r of any individual structures of importance. roduced some works of the latter class that would erved his name from oblivion, and among them oble mansion of Prior Park, erected for 'the Allen,' that of Buckland, for Sir John Throck- nd the Exchange at Bristol, first opened in Sep- 743. This last is, if not a very large, a very structure (110 by 148 feet), and the principal front a far more tasteful specimen of the Palla- than almost anything by Palladio himself. who at that time was a justice of the peace for hire, died May 23rd, 1754, but at what age is not was probably born about the close of the pre- ntury. He was also known as a philosophical on his art by his 'Origin of Building, or the n of the Antients,' folio, 1741, which is however ined and fanciful in its opinions, its argument how that the system of architectonic beauty and is derived from the Jewish nation. To this n may be added his 'Essay towards a Descrip- th,' second edition, 2 vols. 8vo., plates, London, l 'Description of the Exchange of Bristol,' with ., Bath, 1745.

, ROBERT, sometimes distinguished as 'Pal- od, an accomplished scholar and archæologist, ve of Ireland, having been born at Riverstown in of Meath, in 1716. Having finished his studies , where he applied himself with extraordinary to classical and more especially Grecian litera- isited Italy more than once, and in 1742 made a far as the island of Chios; but it was not until , in conjunction with his friends Bouverie and and with the Italian architect Borra for their , he set out on his celebrated antiquarian expedi- gh Asia Minor and Syria. Before reaching Pal- verie died of fatigue, but Wood and his remain- anions pursued their researches and labours with Almost immediately on his return he published s of Palmyra,' 1753, with 57 plates; and in 1757 s of Balbeck,' 47 plates,—two works constituting in the study of classical architecture, and which, rds surpassed by Stuart's 'Athens,' had the merit ing it by several years.

, while engaged in preparing for the press his the Genius of Homer,' he was made under-secre- ate by the Earl of Chatham, in consequence of suspended his literary studies, and that work published till after his death (which happened , September 9, 1771), when it appeared under the title of 'An Essay on the Original Genius and Writings of Homer; with a Comparative View of the Antient and Present State of the Troad,' 4to., London, 1775. This learned dissertation, which has been translated into French, German, Italian, and Spanish, treats of the country of Homer, his travels, his system of mythology, and of the geography and ethnography of the 'Iliad' and 'Odyssey.' It is however by his two other works that he is now more generally known, and they are a most important addition to the history and archæology of architecture, affording as they do complete and satisfactory evidence of Roman magnificence in distant regions, and in places whose very existence had come to be nearly regarded as fabulous. For some account of the edifices there discovered, see BAALBEC and PALMYRA.

C., No. 1745.

WOODALL, JOHN, an English surgeon, was born about the year 1556. He was a surgeon in the army during the reign of Queen Elizabeth, and went to France with the troops under Lord Willoughby. On his return he settled in London, and was very active in his attentions to those sick of the plague which prevailed in London in the early part of the reign of James the First. There is no record of his having been a surgeon in the navy, but in 1612 he published a work describing the diseases of sailors, under the title of the 'Surgeon's Mate.' In this work there is an excellent account of the fearful disease, as it prevailed at that time, known by the name of scurvy. In the same year that he published this book he was appointed surgeon to St. Bartholomew's Hospital. In 1628 he published a treatise entitled 'Viaticum,' and afterwards a treatise 'On the Plague,' and a work upon 'Gangrene and Sphacelus." All these works were collected together and published in London, in 1639. These works display sound observation and correct reasoning, and obtained for him an extensive reputation. He had a large practice in London, and was made a master of the Surgeons' Company. There is no account of the time at which he died. In the preface to the works published in 1639, he speaks of himself then as in infirm health. (Hutchinson's *Medical Biography*.)

WOODBINE. [CONVOLVULACEÆ.]

WOODBRIDGE. [SUFFOLK.]

WOOD-CHAT, a provincial name for the Wood-Shrike, *Lanius rufus*. [SHRIKES.]

WOOD-CUTTING MACHINERY. This term, though applicable also to contrivances for cutting wood by means of toothed instruments which tear away or remove a portion of its substance, and which are treated of under SAW, vol. xx., p. 476, and SAW-MILL, p. 478 of the same volume, is used in a more limited sense to distinguish contrivances for dividing wood by knife-like or sharp-edged instruments, which most commonly act by the simple division or separation of the fibres, as explained under SAW, and which, whether they act by merely splitting the wood, or by intersecting its fibres, divide it into several pieces without any waste of material such as is necessarily occasioned by the use of a saw.

The valuable nature of some of the woods used for veneering, and the extreme thinness of the sheets into which it is divided, often not exceeding the thickness of the saws employed for cutting them, renders it important to save the wood which is reduced to sawdust and wasted by the ordinary method of cutting. This has been accomplished in some cases by the use of a planing-machine, acting upon the same principle as a carpenter's plane, but powerful enough to remove, by a single operation, a shaving thick enough to be used for veneering, and equal in width and length to the log from which it is cut. The same principle of cutting has been most ingeniously applied in a veneer-cutting machine used in Russia, of which descriptions have appeared in many English works on machinery. In this machine the length of the blade is rather greater than the length of the log which is to be converted into veneer, and the log is mounted upon an axis parallel with its edge, and turned to a circular form. The blade is then pressed against the log in such a way that, as the latter revolves slowly upon its axis, a thin spiral sheet or shaving is cut from its surface; and as the blade is depressed in proportion to the constantly diminishing diameter of the log, this operation is continued until the greater part of the timber is converted into one continuous sheet of veneer, which, as fast as it is pared off, is rolled upon a cylinder like a roll of cloth. By this curious contrivance veneers of any size may be produced, and the wood may be converted without waste into sheets so exceedingly thin that some have been used for covering or binding books. The appearance of the grain is of course somewhat different to that of veneers cut in the usual way, and it is said that the veneers cut by knife-edge machinery are not so easy to polish as those cut with a saw, their surfaces being furrowed by the mode in which the fibres are, as it were, torn away from each other, instead of being intersected by the saw. So rapid is the action of the Russian spiral veneer-cutting machine, that it will produce 100 feet in length of veneering in three minutes.

The application of knife-edge machinery to the cutting of wood has recently excited much attention, owing to the establishment, by Captain Taylor, of a factory for barrels and similar articles by such means near Waterloo Bridge, London. Having reduced the wood which is to be converted into staves to blocks of suitable length, his process is to steam them in ovens or boxes similar to those used by shipwrights for steaming timbers to be bent, and then to cut them into the required form by cutters worked by machinery, while they are in a softened state. By various machines the several parts of a cask or other vessel are shaped with greater regularity than could be accomplished by hand, and with astonishing rapidity; and they are finally fitted together by similar means. The same kind of machinery is applicable to the cutting of park-paling and many other articles; and so great is the power of the cutters upon wood which has been properly prepared, that a person who witnessed experiments upon various kinds of wood observed, that the knives went through a log of African oak with as much ease as if it had been a piece of new cheese.

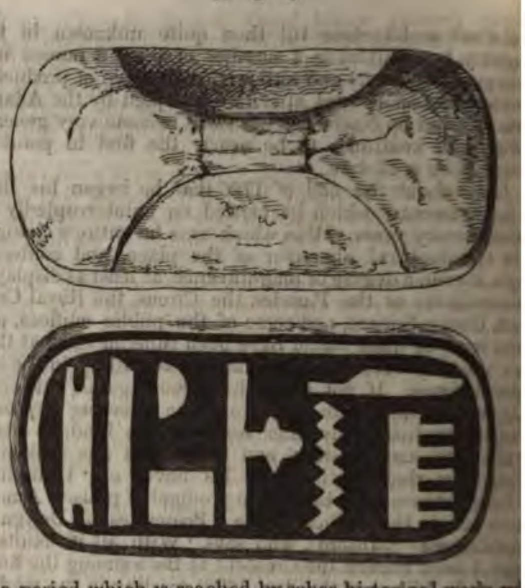
WOODCOCK. [SCOLOPACIDÆ, vol. xxi., p. 85.]

WOODDESSON, DR. RICHARD, was Vinerian professor in the university of Oxford. He published 'Elements of Jurisprudence, treated of in the preliminary part of a Course of Lectures on the Laws of England,' Lond., 1783, 4to.; 'A Systematical View of the Laws of England, as treated in a Course of Lectures read at Oxford during a series of years,' Lond., 1792, 3 vols. 8vo.; 'Brief Vindication of the Rights of the British Legislature; in answer to some Positions advanced in a pamphlet entitled Thoughts on the English Government,' Lond., 1799, 8vo. pamphlet. Wooddesson died Oct. 22, 1822.

The Lectures on the Law of England were edited in 1834, in 3 small volumes, 8vo., by W. R. Williams, D.C.L., who observes in the preface that 'these lectures seem to be as superior to the Commentaries (of Blackstone) in accuracy of rules and justness of division and definition, as they are inferior in elegance of style and charm of narrative;' or, to speak in plain terms, the editor means to say that the Lectures are superior to the Commentaries in all matters which constitute the merit of a law book; and he is quite right. A student who would labour at these lectures, instead of reading Blackstone, would learn something of English law. The editor's notes are useful.

WOOD-ENGRAVING is the art of producing raised surfaces, by excision, on blocks of wood, from which impressions can be transferred by means of a coloured pigment to paper, or other suitable medium, and generally applied to pictorial representations of objects.

The art of cutting both upon metal and wood for other purposes than those which are now understood as printing, ascends to a very remote antiquity. [ENGRAVING.] The Egyptians indeed seem to have made a very close approximation to printing. Some of their wooden stamps are yet remaining, and are perfectly capable of giving impressions in the manner of our present wood-cuts, though their use was doubtless for stamping on clay or other ductile material; bricks so impressed being frequently found, of which some are in the British Museum. We give, in the next column, a specimen of one of these stamps, found in a tomb at Thebes, and brought to England by E. W. Lane, Esq. The original is five inches in length, and two and a quarter broad.



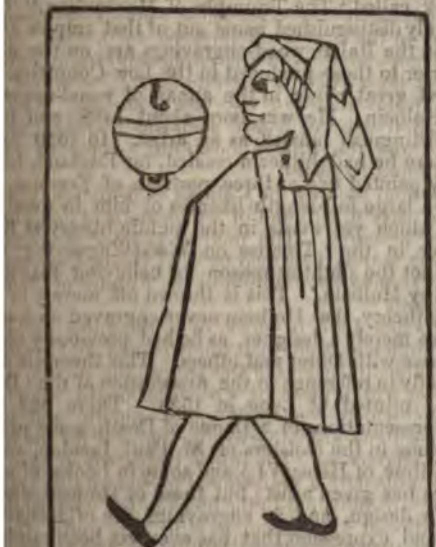
The earliest application of wood-engraving to the production of a book originated, there can be but little doubt, in China, and about the middle of the tenth century, although it has been contested, chiefly on account of the silence of Marco Polo, whose work was written in the last two or three years of the thirteenth century. The omission is certainly remarkable; yet on the other hand the date here given does not ascend to the period of Chinese fable, but to a period which is reached by sober historical works, and the dynasty under which it is thus stated to have been invented (that of Soong) became remarkable for the rapid development of literary genius that took place under it. It is stated that the first essay in printing was made by cutting *in* stone, and transferring the impression to paper, the characters of their language being thus white and the ground black, as in the example given in the cut above. This was speedily relinquished for the use of wooden blocks, in which the characters were cut in relief, and the appearance when transferred was that of our present books. No material alteration has since been made, except that of introducing pictorial representations, which occasionally form a whole volume, the subjects being sometimes connected so far, though each page is from a separate block, they would join and produce a total length of some hundred feet. Such are the illustrations to the Wan Show, 'pieces of music and songs sung in the streets on imperial birth-days,' being a series of representations of the public entertainments and exhibitions, horse-racing, foot-racing, &c., of which there is a copy in the library of the Asiatic Society. The work itself is in 6 vols., of a size somewhat larger than our demy 8vo., and the illustrations form a separate volume of several hundred pages.

The material used by the Chinese is pear-tree, which is tough, but easy to cut, and of which slabs of considerable size can be procured. The method adopted in engraving and printing is thus described by J. F. Davis, Esq., in 'The Chinese, a General Description of the Empire of China and its Inhabitants:'—

'The wooden plate, or block, of a thickness calculated to give it sufficient strength, is finely planed, and squared to the shape and dimensions of the pages; the surface is then rubbed over with a paste or size, occasionally made from boiled rice, which renders it quite smooth, and at the same time softens and otherwise prepares it for the reception of the characters. The future pages, which have been finely transcribed by a professional person on thin transparent paper, are delivered to the blockcutter, who, while the above-mentioned application is still wet, unites them to the block so that they adhere, but in an *inverted* position, the thinness of the paper displaying the writing perfectly through the back. The paper being subsequently rubbed off, a clear impression in ink of the inverted writing remains on the wood. The workman then with his sharp graver cuts away with extraordinary neatness and despatch all that portion of the wooden surface which is not covered by the ink, leaving the characters in pretty high relief. Any slight error may be corrected, as in our woodcuts, by inserting small pieces of wood: but the process is upon the whole so cheap and expeditious, that it is generally easier to re-plane the block, and cut it again, for the mode of taking the impression renders the thickness of the block an immaterial point. Strictly speaking 'the press of China' would be a misnomer, as no press whatever is used in their printing. The paper, which is almost as thin and bibulous, or absorbent of ink, as what we call silver-paper, receives the impression with a gentle contact, and er pressure would break through it. The printer in his right hand two brushes, at the opposite extre- s of the same handle; with one he inks the face of the icters, and the paper being then laid on, he runs the rush over it so as to make it take the impression. do this with such expedition, that one man can take couple of thousand copies in a day.'

Europe the first application of the art of wood-engrav- ook place in Germany, though the place is not exactly tained, but is supposed to have been near Nürnberg, the close of the 14th or beginning of the 15th cen- It was probably first used for the production of play- ards, the outlines of which were formed by impres- from wood-cuts, and the colouring filled up by hand; e dismiss as utterly unfounded the story told by Pa- , in his 'Traité de la Gravure en Bois,' of impressions series of wood-cuts seen by him, of a date between and 1287, executed by Alexander Alberic Cunio and lla, his twin sister; although the story is believed by y ('Inquiry into the early History of Engraving'), and ('Materiali per servire alla Storia de' Progressi dell' one in Rame e in Legno').

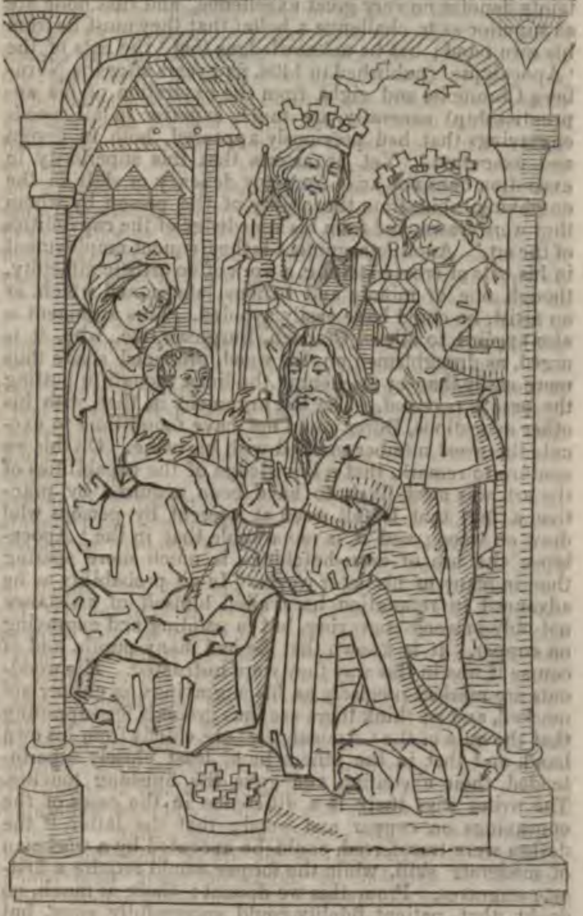
rds were known in France in 1340. John I. of Castile l an edict against the use of them in 1380 (Bullet, *rches Historiques sur les Cartes à jouer.*) In the year, in a book of the bye-laws of Nürnberg, they are ded among the games allowed to the citizens, provided take did not exceed four-pence. (Von Murr, *Neues al zur Litteratur und Kunstgeschichte*, part ii.); n 1418 the burgess-book of Augsburg contains the of a 'Kartenmacher' or card-maker. The trade in from Augsburg, Nürnberg, and Ulm became so , that Venice prohibited their importation, and in they were imported by the cask. It is thence almost m that it must have been by means of some facility ltiplying copies that they could have been manu- red so cheap as to command so extensive a demand reign countries, but none of the specimens now re- ing enable us to fix any precise date to their produc- We give one specimen, copied from Mr. Singer's sting work on playing-cards:—



Knave of Bells.

e first wood-cut with a date known to be in existence 1423. It was discovered by Heineken, pasted on ver of a manuscript in the library of the convent of eim, near Memmingen in Suabia, and is now in the y of Earl Spencer. It represents St. Christopher ng our Saviour on his shoulders across a river. The gures are drawn with much spirit; but the acces- , a man with a loaded ass, a hermit holding up a lan- a man ascending a steep path toward a house, show orable want of knowledge of perspective. It is by eans certain however that this print is the most t specimen we possess, as there are several others , from their greater rudeness, have been held to have or claims to antiquity. But this rudeness cannot be accepted as a proof, as there is reason to believe that these scriptural subjects were addressed to the wants of the poorer classes, and were intended to supply the place of the more costly illuminations of the rich, while they admitted of being made to occupy a middle place by being finished off by hand in colours, and indeed many of the remaining specimens owe part of their rudeness to the defect of parts intended to be so supplied. Cheapness was therefore an element necessarily required in the production of these prints.

The art however made rapid progress. The next great step was the production of block books and the adoption of moveable letters. [PRINTING.] Without entering into the disputed question of the dates of the 'Biblia Pauperum,' the 'Speculum Salvationis,' and others, it will be enough to say that they prove the extension of its use, and many of the early books with moveable types were illustrated with pictorial wood-cuts. Of one of these works we subjoin a fac-simile specimen:—



Wise Men's Offering.

Maps also were engraved on wood. In an edition of Ptolemy, printed in 1482 at Ulm, there are twenty-seven; and in a later edition, printed at Venice in 1511, the outline, with the mountains and rivers, is in wood, while the names are printed with type, and in two colours, no doubt by separate workings. In England the original map of London by Aggas, measuring 6 ft. 3 in. by 2 ft. 4 in., to which the date of 1560 was assigned by Vertue, though it was probably some years later, was on wood in several blocks, worked on separate sheets of paper. In 1486 the improvement known as 'cross-hatching,' by which the bold and free effect of a pen-drawing was endeavoured to be attained, was shown in Breidenberg's 'Travels,' printed at Mentz. This invention has been usually attributed to Michael Wolgemuth, the master of Albert Dürer. This work however preceded by seven years the Nürnberg Chronicle, said to be by Wolgemuth, but who probably only furnished the designs, and the execution of the cuts is in a very superior style to that of any existing contemporary production: two fac-simile specimens are given in 'A Treatise on Wood-Engraving, Historical and Practical,' executed by J. Jackson, the most complete work that has been produced on the subject in this country, and to which we are much indebted, although we have been compelled to differ from some of the opinions therein.

The art had now attained an excellence which induced artists of celebrity and talent to select it as the means of conveying their designs to the world. Among the most distinguished in this line was Albert Dürer, whose productions as a painter, and an engraver on copper and wood, are so numerous as to excite a doubt whether he was actually an engraver on wood himself, or whether he only put the designs on the blocks, leaving them for other hands to execute. Bartsch, in his 'Peintre-Graveur,' and the writer of the work above mentioned, 'A Treatise on Wood-Engraving,' have agreed that he did not engrave on wood. The last named says, of all the wood-engravings marked with the initials of Dürer, about two hundred, 'the greater part of them, though evidently designed by the hand of a master, are engraved in a manner which certainly denotes no very great excellence,' and that none are so superior as to challenge a belief that they must be from his own hand; but he acknowledges that 'the cuts of the 'Apocalypse' (published in 1498, five years after the Nürnberg Chronicle, and eight from the expiration of his apprenticeship) generally are much superior to all wood-engravings that had previously appeared, both in design and execution.' Yet he asserts that this superiority in execution does not arise from any delicacy or skill in the engraving, 'but from the ability of the person by whom they were drawn, and from his knowledge of the capabilities of the art.' Another argument is the frequent employment in his cuts of cross-hatching, a work of no artistic difficulty, though one of minute and tedious labour, and which, as an artist, he could have easily avoided. This argument is also applied to others, Cranach, Burgmair, &c., who, it is urged, as draughtsmen on the wood, produced shade thus more easily than by thickening the lines, though in cutting the case is reversed. The last argument is, that, with his other avocations, Dürer could not have found time to execute the great number marked with his name. On this we venture to remark, that a knowledge of the capabilities of the art was most likely to have been acquired by practice, a fact that is felt even at present by persons who draw on wood; and it is remarkable that in the 'Apocalypse' the use of cross-hatchings is much more sparing than in many of his later works. In all probability as he advanced in reputation he availed himself of assistance not only in wood-engraving, but in painting and engraving on copper. It is known that he had many pupils, and of course it was in this way they were instructed. His wood-cuts are marked precisely as his engravings on copper are marked, and we think there are thus grounds for supposing that the cuts of the 'Apocalypse' are chiefly from his own hand, and that in the others he at least closely superintended their execution and gave the finishing touches. The writer says there is a difference in the cases of the engravings on copper and wood; that the latter, if the design were transferred, could be executed by a workman of moderate skill, while the former would require a first-rate engraver. From this we dissent: there is much, no doubt, that patient fidelity could successfully copy, but there is much of artistic feeling and expression that none but an artist of great talent could reach: we refer as an example to the Christ taken from the Cross, of which the block still exists, and from which impressions were printed in Ottley's 'Inquiry into the Origin and Early History of Engraving,' and in which the cross-hatching is but sparingly though effectively introduced. It is yet a common practice for engravers to employ their pupils in the more tedious and mechanical parts of their business, and this might lead him to adopt the cross-hatching more frequently than in those executed by his own hand, in which however he would not altogether omit it, as it was then understood to be an improvement. It would be hard however in such cases to withhold the merit of the engraving from the master because he had been assisted perhaps by various persons, according to their capacity, under his immediate supervision. This is also Ottley's opinion. He says, 'Dürer or Burgmair might have found employment for a dozen young men;' while the Abate Pietro Zani, in his more recent work ('Enciclopedia Metodica critico-ragionata delle Belle Arte,' Parma, 1821), contends with great strength of argument for Dürer being actually the engraver of the wood-cuts attributed to him. Indeed writer whom we are replying to admits he may have graved 'two or three wood-cuts of his own designing,' might have had engravers in his house to execute the signs 'under his own superintendence.' But this seem admit the whole case. Thus much we have though necessary to urge in favour of Dürer's claims to be sidered as an engraver on wood, though doubtless his as an artist is to be estimated rather from his other as a painter, an engraver on copper, and as a sculpto all of which he excelled. In the history of the art ever the question has but little real importance. prints exist, the date of their production is well ascerta the progress of improvement definitely marked, let engravers have been who they might. But in an art had thus rapidly advanced, and was coming into genera if the designers and the engravers were distinct, it is most probable that the excellence of the latter woul least have obtained in some cases a particular mentio was done in a later stage, and is the practice now.

In the early part of the sixteenth century several of celebrity were either designers on wood or engra Louis Cranach, Hans Burgmair, Hans Schaufflein, Graffe of Berne, and, in Italy, Ugo da Carpi. Their or monograms are on the works, but their claims t engraving have been denied by Bartsch and the wr the 'Treatise on Wood-Engraving,' on what we thin wholly insufficient ground of the execution not being enough. To Da Carpi has been attributed the inv of imitating drawings in chiaro-scuro, effected by two or more blocks, but it has been shown that th been done earlier by Cranach, though Da Carpi m tainly improved on it, and some of his designs are have been drawn on the blocks by Raffaelle hims many of them are from his designs. Books were this period most profusely illustrated, but, with the tion of those from the artists already named, and few others of some though inferior merit, the illus are very rude both in design and execution. The chiefly practised in Germany, being greatly patro the emperor Maximilian, for whom Burgmair produ great work called 'The Triumphs of Maximilian.' was the only distinguished name out of that empire period, and the Italian wood-engravings are, on the even inferior to those produced in the Low Countri

The next great name in the annals of wood-engraving is Hans Holbein. He was born about 1498, and began early to distinguish himself as an artist. In 1526 he left Basle, where he had hitherto resided, for England, having previously painted two or three portraits of Erasmus, and executed a large full-length likeness of him in wood, the block of which yet exists in the public library at Basle. The writer in the 'Treatise on Wood-Engraving' says 'there is not the slightest reason for believing that it was engraved by Holbein.' This is thrown off merely in support of his theory, that Holbein never engraved on wood at all, but was merely a designer, as he had previously argued was the case with Dürer and others. This theory is developed chiefly in reference to the first edition of the 'Dance of Death,' printed at Lyon in 1538. There had been several representations of a Dance of Death, some painted in fresco (one in the cloisters of St. Paul, London, said to be of the time of Henry VI.), and some in books, of which Mr. Douce has given a list; but those of Holbein were far superior in design, and as engravings are of a character for spirit and expression that has even yet been rarely excelled, though wanting in mere mechanical dexterity, as is shown particularly in the foliage of trees and other subordinate matters.

Mr. Douce however denies to Holbein the invention of the designs, as the writer in the 'Treatise on Engraving' denies his being the engraver. The doubt in both cases arises principally from a passage in the dedication to the Lyon edition of the 'Dance of Death' above mentioned, lamenting 'the death of him who has imagined such elegant figures as are herein contained,' adding that Death, 'apprehensive that the artist could thus become immortal, determined to shorten his days, and thus prevent him finishing other subjects which he had already drawn.' One such unfinished subject is then described, the Waggoner, which however was supplied in a subsequent edition, but varying considerably from the description, and not equal either in design or execution to the rest of the original poorest, the public were familiarised with the best specimens, and a large sale was ensured.

For the purpose of illustrating books wood-engraving is peculiarly adapted. Being worked in the same manner as type, impressions are produced with great rapidity. Any number of cuts may be printed at once on a sheet of paper that will come into the press or machine, and an almost infinite number of impressions may be taken off without material injury to them. This seems the proper purpose of the art. The attempts which have been made to imitate the effects of copper-plates are misapplied, and the endeavours have been failures. The extreme neatness, length and sweep of line, and bold outline of the copper cannot be reached in wood-engravings, while in depth of shadow and effect they equal even mezzotint, with more distinctness of detail.

It is not necessary to detail the history of wood-engraving beyond this period, as many of Bewick's immediate successors are yet living, though we may state that it is difficult to conceive that a higher degree of perfection can ever be attained than that now realised by our present artists, while the designs are frequently furnished by artists of the highest eminence. Within the last few years also the wood-engravers of France, and also of Germany, have made such progress in improvement as to become no contemptible rivals of their English brethren. Nor is it any part of our plan to give practical instructions for engraving, which can only be effectively learned by instruction and practice. A description of the process as practised in his time is giving by Papillon, in his 'Traité de la Gravure en Bois,' 1766; and a far more detailed account, with all the modern improvements, by Mr. Jackson, in the 'Treatise on Wood-Engraving' already mentioned. We will only observe that one of the greatest practical improvements, that of lowering the surface of the blocks in parts, so as to graduate the shadows into the lights, was, though not invented, yet brought into use by Bewick, nearly all his blocks being so prepared for working; and that box is the wood that is now universally used for engraving upon.

(Ottley's *Inquiry into the History of Engraving on Copper and Wood*; Singer's *Researches into the History of Playing-Cards*; *Treatise on the History of Wood-Engraving, historical and practical, with upwards of three hundred Illustrations, engraved on Wood by* John Jackson; Heineken, *Idée Générale d'une Collection complette d'Estampes.*)

WOODFALL, WILLIAM, was the son of the printer and proprietor of the 'Public Advertiser' newspaper: another son, we believe the elder of the two, was Henry Sampson Woodfall, who succeeded his father in the management of the paper, and held it when it became the medium through which the letters of Junius were given to the world. William was born in 1745 or 1746, and began life by being sent to learn the printing business under Mr. Baldwin, of Paternoster Row. He was then employed for some time in assisting his father in printing and editing the 'Advertiser,' till a taste for theatrical amusements, it is related, took such possession of him, that he broke away with a company of players on an excursion to Scotland to gratify that passion. While in Scotland he married, but returned to London about 1772, when he was first employed for a short time as editor of a newspaper called 'The London Packet,' and then undertook the direction, both as editor and printer, of 'The Morning Chronicle.' With that paper he remained connected till 1789, when he left it and set up one of his own, which he called 'The Diary.' Before this, in 1785, he had published in an 8vo. pamphlet (price 3*s.* 6*d.*) a 'Sketch of the Debate in the House of Commons in Ireland upon the rejection of the twenty commercial propositions;' but it was in 'The Diary' that he first gave proof of his wonderful talent for reporting, by presenting his readers with as detailed accounts of the parliamentary debates on the day after each took place, as the other papers had been in the habit of supplying after an interval of many days; for the practice then was to give only the shortest summary at the time, and to reserve the full speeches till the reports of them could be prepared at leisure. Woodfall's mode of proceeding was what would now be thought very extraordinary. 'Without taking a note to assist his memory,' says the notice of him in the obituary of the 'Annual Register,' 'without the use of an amanuensis to ease his labour, he has been known to write sixteen columns, after having sat in a crowded gallery for as many hours, without an interval of rest.' This e
however, it is added, in which he took pride, and
brought him more praise than profit, 'wore down h
stitution, which was naturally good; and whe
papers, by the division of labour, produced the same
of debate, with an earlier publication, he yielded t
test, and suffered his 'Diary' to expire.' In hi
years he offered himself a candidate for the office
Remembrancer, but it was given to another. To t
last he continued constantly to attend the debates
in the House of Lords four or five days before hi
on the 1st of August, 1803. He left a large
whom at least one son, Henry, acquired some liter
tation; and a daughter, Sophia, who married Mr.
bon, became an actress, and also wrote several no

(*Annual Register*, vol. 45.)

WOODFORD. [ESSEX.]

WOODHOUSE, ROBERT. There is almost
silence concerning Professor Woodhouse in the
depositories of biographical information; for the
his private life, as here given, we are indebt
courtesy of his surviving brothers, Dr. J. T. W
senior fellow of Caius College, Cambridge, and
Woodhouse, Esq., formerly attached to the Supre
at Bombay.

Robert Woodhouse was born at Norwich,
1773. His father was in business in that city,
was possessed of some freehold estates. He was o
of some antiquity, and claimed and sought to re
estate at Beesthorpe, in the possession of Lord B
uncle of the poet). His mother was the daugh
Rev. J. Alderson of Lowestoffe, who was the gr
of Baron Alderson and Mrs. Amelia Opie. He
cated at North Walsham public school, where h
no particular desire for the studies in which he
became eminent. He must have commenced re
Caius College, Cambridge, in 1791, and he too
degree, and was senior wrangler and first Smith's
in 1795. He gained a fellowship in his college
the fellows, or most of them, may continue lay
the concerns of the College and University, with
private pupils, and writings, occupied his life.
he was elected to succeed Dr. Milner as Lucasian
of mathematics; and in 1822 he was remov
Plumian professorship of astronomy and experim
losophy, vacant by the death of Mr. Vince. In
married Harriet, the sister of William Wilkins,
architect, whom he survived. In 1824, when the Ob
tory was completed at Cambridge, he was appoi
superintendent; but by this time his health had fail
he was hardly equal to the extent of his duties. He
in London, December 23, 1827, and was buried in
chapel at Caius College.

Woodhouse is distinguished as the first who, in his U
versity, cultivated the methods of analysis which the
nius of the Continental mathematicians had made
superior in power to that which Newton had left, w
last was exclusively studied in England at the time
he graduated. He was the first who introduced this
lysis into a work written (or at least published) for
English student, and he must therefore be consider
the leader of the movement by which the mathematic
of this country assimilated their methods to those of
Continental brethren. For this position he had pe
qualifications: a profound and extensive knowled
every stage of the progress of all that he attempt
introduce; severe habits of logic, such as are frequ
wanting in the modern mathematician; a perfec
sence of discipleship; ability to see that much
importation was as inferior in accuracy as it was su
in power; and thought and talent to suggest the
of amendment. To these we must add a high
character, and the esteem of his contemporaries—
of the utmost consequence to a literary reformer.
style of writing is peculiarly his own, frequently
and perplexed in appearance, but always containing
little additions and collateral explanations which
writers omit, to the detriment of the reader. It
almost seem as if the hints just alluded to had
stuck in after the sentences were written. With
who would rather be stopped for a minute by a w
construction than for an hour by want of materia
make out a meaning, Woodhouse is a favourite w

with those who like to think about the first
their subject. But to those others who parse
nprehending, and think they have made out
soon as they see how his sentence runs, he is
id still more so to those who are rather bent
athematical symbols than understanding them.
t mention his papers in the 'Philosophical
' as their principal points are repeated in his
ings, which are as follow :—

'rinciples of Analytical Calculation,' Cam-
1803. In this work, which is rather of the
id controversial, than of the elementary cha-
iouse called the attention of his University to
and first principles of the Continental analysis,
ecommendation of the former, and a search-
on the latter. He passes under review the
ifinitesimals, limits, expansions, &c., exposes
fficiency of the method of Lagrange [FUNC-
Y OF], and gives his own views of the mode
; the differential calculus. He had evidently,
ens to those who strictly investigate received
iired, if not an absolute scepticism as to the
any rigour at the outset, at least an instinc-
objection. Though differing from several of
onclusions, particularly those which he comes
acter of the theory of limits, we must always
und thought and clear exposition which dis-
vork throughout. Considering the time and
ch it was published, it is a rare instance of
e choice of a subject and of the manner of

other qualifications of a controversialist,
id a power of sarcasm, which, though in pri-
nly went the length of what is called 'dry
appeared now and then in his writings in a
would have made an opponent careful what

ts of Trigonometry,' Cambridge, 8vo., 1809
quent editions). Of this work Dr. Peacock
nore than any other contributed to revolu-
thematical studies of this country. It was a
lently of its singularly opportune appearance,
l, and such as is not likely, notwithstanding
imilar publications in the present day, to be
seded in the business of education ; . . . and,
vorks of this author, it is written in a manner
l to fix strongly the attention of the student,
him reflect attentively upon the particular
ch are followed, and upon the reasons for
i.' The 'Analytical Calculations' was an
teacher, but the 'Trigonometry' was ad-
student. It excited the opposition of those
ched to the old system, and paved the way
ient introduction of the differential calculus,
vhich must have been accompanied by trea-
ometry adapted to themselves, if Woodhouse
ed the want.

tise on Isoperimetrical Problems, and the
iriations,' Cambridge, 8vo., 1810. There is
uliar to himself in every work which Wood-
d. The mode of writing scientific history,
re afterwards adopted, is here seen for the
consists in taking up the subject in such a
s history in the hands of each individual is
the rest ; accordingly we have both the his-
ject and of each of its promoters in his con-
it. Woodhouse puts distinctly before the
y problems, methods, and notation of the
s on the calculus of variations, from the
d problems of the Bernoullis, to the con-
mparatively finished methods of Lagrange.
not pass away like an elementary work ; it

ise on Astronomy,' Cambridge, 8vo., 1812.
s intended as a first volume, and the second,
318, is on the theory of gravitation, which
nproperly called *Physical Astronomy*. But
uent editions the first volume was enlarged
n were obliged to be called *parts*; so that we
i., parts 1 and 2, on astronomy, and vol.
l astronomy, or the theory of gravitation. Of
s only necessary to say, that it was the first
n the student was introduced to what had been done abroad since the death of Newton, and that it does not retain its place only because the subject has advanced both abroad and at home. But the first volume still remains perhaps the most remarkable work on astronomy of its century. This distinction it owes to the manner in which Woodhouse makes the reader feel that he is in the very observatory itself. The methods are as perfect as if they had been directions to a computer, a quality which writers who have to explain those methods mathematically frequently do not give them ; the examples seem as if they were real ones, as if some astronomer had had to put down the actual figures, and the very observations which are cited are made to smell of the instruments which gave them. Many theoretical works on astronomy may make a reader think he would like the practical part of the science, in which he may afterwards find himself mistaken : but Woodhouse's treatise cannot deceive him in this respect ; he will or will not relish practical astronomy according as he is or is not pleased with Woodhouse's book. At least the preceding is more near the truth of this book than of any other. The secret was, that the author was an expert practical astronomer, as well as an original thinker on first principles, who was able to change places with the student in an unusual degree. He was very fond of the subject of practical astronomy, a taste which is not always found in the mathematician, and rarely indeed in one of a speculative turn. Had the observatory been built before the failure of his health, he would probably have become as distinguished in the promotion of astronomy as he was in its explanation : as it was, he had only time to discover [TRANSIT, p. 124] the injurious effect of the diagonal braces of the transit instrument.

The character which must be given of the several writings of Woodhouse entitles us to suppose that the revolution in our mathematical studies, of which he was the first promoter, would not have been brought about so easily if its earliest advocacy had fallen into less judicious hands. For instance, had he not, when he first called attention to the continental analysis, exposed the unsoundness of some of the usual methods of establishing it more like an opponent than a partizan, those who were averse from the change would probably have made a successful stand against the whole upon the ground which, as it was, Woodhouse had already made his own. From the nature of his subjects, his reputation can never equal that of the first seer of a comet with the world at large : but the few who can appreciate what he did will always regard him as one of the most philosophical thinkers and useful guides of his time.

WOODHOUSELEE, LORD. [TYTLER, A. F.]

WOOD-LARK, *Alauda arborea*. Although this resident is not plentiful in Great Britain, it is scattered generally over the United Kingdom. Its length is about six inches, and its plumage a good deal resembles that of the Sky-Lark : the hind claw is long and nearly straight.

Montagu well describes its habits. 'It sings,' says he, 'delightfully on wing ; describing its flight in widely-extended circles, and pouring out its song a whole hour without intermission ; it rarely utters its song when sitting on the ground, though sometimes when perched on a tree. The song is much more melodious than that of the Sky-Lark, but does not consist of so great a variety of notes ; but then it sings almost throughout the year, except in the months of June and July. It does not mount in the air in a perpendicular manner, and continue hovering and singing in the same spot, like the Sky-Lark, but will sometimes soar to a great height, and keep flying in large irregular circles, singing the whole time with little intermission ; and will thus continue in the air for an hour together. The nest, which is early formed, for the Wood-Larks begin to build in March, is made of dry grass with a finer lining of the same, and a few hairs, on the ground, generally in uncultivated rough land, and mostly sheltered by a tuft of rank grass, weeds, or furze, a stunted bush, or the like. The four or five eggs are brown, with dusky and ashy mottles, most numerous at the large end.

The Wood-Lark is rare in the North of England and Scotland, and has not been noticed in Shetland or the Orkneys. It visits Denmark, Sweden, and Russia in the summer, but is permanent in Germany, Holland, France, Spain, and Italy. The species is common in Smyrna, according to Mr. Strickland.

It is the *Lulu* of the French; *Tuttuilla* and *Tattavella* of the Italians; and *Baumlerche*, *Waldlerche*, and *Haidelerche* of the Germans.

WOODPECKERS, *Picidæ*, a family of Scansorial birds. [SCANSORES.]

The order *Picæ* of Linnæus is thus characterized:—

Bill (*cuneus sarriens*) cultrated, with a convex back. *Feet* walking, short, rather strong. *Body* 'tenaciusculum,' impure. *Food* 'quisquiliæ.' *Nest* in trees; the male feeding the incubating female; Monogamy. Order analogous to the *Primates*.

This order seems to be the most arbitrary in the ornithological system of Linnæus; for under it birds of very discordant habits are collected. The Woodpeckers, the Crows, the Trogons, the Orioles, the Cuckoos, the Kingfishers, the Humming-Birds, are there associated with others in the following succession:—

Picæ.

Bill subcompressed, convex.

Genera:—*Psittacus*, with its three sections; *Ramphastos*; *Buceros*; *Buphaga*; *Crotophaga*; *Corvus*; *Coracias*; *Oriolus*; *Gracula*; *Paradisea*; *Trogon*; *Bucco*; *Cuculus*; *Yunx*; *Picus*; *Sitta*; *Todus*; *Alcedo*; *Merops*; *Upupa*; *Certhia*; and *Trochilus*.

Brisson had previously arranged the Wryneck, the Woodpeckers, and the Jacamar in the first section (Bill straight) of his thirteenth order of Birds—those, namely, with four toes, two before and two behind.

Latham's *Picæ* consist of even a more heterogeneous group than that assembled under the *Picæ* of Linnæus.

The fourth order of Birds, in the Method of Lacépède, consists of those which have the bill straight and compressed, and under it two genera only, *Galbula* (Jacamar) and *Picus* are arranged. The Count's third and fifth orders are formed respectively of the genera *Bucco* and *Yunx*.

The first family (*Cuneirostres* or *Sphenoramphes*) of M. Duméril's third order (*Grimpeurs* or *Climbers*) comprises the genera *Picus*, *Yunx*, *Galbula*, *Crotophaga*, and *Cuculus*.

The *Pici* form M. Meyer's third order, and are divided into two sections:—

1. With stiff feathers. Genera:—*Picus*; *Certhia*.
2. With soft feathers. Genera:—*Yunx*; *Sitta*; *Tichodroma*.

Illiger's *Scansores* consist of the *Psittacini*; the *Serrati*; the *Amphiboli*; the *Sagittilingues*; and the *Syndactyli*. The *Sagittilingues* embrace the genera *Yunx* and *Picus*.

The great genus *Picus* is placed by Cuvier in his third order, *Grimpeurs*, between *Galbula* and *Yunx*.

The *Zygodactyli* are the first tribe of the *Sylvicolæ*, the second order of Birds according to the method of M. Vieillot: the second family of that order, the *Macroglosses*, consist of the genera *Picus* and *Yunx*.

The *Zygodactyli* are the fifth order in M. Temminck's arrangement; and the genera *Picus*, *Galbula*, and *Yunx* constitute the second family of that order.

The Cuckoos and the Woodpeckers form the *Zygodactyles* of M. de Blainville.

Mr. Vigors, as we have seen, separates the *Parrots* and *Woodpeckers* from the other families of SCANSORES, associating them together in consequence of their affinity in the essential characteristics of the tribe; and, in his view, they compose its normal groups, as climbers *par excellence*, differing however as to the mode in which they climb: the Parrots using the foot chiefly in grasping the object which assists them in their ascent, and in conjunction with the bill; while the *Picidæ* rely upon the strength and straightness of the hind toes in supporting them in a perpendicular position on the sides of trees, in which posture they are also assisted by the strong shafts of the tail-feathers. Not that some of the *Psittacidæ* do not partially employ the tail in supporting themselves as they climb, in a corresponding manner with the *Woodpeckers*, for Mr. Vigors makes the remark that they do, particularly *Psittacus Alexandri* and its congeners, from his own observation. The tongue too, he states, peculiar to the Parrots, may be observed to become slenderer, and. as is said, more extensible, in that group of which *Psittacus aterrimus*, Gm. is the representative; thus evincing, Mr. Vigors adds, an approximation, slight indeed, but still an approximation, to the bill of the *Woodpeckers*.

Mr. Vigors recognised in the Linnean BARBETS a group apparently intervening between the *Psittacidæ* and *Picidæ*, and diminishing the distance that exists even in the form of the bill. That important group, to him evidently exhibited the expected gradation in the structure of that member; the bill of *Pogonias* approaching more nearly that of the *Parrots*, by its short, strong, and hooked conformation, to say nothing of the frugivorous habits of the *Barbets*, while the straighter and more lengthened bill of the true *Bucco* united itself to that of *Picus*. Many other particulars in form, and also an extraordinary conformity in colouring, still further pointed out the affinity; and he was at length confirmed in his conjectures respecting the situation of these birds, by arriving at the knowledge of their habits being actually those of the true *Woodpeckers*, and of their chief affinity being to that group. Thus Mr. Burchell, in his interesting 'Travels in Africa,' mentions a little noisy *Barbet* (*Pogonias*, Ill.; *Bucco niger*, Gm.), which the Hottentots called *Hout Kapper* (Woodcutter) from the noise it makes with its beak against the branches of trees in search of insects. The attention of Mr. Vigors was first called to this last peculiarity in the manners of the *Barbets* by Mr. Swainson, to whose friendship, he states, he is indebted for much valuable information in his inquiries into affinities; and on applying to Mr. Burchell, Mr. Vigors received still more corroborating proofs of the intervention of these birds between the *Parrots* and *Woodpeckers*. Mr. Burchell also entered into a detailed account of these affinities, before a meeting of the Zoological Club of the Linnean Society, extracted from his personal observations during his travels. The regular gradation by which the *Psittacidæ* and *Picidæ*, united in their general characters—and those the characters most prominent and typical of their own tribe—are also united in their minuter points of formation, appeared to Mr. Vigors eminently conspicuous. 'We are thus,' observes Mr. Vigors in continuation, 'introduced to the family of *Picidæ*, a very important and well-defined group, both in manners and general conformation. It is composed, as we have seen, of the genus *Pogonias*, Ill.; in some species of which the serrated bill is gradually lost, or rather changes into the entire bill of some of the shorter-billed species of the true *Bucco*, Auct. which succeed them. The bills of these again lengthen by degrees, and nearly assume the form of the Linnean *Picus*, which composes the greater portion of the present family. A group of these, represented by the *Picus minutus*, Linn., in which the shafts of the tail-feathers are soft and flexible, unlike those of the genuine *Woodpeckers*, leads round again to the *Barbets*, where the family commences. To these also the well-known genus *Yunx*, Linn. appears to be associated.' Mr. Vigors then alludes to the strong affinity between the *Picidæ* and the succeeding group of *Certhiadæ* [CREEPER]. ('Natural Affinities that connect the Orders and Families of Birds,' *Linn. Trans.*, vol. xiv.)

The *Proglosses* of M. Latreille are arranged between the *Cuculides*, and the *Grandirostres* (Toucan and Araçari); the *Proglosses* consists of the genera *Yunx*, *Picoides*, and *Picus*.

In the Method proposed by M. de Blainville in 1816 and 1821, and developed by M. Lherminier in 1827, the Woodpeckers (*Picus*) stand between the Toucans and the Hoopoes, in the first subclass (Normal Birds).

In the *Projet* of M. Lesson the *Picées* comprise the genera *Yunx*, *Picoides*, *Picus*, and *Picumnus*, and are placed between the *Cuculées* and the *Ramphastidées*, forming the fourth family of the first tribe (*Zygodactyles*) of *Insessores* or *Grimpeurs*.

Mr. Swainson is of opinion that the structure of the *Picidæ* constitutes them the most perfect of all the climbing birds, for nature has rendered their whole organization subservient to this particular power. The feet, he observes, although very short, are unusually strong; the nails are broad and crooked, and the toes placed in pairs, that is, two forward and two backward.

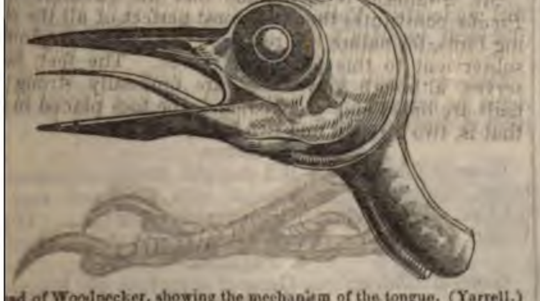
Foot of Woodpecker.

s an additional and powerful support in their rapid perpendicular ascent up the trunks of trees, their tail-ers, he remarks, terminate in points, and are uncom-ly hard, so that being pressed against the bark, they t the bird in its progress or in keeping its position. bill, destined for the laborious operation of penetrat-he wood or stripping off the bark of forest-trees, is tifully adapted for the purpose, being wedge-shaped, shed with regular-sided angles, and in one species us principalis) nearly of the colour and consistency ory, whence it has been termed the *Ivory-billed Wood-er*. Mr. Swainson then calls attention to the worm-tongue barbed at the point, and capable of being pro-ed to a great length.

Bill of Woodpecker.

the *Physiological Series* of the Museum of the Royal ge of Surgeons in London, No. 311 is a preparation he head of a woodpecker, showing the depressed cal and pointed form of a beak, adapted for penetrat-he bark of trees. No. 1477 exhibits the lower jaw, the tongue and larynx of a woodpecker. The tongue sts of two parts, viz. a fixed base and a projectile cy-ical portion, which is received, when retracted, into ath formed by the base. The extremity of the cy-ical tongue is tipped with horn. No. 1478 shows the ue in its retracted state. No 1479 is the tongue pro-ed. Professor Owen, in the Catalogue (vol. iii., pt. 1), ves, that to accommodate this long prehensile instru-to the two states exhibited in the preparations above ed, its cornua (apo- and cerato-hyals) are proportion-developed, and are reflected over the posterior and rior parts of the cranium, where they meet and are ed in a groove; their extremities extending, when the ue is retracted, to the base of the bill, as in the pre-g preparation; but gliding backwards, when the ue is protruded, to the situation shown in the present

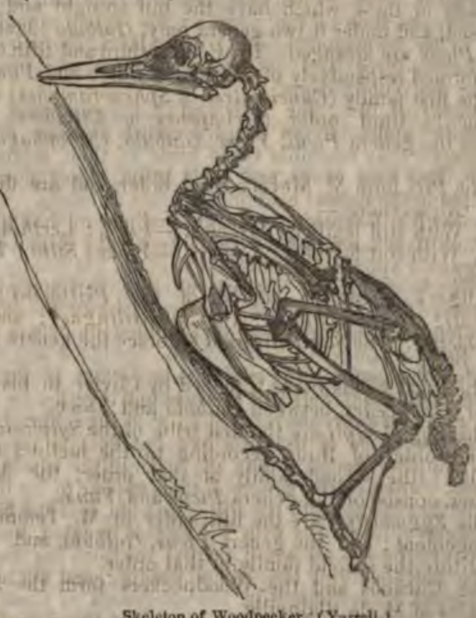
The return of the cornua to the first position is as-by an elastic ligament attached to the extremities. 1479 A is the head of *Picus viridis*, in which species, rofessor observes, the mechanism for protruding and cting the tongue is even more remarkable than in the ding. The cerato-hyals, or extremities of the cornua e os hyoides pass over the head, and into the right il, where they appear to be fixed. The muscles h protrude the tongue take their origin from the o- and apo-hyals, and leaving these where they con-e to enter the mouth, pass forward to be attached to ower jaw as a fixed point, from which they act with advantage in jerking forwards the cornua of the os des and the tongue. The retractor muscles are first ped four or five times round the trachea, which is fixed point; they then pass along the sides of the la-towards their insertion into the basi-hyal bone. The of these contrivances for the rapid and extensive pro-ion of the tongue is the transfixion of the insects ch constitute the food of the woodpecker, and which dislodged from their hiding-places under the bark of trees by means of its powerful bill. For the more effectual retention of the stronger insects, it may be observed that the horny sheath at the tip of the tongue is barbed; the tongue is also lubricated by a glutinous secretion, abundantly furnished by the two large submaxillary glands, which may be seen extending from behind the angles of the lower jaw along the under side of the rami to the symphysis.



ad of Woodpecker, showing the mechanism of the tongue. (Yarrell.)

This mechanism enables tne bird to introduce the tongue into holes and crevices, and under the loose bark of trees, to the destruction of insects there harboured. A similar conformation, directed to a different end, exists in the HUMMING-BIRDS.

Mr. Yarrell observes, that another anatomical peculiarity remarkable in the skeleton of the woodpecker, but admirably adapted to the habits of the bird, is the small size of the keel of the breast-bone. 'Moderate powers of flight,' says this observing zoologist, 'sufficient to transport the bird from tree to tree, are all that it seems to require; large pectoral muscles with a deep keel to the breast-bone would to this bird be an inconvenience. The advantage of a narrow shallow keel is immediately apparent, on looking at a representation of the skeleton in a climbing position; the low keel, allowing the bird to place its body close to the tree, brings its centre of gravity in a perpendicular line before the points of support, and thus materially diminishes the labour of, and the strain upon, the muscles of the legs and thighs. The descending position of the bones of the tail indicate the mode by which the stiff points of the tail-feathers are brought into contact with the surface of the bark of the tree to form an accessory prop.' (*British Birds.*)



Skeleton of Woodpecker. (Yarrell.)

In the opinion of Mr. Swainson the divisions of this family are strongly marked; because, as some few intervening forms are wanting, the circle is, in one sense, incomplete. Thus the *Nuthatches* (*Sittæ*), he observes, although clearly approximating to the *Woodpeckers*, are not directly united to them; neither does the intervention of the *Wryneck*, with its worm-like tongue, or of *Oxyrhynchus*, with its acute bill, do more than indicate the broken links of the chain. The absolute connection between the true *Woodpeckers* (*Picinæ*) and the subfamily of Barbets (*Buccoinæ*) is, he thinks, unquestionably established by two very singular little birds; one being the *Minute Woodpecker* of Linnæus (*Asthenurus*, Sw.), the other a *Barbet* (*Picumnus*, Temm.).

The true Woodpeckers (*Picianæ*, Sw.) are, Mr. Swainson observes, typically represented by the great ivory-billed species already noticed. 'The upper and lower ridge of the bill in this bird exactly correspond,' he remarks, 'in their inclination towards the tip, rendering the organ a perfectly straight wedge. This construction is,' he points out, 'rendered still more perfect by a ridge, forming a strongly carinated line, which runs parallel to the culmen, and is situated nearly half way between that and the ternal margin of the upper mandible. Mr. Swainson then draws attention to the crests in these birds—short, rigid, and turned upwards; but their chief generic distinction rests, in his opinion, on the structure of the feet, the hinder external toe being manifestly longer than that in front: this peculiarity is, he observes, even extended to such aberrant species as have one of the small toes wanting—the two northern species, *Apternus tridactylus* and *A. arcticus*, for instance. To this group therefore he restricts the generic name of *Picus*, which includes in his arrangement all the British species excepting *viridis*.

In the next group, *Chrysoptilus*, he finds a diminution of the typical excellences; the bill, as in the *Common Green Woodpecker*, is still nearly straight, but the lateral ridge is close to the culmen, and the hind-toe is either of equal length or slightly shorter than the fore-toe: the crest, though still short, is less rigid, and not so much developed. Mr. Swainson remarks that the colours of these birds are always gay; green and soot-black predominate, and most of the typical species have the quills of a beautiful golden hue, whence the generic name above stated.

The third genus, *Malacolophus*, Sw., is described to be highly elegant: the bill is no longer straight, the culmen being more arched than the lower ridge or gonys, and the latter particularly short, owing to the prolonged advancement of the chin, which occupies full one half of the lower mandible. The lateral ridge of the upper mandible is as in the last genus; but the anterior toe is longer than the hind-toe: the crest is long, formed of loose feathers, and, like the rest of the plumage, particularly soft: hence the generic name.

Colaptes, Sw., is distinguished from *Malacolophus* by the greater curvature and compression of the bill, and by the disappearance of the ridge on the upper mandible; thus, in Mr. Swainson's opinion, assimilating the group to the *Tenuirostres*, and exhibiting the weakest structure among the Woodpeckers.

Melanerpes, Sw., the fifth and last genus, may, Mr. Swainson thinks, be not unaptly called *Swallow Woodpeckers*, for they resemble those birds in their migratory habits, their long wings, and their black glossy plumage, destitute in the typical examples of spots or bands. 'Yet,' continues Mr. Swainson, 'here we find nature has begun to return once more to her original type: the ridge on the bill is again apparent, at first but slightly, but finally very distinct; this member, likewise, although not straight, is less arched than in *Colaptes;* the two greater toes are of equal length; the wings long and pointed; and the third quill equal or longer than the fourth; the black and white plumage, seen only in the typical genus *Picus*, is again assumed, until the two groups are blended together by such birds as *Picus rubriventris*, Vieill., *P. varius*, Linn., &c.; so that the circle of the true Woodpeckers is rendered more complete, perhaps, than any other in the whole class of birds. The primary divisions thus appear to be three: the first having the bill equally angulated, and the hinder toe longest; the second with the angles unequal, and the two longest toes of the same length; the third has the culmen curved, the angle obsolete or wanting, and the hinder toe shortest. Very many of the subgenera of these five principal forms have been determined, and their chief characters will be found in our systematic arrangement.'

Mr. Swainson is of opinion that we are conducted to the *Buccoinæ* or Barbets, forming his second principal group of the *Picidæ*, by the *Minute Woodpecker* (*Asthenurus minutus*, Sw.), whose black and spotted head indicates, according to his view, an affinity to *Malacolophus*. The Barbets, he observes, have feet of the same construction and possess the same faculty of climbing as the Woodpeckers, but in a much less degree; their tail-feathers are, he remarks, of the ordinary construction and soft; the bill in some is very strong, straight, and compressed; in others it is greatly depressed; and in one group, short and toothed. He quotes Mr. Burchell as the first naturalist who discovered the affinity of these singular birds to the Woodpeckers, he having frequently heard the loud tapping of the Barbets in the forests of Southern Africa, and witnessed their dexterity in climbing trees. In the straight-billed or typical Barbets (*Bucco*) we have, Mr. Swainson remarks, the predominant colours of the Parrots—green, red, blue, and yellow variously combined; while the black and red plumage of the tooth-billed division (which is the true type of the whole) corresponds with that of the most perfectly formed
Woodpeckers; a third group, according to Mr. Sw
whose precise situation is not yet known, represent
birds in South America.

Mr. Swainson concludes his observations on the
by stating that the other genera, whose climbing hab
induced naturalists to place them with this family, a
and *Oxyrhynchus:* the first of these types belongs
sively to the Old World; the latter, in Mr. Sw
opinion, seems to be the representative of it in Am

The following is Mr. Swainson's systematic a
ment:—

Picidæ.

Family Character.—Bill straight, more or less
Toes placed in pairs.

Subfam. *Picianæ* (Picinæ?). *The True Wood*
Bill wedge-shaped. Tongue vermiform.

Genera.

1. Picus. *Typical Woodpeckers.*

Generic Character.—Bill perfectly wedge-shaped,
drical; the culmen straight; lateral ridges remove
the culmen. Versatile (outer posterior) toe always
than the anterior (outer fore toe).

Subgenera:—*Picus*, (America and India); *Hem*
(India); *Dendrobates*, (Africa, except two specie
Tropical America); *Apternus*, (Arctic Regions)
Dendrocopus, (Universal).

2. Chrysoptilus. *Green Woodpeckers.*

Generic Character.—Versatile and anterior toes o
length. Lateral ridge nearest to the culmen, which is
and either quite straight or very slightly bent. B
pressed or widened at the base. Colour green ba
spotted with black. Subtypical genus.

Subgenera:—*Dendromus*, (Africa and India); C
nerpes, (Tropical America); *Dryotomus*, (Americ
Europe); *Chrysoptilus*, (Tropical America).

3. Malacolophus. *Rasorial Woodpeckers.*

Generic Character.—Versatile toe shorter than t
terior, culmen curved. The lateral ridge (except
typical group) wanting. Tarsus shorter than the v
toe. Hind head with a crest of very soft feathers.

Subgenera:—*Brachylophus*, (Old World only);
lophus, (India only). Typical: *Malacolophus*, (T
America only); *Meiglyptes*, (India); *Chrysonotu*
only).

4. Colaptes.

Generic Character.—Tarsus lengthened and equal
versatile toe; which latter is shorter than the a
Bill broader at its base than it is high; the side
pressed; the culmen considerably curved from its
the lateral ridge either obsolete or entirely wanting.
trils partially defended by feathers.

Subgenera:—*Geocolaptes*, (Africa only); *Colapt*

5. Melanerpes.

Generic Character.—Bill straight, more or les
drical: base wide; the ridge of the culmen slightl
but not very prominent; the sides rounded; the
ridge slight, and placed near but not close to the c
Gonys very long, as in the typical group. Nostrils
concealed. Wings long; the first quill spurious (
small; the second nearly as long as the third. To
ous. Habits gregarious and migratory. Colours
varied with white and red. The fissirostral type, (A
only.)

Subgenera:—*Centurus*, *Leuconerpes*, *Melanerp*
surus. Subfam. *Buccoinæ*, Barbuts [BARBETS]
surrounded with long bristles. Tail short, soft.

Genera.

1. Asthenurus.

Generic Character.—Bill short, compressed, very s
Rictus smooth. Wings with the three first quills gra
Tail moderate. Versatile and anterior toes nearl
(Tropical America.)

2. Picumnus.

Generic Character.—Habit of *Asthenurus;* b
rictus is bristled; the tail very short and not pr
beyond the wings. (Tropical Asia.)

3. Bucco.

Generic Character.—Bill straight, strong; the b
broad, dilated, and surrounded with long and v
bristles. Tarsus shorter than the versatile toe. (
World.) Subgenus, *Micropogon*, (South America

4. Pogonias.

Generic Character.—General structure of *Buc*

in of the upper mandible distinctly toothed.
ly.)

Yunx. [Wryneck.]
Oxyrhynchus.

Character.—Bill as in *Yunx*; but the culmen
the gonys less curved. Wings lengthened,
the first quill nearly as long as the second, with
web crenated. Feet short, insessorial: lateral
. Tail moderate, even. (South America.)
cidæ, in Mr. Swainson's arrangement, are placed
he *Psittacidæ* and the *Certhiadæ*.
Geographical and Comparative List of the Birds
and North America, by the Prince of Canino and
o, the *Picidæ*, which are arranged between the
æ and the *Cuculidæ*, consist of the following sub-
nd genera:—

a. Picinæ.

:—*Dryocopus*, Boie; *Picus*, Linn., (*Dryobates*,
drocopus, Sw.); *Dendrocopus*, Bonap., (*Picus*,
yotomus, Sw.; *Apternus*, Sw.; *Melanerpes*, Sw.;
Sw.; *Colaptes*, Sw.; *Gecinus*, Boie (*Chrysop-*
).

b. Yuncinæ.

Yunx.
R. Gray places the *Picidæ* (*Picus*, Linn., and
n.), his third family of *Scansores*, between the
and *Cuculidæ*. Mr. Gray's *Picidæ* include
ing subfamilies and genera:—

I. Bucconinæ.

:—*Laimodon*, G. R. Gray; *Bucco*, Linn.; *Barba-*
.; *Psilopogon*, Boie; *Capito*, Vieill.; *Caloram-*
.; *Trachyphonus*, Ranz.

II. Picumninæ.

:—*Picumnus*, Temm.; *Microlaptes*, G. R. Gray;
dgs.; *Vivia*, Hodgs.

III. Picinæ.

:—*Picoides*, Lacep.; *Hemicircus*, Sw.; *Campe-*
R. Gray; *Dendrobates*, Sw.; *Picus*, Linn.

IV. Dryocopinæ.

:—*Campethera*, G. R. Gray; *Dryocopus*, Sw.;
pes, Sw.; *Chrysoptilus*, Sw.; *Melanerpes*, Sw.;
, Sw.

V. Celeinæ.

:—*Gecinus*, Boie; *Hemilophus*, Sw.; *Celeus*,
iglyptes, Sw.; *Tiga*, Kaup; *Brachypternus*,
Centurus, Sw.; *Leuconerpes*, Sw.

VI. Colaptinæ.

:—*Colaptes*, Sw.; *Geocolaptes*, Burch.

VII. Yuncinæ.

Yunx, Linn.

European Woodpeckers.

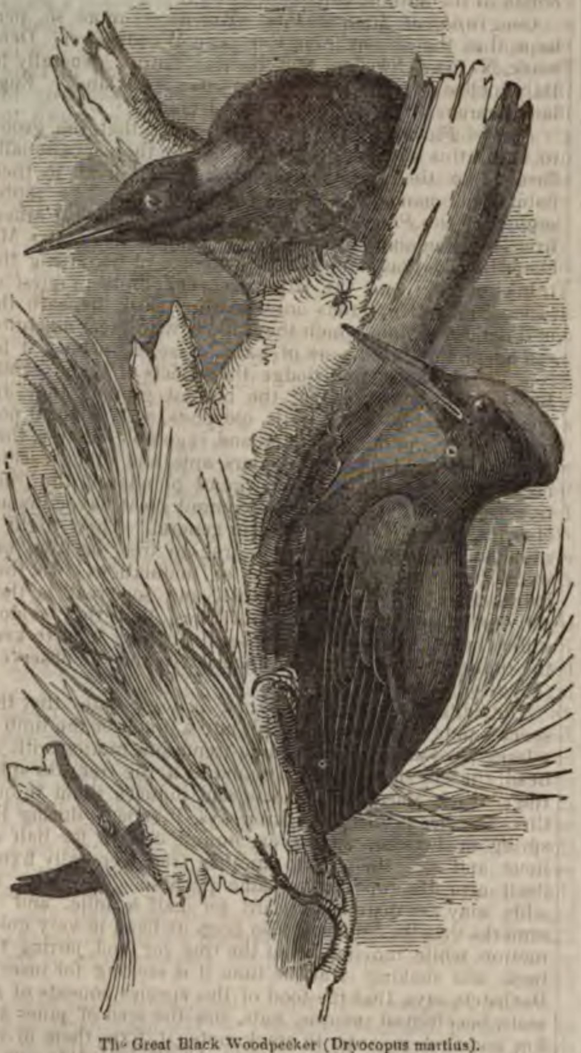
es.—*Picus martius*, Linn. (genus *Dryocopus*,
yotomus, Sw.).
tion.—The whole plumage deep black, except
e *male*, all the upper part of the head is of a
; the *female*, on the contrary, has only a small
hat colour on the occiput. *Very old males* have
nd abdomen tinged with reddish; part of the
hered; iris yellowish white; naked circle which
the eye and feet black; bill bluish-white,
e point. Length from 16 to 17 inches.
Males have the upper part of the head marked
nd blackish spots; iris whitish ash-colour. The
male grows the more vivid does the red on the
me.
.—Plumage varied with white; rarely, the top
orange-red.
the *Pic noir* of the French; *Picchio grande*,
ro, and *Picchio corvo*, of the Italians; *Schwartz-*
Fichten und Nordischer Baumhacker of the
Swarte Specht of the Netherlanders; *Great*
odpecker of the modern British.
hical Distribution.—The north of Europe and
ncipally; Norway, Sweden, Poland, and Russia
and it inhabits the Swiss mountains and those
nd the Tyrol. It is rare in France and Germany.
record of its appearance in Holland. The prince
and Musignano mentions it as occurring very
e neighbourhood of Rome, in the winter only,
sub-Apennine woods. Sir W. Jardine, in the
's Library' (1839), says, 'Mr. Jenyns, the latest
our British Fauna, in 1835 writes thus:—"No specimen however known to have been certainly killed in this country exists in any of our museums, and there is strong reason to doubt the reality of its claims to a place in the British Fauna." The authority previous to this rests with the works of Drs. Latham and Pulteney.'

Mr. Yarrell, in his interesting 'British Birds,' states, in the number published on the 2nd September, 1839, that the Great Black Woodpecker was added to the catalogue of the birds of these islands by Dr. Latham, who said that he had been informed that the species had occasionally been seen in Devonshire and the southern parts of the kingdom. Mr. Yarrell refers also to Dr. Pulteney's catalogue of the Dorsetshire birds, where the Great Black Woodpecker is noticed as having been more than once killed in that county—one in particular said to have been shot in a nursery at Blandford, and another at Whitchurch; and he then quotes Montagu's supplement for the following passage, which, to every one who is aware of the great ornithological knowledge of the present earl of Derby, will be conclusive:—'Lord Stanley assures us that he shot a *Picus martius* in Lancashire; and we have heard that another was shot in the winter of 1805 on the trunk of a tree in Battersea Fields.' Mr. Yarrell then goes on to state that the specimen of the Black Woodpecker, formerly in the collection of Mr. Donovan (who was well known to give very high prices for rare British-killed birds, for his own use in his 'History of British Ornithology'), was affirmed to have been shot in this country; and, at the sale of Mr. Donovan's collection, this specimen was purchased by the earl of Derby, and is now at Knowsley. Mr. Yarrell further states that he has been told of two instances of the Black Woodpecker having been killed in Yorkshire, and that it is also recorded to have been killed in Lincolnshire. 'A few years since,' says Mr. Yarrell in continuation, 'a communication was made to the Zoological Society of London, that two examples of the Great Black Woodpecker had been at that time killed in a small wood, near Scole Inn in Norfolk; and, still more recently, a pair were frequently seen in a small preserved wood, near Christchurch in Hampshire. It was hoped that they would have remained to go to nest; but the birds, disturbed by being too frequently watched, left the wood. Lastly I may add, that Sir Robert Sibbald, in his *Scotia Illustrata*, claims *Picus martius* as a bird of Scotland, including it in his *Historia Animalium in Scotia*.' (*British Birds*.)

Willughby does not declare that the bird is not found in England. He procured his specimen in the market 'at Ratisbone in Germany,' and it was killed in the neighbourhood of that city; but, touching its absence in England, he only says, 'It is not found in England *that we know of*.' Lewin figures the species in his *Birds of Great Britain*, and writes thus:—'We believe this to be exceedingly scarce in England; but as we have sufficient authority to say that it has been met with more than once in the southern and western part of this kingdom, it may not be amiss to figure it among the British species.' That the bird has occurred in this country in a natural state, even of late years, no one, we apprehend, can doubt, after the perusal of the evidence above collected; and the probability is that this fine species was comparatively abundant in the vast forests which formerly covered so great a portion of Britain, especially in the northern parts of the country.

Habits, Food, &c.—Mr. Gould thus describes the habits of the Great Black Woodpecker:—'We need hardly say that it is on the bark of trees more exclusively that the Woodpecker finds its food, and to this end are its powers and organs adapted. If we examine the toes of the present species, which are to be taken as illustrative of form in the whole of the family (with the exception of a single limited group), we find them long and powerful, furnished with strong claws, admirably adapted for grasping or clinging to the rough inequalities of the bark; besides this they are placed in pairs, so as in some measure to antagonize; but not, as generally stated, two before and two behind, for one pair is lateral and diverges from the other at an acute angle, so as to be applied to the convexity of the tree, and thus render the grasp close and firm. The tail is composed of stiff feathers; the shafts of which taper gradually from the base of the extremities, which, curving inward when pressed against a tree, not only form a fulcrum for the support of the body, but by their elastic tend to propel it forwards. This provision, the more needed from the posterior situation of the legs, is admirably calculated for ascending; and having explored the bark by a spiral course, the woodpecker flies off to the next tree to repeat the same process. The flight of the present species is undulating, seldom protracted to any extent, but limited to a transit from tree to tree in the seclusion of its native woods. Its food consists of the larvæ of wasps, bees, and other insects; in addition however it devours fruits, berries, and nuts with avidity. The female selects the hollows of old trees, in which she deposits two or three eggs of an ivory whiteness.'

Mr. Hewitson saw this species in two instances only in Norway, and at a distance. The birds were so wild that to approach them was impossible. The same observing ornithologist says that on the wing the Black Woodpecker looks like a crow, and that its notes resemble a loud hoarse laugh.



The Great Black Woodpecker (Dryocopus martius).

Upper figure, female; lower, male. (Gould.)

Picus viridis (Genus *Gecinus*, Boie; *Brachylopus*, Sw.).

Description.—Male.—Top of the head, occiput, and moustaches brilliant red; face black, upper parts a beautiful green; rump tinged with yellowish; quills regularly marked with whitish on their external barbs; tail shaded with brown and striped transversely; base of the lower mandible yellowish; iris white, feet greenish-brown. Total length about thirteen inches.

Female with less red on the head and less black round the eyes; the moustaches black.

The Young at their departure from the nest have a little red upon the head, the rest yellowish ash-colour; all the green paler, and marked on the back with ashy spots; the moustaches formed by some black and whitish spots; the rest of the lower parts greenish white with transverse brown bands; iris blackish ash.

Varieties.—Pure white with the head yellowish; the plumage whitish, with the ordinary colours weakly developed; often more or less variegated with white.

This is the *Pic verd* and *Pic vert* of the French; *Pico verde, Picchio verde*, and *Picchio pollastro* of the Italians; *Grünspecht*, and *Fichten, Laub, Grüner und Grün Ordhacker* of the Germans; *Wedknar, Gronspit*, and *Grongjoling* of the Swedes; *Groenspet* of the Danes and Norwegians; *Deteu* and *Detela* of Scopoli; *Green Woodpecker* or *Woodspite, Rain-bird, Rain-fowl, Highho, Hewhole, Awl Bird, Pick-a-tree, Yappingale, Yaffil, Yaffle, Yaffler, Woodwall? Whet-ile, Popinjay*, and *Poppingjay* of the modern British; *Cnocell y coed* and *Delor y derw* of the antient British.

Belon seems to confound the Great Black Woodpecker and the Green Woodpecker: his description and figure indicate the latter, but over the cut in 'L'Histoire de la Nature des Oyseaux' (folio, 1555), he writes '*Dryocolaptes, Pipra, Pipo, Chloreus en grec, Picus martius major, Picus arborarius et arborum cavator en Latin, Pic mart, Pic verd, ou Pic iaulne en Françoys*;' and below he gives the description of the δρυοκολάπτης (Dryocolaptes) from the ninth chapter of the ninth book of Aristotle (*Hist. Anim.*), where the Greek zoologist states that the *Dryocolaptes* does not perch on the ground, but strikes the oaks to make the worms and insects (σκνῖπες) come forth. Now the Green Woodpecker frequently alights on the ground for the purpose of feeding on emmets. In the 'Portraits d'Oyseaux,' &c. (4to., 1557), over the same figure, appears 'Grec, δρυοκολάπτης; Latin, *Picus maximus, Picus martius, Arborarius*; Italien, *Pico, Pichio*; Françoys, *Picmart, Pic verd, Pic iaulne, Picumart*;' and below it:

> 'Le Pic verd iaulne à la Turtrelle a guerre,
> Et au Corbeau et au rouge Pic verd.
> De plume iaulne il a le corps couvert,
> Et ses petits en un trou d'arbre enserre.'

Further observations relating to the Woodpeckers and to the antients will be found at the end of this section.

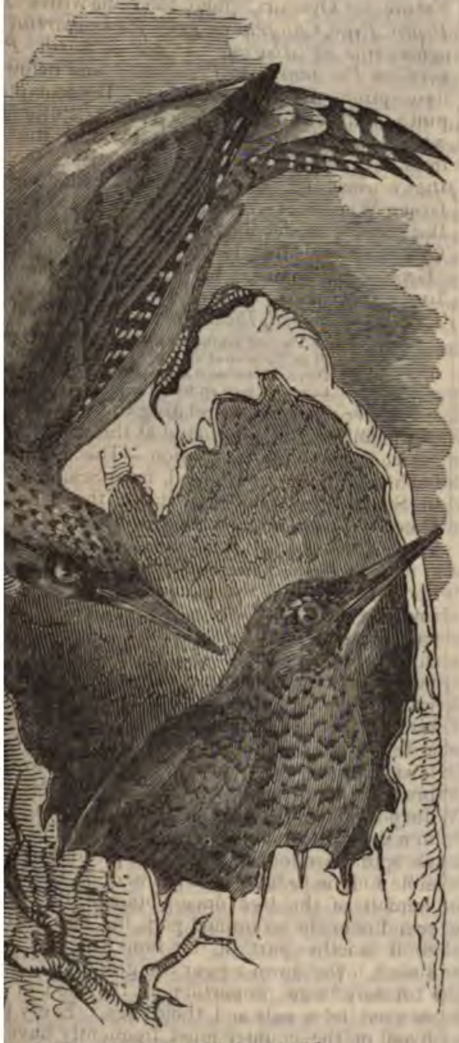
Geographical Distribution.—The European continent, but not common in Holland, from Scandinavia and Russia to Spain, Provence, and Italy; the wooded districts of Greece. England and Scotland generally, where woods are. Not recorded as having been found in Ireland.

Habits, Food, &c.—This species obtains its food upon trees and on the ground; its flight is short, undulating, and rather laborious. 'When seen moving on a tree,' says Mr. Yarrell, 'the bird is mostly ascending in a direction more or less oblique, and is believed to be incapable of descending unless this action is performed backwards. On flying to a tree to make a new search, the bird settles low down on the bole or body of the tree, a few feet above the ground, and generally below the lowest large branch, as if to have all its work above it; it proceeds from thence upwards, alternately tapping to induce any hidden insect to change its place, pecking a hole in a decayed branch, that it may be able to reach any insects that are lodged within, or protruding its long extensible tongue to take up any insect on the surface; but the summit of the tree once obtained, the bird does not descend over the examined part, but flies off to another tree, or to another part of the same tree, to recommence its search lower down nearer the ground.'

A very large proportion of the food of this species is derived from ants and their eggs. Every person who has lived in the country must frequently have seen this gay-coloured woodpecker on its feed at some ant-hill. Mr. Yarrell states that he has seldom had an opportunity of examining a recently killed specimen, the beak of which did not indicate by the earth adhering to the base, and to the feathers about the nostrils, that the bird had been at work. Bechstein says that in the winter it will take bees from the hive, and that in the house it is fed on nuts, ants' eggs, and meat. Of its manners in captivity the German ornithologist says that the beauty of its plumage is all that can be said of it; for it is so fierce, quick, and stubborn, that it can only be kept chained. It is curious, he adds, to see it crack nuts.

Buffon laments over the hard lot of this bird, always condemned to labour for its existence, and hears in its wild laughing cry exclamations of wretchedness. An animal can hardly be unhappy while obeying an instinct which is associated with enjoyment; and so differently has

n upon other ears, that it has conveyed the idea
But Buffon had strange fancies about the hap-
unhappiness of animals. [BUFFON.]
is generally formed in an elm or ash tree, and
birds are excavating the hole on which they
d for its place, they are said to carry their chips
e, for fear their presence on the spot should
covery. The eggs, which are smooth, shining,
are deposited on the bare loose decayed wood,
n five to seven in number.
he laughing note, which is repeated more fre-
l loudly before rain, a low jarring sound is
the adults, and is supposed to be a sexual call.
states that the young are fledged in June, and
t at a short distance from the hole where they
ed before they are able to fly, and that he has
young birds taken from the tree and brought
to become very tame and utter a low note not
of a young gosling.



The Green Woodpecker (Gecinus viridis).
er figure, adult male; lower, young bird. (Gould.)

jor (Genus *Dryobates*, Boie; *Dendrocopus*, Sw.).
on.—Male.—A transverse whitish band on the
op of the head black; on the occiput a red
rge black band originates at the angle of the
ds the temples and forms a junction with itself
ape in one direction, whilst in another it ad-
rging as it proceeds, upon the breast; back
leep black, temples, a patch on the side of the
ulars, middle wing-coverts, and lower parts
white spots on the two barbs of the quills;
nd tail-coverts crimson; lateral tail-feathers
with white, with some black spots; four middle
black; iris red. Length about 9½ inches.
le has no red on the occiput.
fore the moult.—Forehead grey; all the top of the head of a fainter red than in the adults, interspersed occasionally with a few black feathers; occiput black; black of the plumage generally tinged with brown; white of the lower parts tarnished, and interspersed with small blackish points.

After the first moult the red on the top of the head disappears, to give place to the black; and the occiput, which is black in the *young*, becomes red in the *adult males*. By this peculiarity in the change of the livery the young of this species may infallibly be distinguished from those of *Picus leuconotus* and *Picus medius*.

This is the *Grand Pic varié* and *Pic varié* ou *Epeiche* of the French; *Picchio Cardinale maggiore*, *Picchio vario maggiore*, and *Picchio rosso maggiore* of the Italians; *Der Bunt Specht*, *Fichten*, *Kieffern*, *Laubholz und Bergbuntspecht*, and *Grosser Baumhacker* of the Germans; *Gyllenrenna* of the Swedes; *Hakke-speet* of the Danes; *Great Black and White Woodpecker*, *Greater Spotted Woodpecker*, *Witwall*, *Whitwall*, *Wood Pie*, and *French Pie* (the last in Gloucestershire) of the modern British; *Delor fraith* of the antient British.

Geographical Distribution.—Extensive, more so, perhaps, than that of any other European Woodpecker. Denmark, Norway, Sweden, and Russia, Europe generally to Italy inclusive. Common in Smyrna (Strickland). England, (rarer northwards,) Scotland, Ireland.

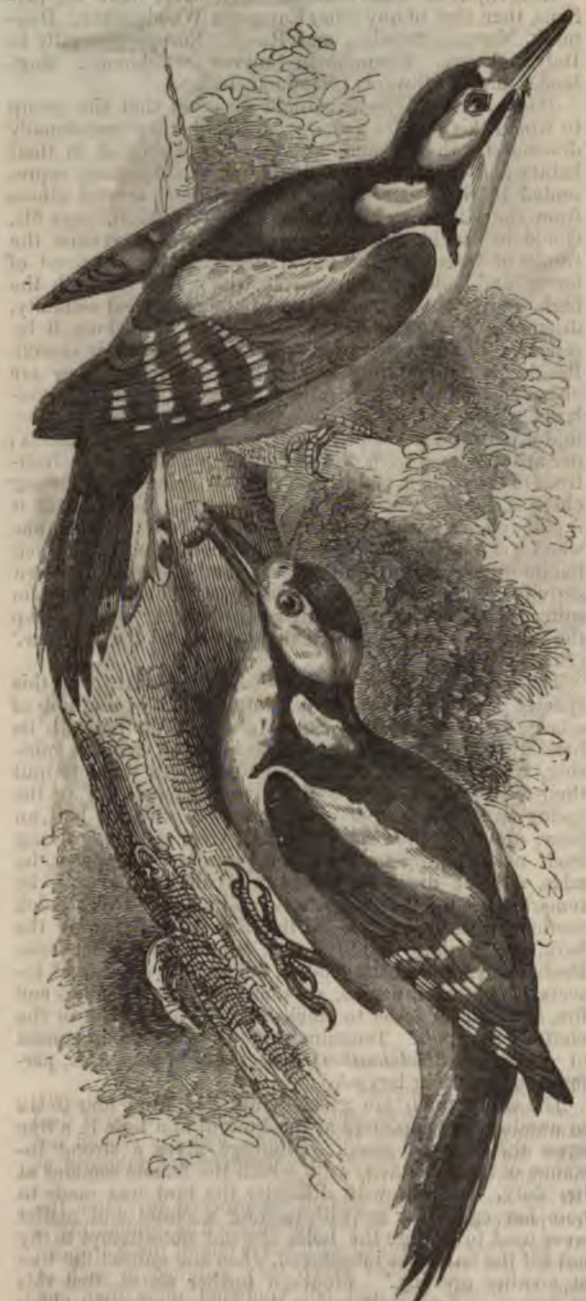
Habits, Food, &c.—Mr. Gould observes that the group to which this species belongs, although they occasionally descend to the ground, are far more arboreal in their habits and manners than the Green Woodpeckers represented by the *Picus viridis*, *caniceps*, and several others from the Himalaya Mountains. 'They exhibit,' says Mr. Gould in continuation, 'great dexterity in traversing the trunks of trees and the larger decayed limbs in quest of larvæ and coleopterous insects which lurk beneath the bark, and to obtain which they labour with great assiduity, disengaging large masses of bark, or so disturbing it by repeated blows as to dislodge the objects of their search. Besides searching trees of the highest growth, they are observed to alight upon rails, old posts, and decayed pollards, where, among the moss and vegetable matter, they find a plentiful harvest of spiders, ants, and other insects; nor are they free from the charge of plundering the fruit-trees of the garden, and in fact commit great havoc among cherries, plums, and wall-fruit in general. Their flight is rapid and short, passing from tree to tree, or from one wood to another, by a series of undulations. In their habits they are shy and recluse, and so great is their activity among the branches of trees, that they seldom suffer themselves to be wholly seen, dodging so as to keep the branch or stem between themselves and the observer.' (*Birds of Europe.*)

The editor of Pennant's *British Zoology* states that this species puts the point of its bill into a crack or the limb of a large tree, and makes a quick tremulous motion with its head, thereby occasioning a sound as if the tree was splitting, which alarms the insects and induces them to quit their recesses: this, the editor says, it repeats during the spring in the same spot every minute or two for half an hour, and will then fly to another tree, generally fixing itself near the top for the same purpose. The noise, he adds, may be distinctly heard for half a mile, and he remarks that the bird will also keep its head in very quick motion, while moving about the tree for food, jarring the bark, and shaking it at the time it is seeking for insects. Bechstein says, that the food of this species consists of insects, beech-mast, acorns, nuts, and the seed of pines and firs, and that in order to crack nuts, it fixes them in the clefts of the trees. Temminck makes the food to consist of 'hannetons (*Melolonthæ*), bees, grasshoppers, ants, perforating and other larvæ.'

The eggs, which are glossy-white, and from four to six in number, are deposited at the bottom of a hole in a tree upon the decayed wood. Montagu gives a strong instance of the pertinacity with which the female remains at her duty. 'It was with difficulty the bird was made to quit her eggs; for notwithstanding a chisel and mallet were used to enlarge the hole, she did not attempt to fly out till the hand was introduced, when she quitted the tree at another opening.' Montagu further states, that this species more frequently makes that jarring noise for which the woodpeckers are distinguished, than either of the others, especially when disturbed from the nest, as he had an opportunity of observing on the occasion above mentioned. 'As soon,' continues he, 'as the female had escaped, she flew to a decayed branch of a neighbouring tree, and there began the jarring noise before-mentioned, which was soon answered by the male from a distant part of the wood, who soon joined his mate, and both continued these vibrations, trying different branches, till they found the most sonorous.'

It is an observation of Mr. Selby's, that scarcely a year passes in Northumberland without some of these birds being obtained in the months of October and November. This induces him to suppose that they are migratory in some of the more northern parts of Europe, perhaps in Norway and Sweden. They arrive, he remarks, about the same time as the Woodcock and other equatorial migrants, and generally after stormy weather from the north or north-east.

The favourite localities of the *Greater Spotted Woodpecker* are large woods and well-timbered parks. It has been seen, but not so abundantly as the next species, in Kensington Gardens.



The Greater Spotted Woodpecker (*Dryobates Major*).
Upper figure, male; lower, female. (Gould.)

Pennant and others have placed the *Middle Spotted Woodpecker*, *Picus medius*, among the British birds; but there is no safe record of its having been even seen in this country. The mistake has arisen from the captors supposing the crimson-headed young of the *Greater Spotted Woodpecker* to be the *Middle Spotted Woodpecker*, which, when in perfect plumage, has the top of the head red. The last-named species is now withdrawn from the British catalogue.

Picus minor, Linn.

Description.—Old Male.—The whole of the forehead, region of the eyes, sides of the neck, and under parts tarnished white; five longitudinal black lines on the breast and flanks; top of the head red; occiput, nape, upper part of the back and wings black; on the rest of the upper parts black and white bands; a black band goes from the angle of the bill on the sides of the neck; lateral tail-feathers terminated with white and streaked with black; iris red. Length 5¾ inches.

Female.—No red; white of the plumage clouded with brown, with a greater number of spots and black stripes than in the male; the black of the upper parts is also less perfect.

Varieties.—Pure white; yellowish-white with the black of the plumage weakly developed; sometimes variegated with white feathers.

This is *Le Petit Epeiche* and *Le Petit Pic* of the French; *Picchio sarto minore*, *Picchio piccolo*, *Picchio Cardinale minore*, and *Picchietto Cardinale* of the Italians; *Gruspecht*, *Garten und Gras Bunt-specht*, *Kleiner Bunt-specht*, and *Kleiner Baumhackl* of the Germans; *Kleinste Bont-Specht* of the Netherlanders; *Lilla Hackspetten* of Nilsson's Scandinavian Fauna; *Lesser Spotted Woodpecker*, *Lesser Spotted Woodspite*, *Hickwall*, and *Crank Bird* of the modern British; *Delor fraith beiaf* of the antient British.

Geographical Distribution.—This, the least of the European Woodpeckers, but by no means the smallest of the family, is pretty generally distributed over Europe from Scandinavia and as far east as Siberia, to Italy. It is common in England, and Sir Robert Sibbald claims it as a Scotch bird under the name of *Picus varius minor*, a designation by which it was known to Ray and the earlier writers. In Ireland it does not seem to have been noticed.

Habits, Food, &c.—Woods, orchards, nursery gardens, and well-timbered parks are the haunts of this pretty little bird. 'In England,' says Mr. Gould, 'it is far more abundant than is generally supposed; we have seldom sought for it in vain wherever large trees, particularly the elm, grow in sufficient numbers to invite its abode; its security from sight is to be attributed more to its habit of frequenting the topmost branches than to its rarity. Near London it is very common and may be seen by an attentive observer in Kensington Gardens, and in any of the parks in the neighbourhood. Like many other birds whose habits are of an arboreal character, the Lesser Spotted Woodpecker appears to perform a certain daily round, traversing a given extent of district, and returning to the same spot whence it began its route. Besides the elm, to which it is especially partial, it not unfrequently visits orchard-trees of large growth, running over their moss-grown branches in quest of the larvæ of insects which abound in such situations. In its actions it is very lively and alert. Unlike the Large Woodpecker, which prefers the trunks of trees, it naturally frequents the smaller and more elevated branches, which it traverses with the utmost ease and celerity: should it perceive itself noticed, it becomes shy, and retires from observation by concealing itself behind the branch on which it rests; if however earnestly engaged in the extraction of its food, its attention appears to be so absorbed that it will allow itself to be closely approached without suspending its operations. When spring commences, it becomes clamorous and noisy, its call being an oft-repeated note, so closely resembling that of the Wryneck as to be scarcely distinguishable from it. At [illegible] times of the year it is mute, and its presence is only betrayed by the reiterated strokes which it makes against the bark of trees.' (*Birds of Europe.*)

The four or five eggs are deposited in a hole in a tree generally suited to the size of the bird, whereby larger intruders are excluded, and sometimes very deep. They are of a delicate flesh-colour before they are blown, being so transparent that the colour imparted by the yolk is visible; when blown they are of a shining white.

The Lesser Spotted Woodpecker.
Lower figure, male; upper, female. (Gould.)

tridactylus. (Genus *Picoïdes*, Lacép.; *Tridac-*
ephens; *Dendrocopus*, Koch; *Apternus*, Sw.)
iption.—Male.—Forehead variegated with black
te; top of the head golden yellow; occiput and
lustrous black; a black moustache is prolonged
e breast; behind the eyes a narrow white stripe,
irger one below; front of the neck and breast pure
upper part of the back, sides of the breast, flanks,
omen transversely streaked with black and white;
irnished black, with some white spots on the quills;
the upper part of the tarsus covered with feathers;
nandible brown, lower whitish to the point; iris
Length nine inches.

Old Male has the yellow of the head more vivid
re white on the lower parts, but the white is always
sely striped with black.

le.—Top of the head lustrous or silvery-white, va-
l with fine black streaks.

is the *Northern Three-toed Woodpecker* of Ed-
Picus hirsutus of Vieillot; *Dreizehiger Specht*
g und Alpen Dreizehiger Specht of the Germans;
Hackspette of Nilsson's Scandinavian Fauna;
a tre-dita of the Italians.

raphical Distribution.—The vast forests in the
ins of the north of Europe, Asia, and America;
undant in Siberia, common in the Swiss Alps, rare
ce and Germany, where it only passes accidentally;
en in Holland. Such is M. Temminck's account,
ls, in the fourth part of his 'Manual,' that it is never
rarely found on the summits of the Alps, and that it
asses the elevation of 4000 feet above the level of
It inhabits, he adds, exclusively the forests and
at the foot of the Alps, and is very common in
and. Mr. Gould states that it is by no means un-
in the northern parts of the European continent;
forests of the mountainous parts of Norway, Sweden, Russia, and Siberia forming its principal habitat; that it is also found among the Alps of Switzerland, is but an accidental visitor in France and Germany, and has never been taken, he believes, in the British Islands. Dr. Richardson says that this bird exists in all the forests of spruce-fir lying between Lake Superior and the Arctic Sea, and that it is the most common woodpecker north of Great Slave Lake. It much resembles, he adds, *Picus villosus* in its habits, except that it seeks its food principally on decaying trees of the pine tribe, in which it frequently makes holes large enough to bury itself, and remarks that it does not migrate. Temminck observes that the North American specimens are rather less and their colours more vivid than those of Europe; but the total length of a male killed near the sources of the Athabasca River (lat. 57°) is given by Dr. Richardson as nine inches six lines.

Insects and their larvæ and wild fruits form the food of this species, which lays four or five pure white eggs in the hole of a tree.

Three-toed Woodpecker. Lower figure, male. (Gould.)

Two other European Woodpeckers (four-toed), viz. *Picus canus* and *Picus leuconotus*—the first a good deal resembling the *Green Woodpecker*, and the second not unlike the *Greater Spotted Woodpecker*—are unknown as inhabitants of the British Islands.

Before we close this section we proceed to notice the Woodpeckers known to the antients. The probability is that they were acquainted with every one of the European species; but the names which they assigned to each of them, if indeed they did not confound more than one species under the same name, are not, in our opinion, quite satisfactorily determined.

Aristotle ('Hist. Anim.,' viii. 3), after treating of insectivorous birds, says that there are other insect-eaters (σκνιποφάγα), as the greater and lesser *Pιpra* (*Pipo* in Bekker's text), and that some call both these δρυοκολάπτης, that is, tree-pecker or piercer. These birds, he adds, resemble each other and have the same voice, but the greater has the loudest. They both obtain their food by flying to the trees. The *Colius* (κολιός), or Celius (κελεός), Bekker, whose text is the only good one, also, which is the size of the Turtle-dove, but whose colour is green entirely. This, Aristotle says, is a great excavator of trees, on which it gets its living; and its voice is very loud. This bird especially occurs in the Peloponnesus. Aristotle then mentions another insectivorous bird, which is called κνιπολόγος (*cnipologus*, gnat or insect catcher), and hollows trees; but this, from its small size and colour, can hardly have been any known Woodpecker. In the ninth chapter of the ninth book, Aristotle states that the *Dryocolaptes* does not sit on the ground, but pecks the oaks to make the worms and insects come forth, which it afterwards catches with its tongue, which is broad and large. It runs very quickly upon the trees.

This part of the description answers very well for a woodpecker, with the exception of the epithet 'broad' as applied to the tongue. No known woodpecker has a broad tongue, and indeed the conformation forbids such a structure.

The rest of the description, relating to the strong claws for enabling the bird to fix itself against the tree and climb it, applies exactly to a woodpecker.

Aristotle mentions three of these *Dryocolaptes*, one smaller than a *Cottyphus* (blackbird probably), which has red spots; a second of the same size as a *Cottyphus;* and a third not much less than a hen. It has its nest on trees, especially on the olive-tree, and feeds on emmets and worms which come out of the trees. To get at the worms he hollows out the tree so much, they say, as to cause it to fall. A tame one having adjusted an almond in a chink of wood, broke it at the third stroke and ate the kernel.

Aristotle also mentions the strong and compact bill of the *Dryocopus* in the first chapter of the third book (*De partibus Anim.*).

We have seen Belon's opinion as to the *Dryocolaptes;* and he considers one of the Spotted Woodpeckers with red spots to be the *Pipra*. In his chapter on the 'Pic verd rouge, nommé en Françoys Une Epeiche,' he places above the cut the following synonyms:—'Pipra en Grec, Pipo et Picus martius minor en Latin, Epeiche, Cul rouge, ou Pic rouge en Françoys.' (Folio, 1555.) In the 'Portraits d'Oyseaux' (4to., 1557) the same cut is superscribed 'Grec, Πίπρα; Latin, Picus martius minor, Picus varius, albo nigroque distinctus; Italien, Pigozo; François, Epeische, Cul rouge, Pic rouge.' Beneath the cut are the following lines:—

> 'L'Epeische en corps et couleur differente
> Est au Pic verd, mais l'un et l'autre fait
> Son nid au creux d'un arbre, et par effait
> Monte et descend, cherchant qui le contente.'

M. Camus is of opinion that the great *Pipra* is the *Pic-noir* of M. Buffon, *Picus martius;* that the *Colius* is the *Pic-verd* of M. Buffon and others, *Picus viridis;* and that the little *Pipra* is the *Pic varié* or *Epeiche*, *Picus major*.

Pliny appears to use the term *Picus martius* as a general name for all Woodpeckers. Thus, in the eighteenth chapter of his tenth book (*Nat. Hist.*), 'De pico martio,' he notices the 'pici, martio cognomine insignes' as small birds with crooked claws, and proceeds to give a very fair account of their climbing and woodpecking habits, 'scandentes in subrectum, felium modo,' and their hatching their young in the hollows. He who is entertained with Roman fable will find some amusement in Pliny's pages where he speaks of these birds, which were highly esteemed in augury, especially in Latium, out of veneration to the mythical king from whom they derived their name. (*Nat. Hist.*, x. 33; xi. 37; xxvi. 4; xxvii. 10; xxx. 16.)

ASIATIC WOODPECKERS.

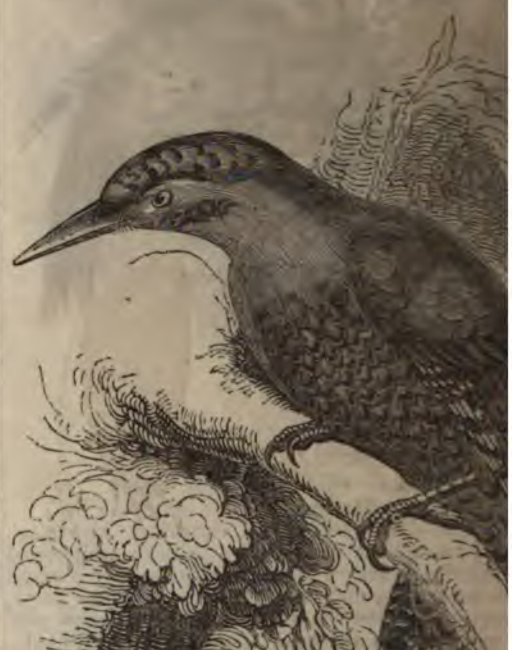
Examples, *Picus squamatus*.

Description.—Top of the head and occiput scarlet; above and below the eye a yellowish-white streak; a black line extending from the base of the lower mandible along the sides of the neck; the upper surface of a bright green; quill-feathers and tail dull olive black, barred with white; throat and breast greyish-green; abdomen and under surface of a still lighter tint, marked with black scales
and regularly disposed; bill yellowish-white, hon
at the base; tarsi brown. Length 12¾ inches.

Geographical Distribution.—Asia; the Himalay
tains.

Mr. Gould, from whom the above description i
observes, in his 'Century,' that there appears
natural group of the Woodpeckers, intermediate
the genus *Colaptes*, whose habits confine them en
the ground, and the typical *Picidæ*, who gain th
sistence almost wholly from the bark of trees.
intermediate division—of which, he remarks,
Picus viridis and the *Picus canus* of the Contin
be considered as the types, and which are the only
found in Europe—the present species as well
occipitalis, also a Himalayan bird, may be clas
these birds being found, like the typical Woodp
frequent trees as a resort for food, while at the
they equally subsist, like the ground-feeding sp
ants and other insects, which they obtain on the
the ground.

Mr. Gould further states that the locality of *Pi*
matus as well as *Picus occipitalis* is believed to
fined solely to the higher parts of the mountains.



Picus Squamatus. (Gould.)

Picus Shorii.

Description.—Upper part of the head and el
crest of the head and rump rich scarlet; a white l
tending from the base of the upper mandible to t
put, edges the scarlet of the head; a black band o
behind the eye below this white line, passes thro
ear-coverts to the back of the neck, and there sp
far as to the back; cheeks and sides of the nec
separated from the throat and forehead by a wav
line passing from the gape to the sides of the ches
of the lower mandible bordered by a brownish mark
white; back orange passing into various tints of sc
the shoulders and wing-coverts, and on the run
bright scarlet; quills, tail, and upper tail-coverts
under surface dirty brownish white, with black sc
marks; bill and tarsi black. Length 12 inches.

Geographical Distribution.—Asia; Himalaya Mo

This three-toed Woodpecker exhibits a close affin

a, Horsf., an inhabitant of the Indian Archipelago,
n colouring as in the absence of the hinder toe,
both birds is represented only by a rudimentary

ould, who makes this observation, and from whose
the Himalaya Birds the description is taken, re-
at it was the only one which the Hon. C. J. Shore,
whose zoological researches in India the bird was
e known, and after whom it was named) was able
e. Few, if any, of the tribe surpass it in brilliancy
ge.

Picus Shorii. (Gould.)

AFRICAN WOODPECKERS.

le, *Picus cafer* (Genus *Trachyphonus*, Ranz;
, Less.; *Polysticte*, Smith).
m, as we have already seen, has been arranged by
Gray as the last of the subfamily *Bucconinæ*.
Character.—Bill of the length of the head,
ove, pointed, recurved or arched longitudinally,
ndible thicker than the lower; nostrils oval,
ished with bristles; tarsi slender; third quill
ail rounded.
ds of this genus are Woodpeckers which seek
on the ground, and under the bark and in the
h grows on trees, and indeed the old zoologists
e species which we have selected as an example
It differs however considerably from the typical
ers, which has led to its separation, and the
ames applied to it by modern zoologists.
tion of *Picus cafer*. Head, belly, and rump
pper coverts of the tail orange; forehead black;
scanty pointed aigrettes; a large black collar
l with white, bordered above with a small nar-
edging varied a little with brown below; back
k and back brown, each feather terminated with
ail rounded, brown, striped with greyish-white;
at the point.
the *Promepic* of Le Vaillant; *Trachyphonus*
, Ranz; *Micropogon sulphuratus*, Latr.; and
guopopa, Smith.
y.—Caffraria.
C., No. 1747.

Habits, Food, &c.—This species inhabits the forests, and lives on insects and their larvæ which harbour in the moss that grows on trees and under their bark.

Trachyphonus Cafer.

AMERICAN WOODPECKERS.

It is not to be wondered at that America, so rich in deep forests as it once must have been, and indeed is now where the axe of the woodman has not yet penetrated, should possess many species of Woodpeckers. Lawson thus enumerates those in Carolina known to him.

'Of Woodpeckers, we have four sorts. The first is as big as a pigeon, being of a dark brown colour, with a white cross on his back, his eyes circled with white, and on his head stands a tuft of beautiful scarlet feathers. His cry is heard a long way; and he flies from one rotten tree to another, to get grubs, which is the food he lives on.

'The second sort are of an olive colour, striped with yellow. They eat worms as well as grubs, and are about the bigness of those in Europe.

'The third is the same bigness as the last; he is pied with black and white, has a crimson head without a topping, and is a plague to the corn and fruit; especially the apples. He opens the covering of the young corn, so that the rain gets in and rots it.

'The fourth sort of these woodpeckers is a black and white speckled or mottled; the finest I ever saw. The cock has a red crown; he is not near so big as the others; his food is grubs, corn, and other creeping insects. He is not very wild, but will let one come up to him; then shifts on the other side of the tree from your sight; and so dodges you for a long time together. He is about the size of an English lark.'

Catesby notices the same species as Lawson and adds others; one of these, *the Gold-winged Woodpecker*, *Picus auratus* (Genus *Colaptes*, Sw.), appears to belong to the same genus as *Picus cafer* above noticed.

As examples of the North American species we select *Picus pileatus* and *Picus principalis*.

Picus pileatus, (Genus *Dryotomus*, Sw.).

Description.—*Male.*—Top of the head, occipital crest, and maxillary stripe bright scarlet. Line bounding the crest laterally from the eye, a band from the nostrils to the side of the nape, thence along the neck to the sides of the breast, the concealed bases of all the quill-feathers, a spot covered by the spurious wing, the chin, throat, and inner wing-coverts pure white. A bar across the orbit and to the middle of the nape, and the rest of the plumage pitch-black, purest on the quills and tail. Some of the ventral feathers are fringed with grey, and two or three of the greater quills are tipped exteriorly with brownish-white. Bill blackish-grey above, pale horn-colour beneath. Irides golden yellow. Legs bluish-black.

The *Female* has a yellowish-brown forehead, with darker shafts and a blackish maxillary stripe. Length of a male killed in the winter, lat. 57°, near the Rocky Mountains, 20 inches.

This is the *Larger Red-crested Woodpecker* of Catesby; *Pileated Woodpecker* of Pennant and others; *Pileated Woodpecker* or *Log-Cock* of the Anglo-Americans; *Moh-keechœ-cannœshees* of the Cree Indians; *Thedè-dilleh* of the Chipewyans.

Geographical Distribution.—Not unfrequent in well-timbered forests, from Mexico to Canada, at least to the 50th degree N. (Nuttall). Resident all the year in the interior of the fur-countries up to the sixty-second or sixty-third parallels; rarely appearing near Hudson's Bay, but frequenting the gloomiest recesses of the forests that skirt the Rocky Mountains. All the United States, and particularly numerous in the Gennessee country, in the state of New York. (Richardson.) Nuttall notices as singular, and perhaps showing the wild timidity of the bird, that though an inhabitant towards the savage and desolate sources of the Mississippi, it is unknown, at this time, in all the maritime parts of the populous and long-settled state of Massachusetts.

Habits, Food, &c.—Catesby says that these birds (besides insects which they get from rotten trees, their usual food) are destructive to 'maiz' by pecking holes through the husks that inclose the grain, and letting in the wet. Dr. Richardson states that the stillness of the primeval shades which it frequents is often invaded by the stroke of its powerful bill, which excels the woodman's axe in the loudness of its sound, and still more in the rapidity with which its blows are urged; nor does it, he adds, fall far short in the quantity of chips it produces. Like other Woodpeckers, it is, he says, extremely industrious, seemingly never a moment idle, flying from tree to tree, and plying its head like a hammer the instant that it alights. A few strokes of the bill suffice to indicate the state of the tree; and Dr. Richardson concludes his observations on this species by remarking that if the bird judges that it would explore the interior in vain, it instantly quits that tree for another.

'From the tall trees which cast their giant arms over all the uncleared river lands may often be heard his loud, echoing, and incessant cackle, as he flies restlessly from tree to tree, presaging the approach of rainy weather. These notes resemble *ekerek rek rek rek, rek, rek, rek*, uttered in a loud cadence, which gradually rises and falls. The marks of his industry are also abundantly visible on the decaying trees, which he probes and chisels with great dexterity, stripping off wide flakes of loosened bark, to come at the burrowing insects which chiefly compose his food. In whatever engaged, haste and wildness seem to govern all his motions; and by dodging and flying from place to place as soon as observed, he continues to escape every appearance of danger. Even in the event of a fatal wound, he still struggles with unconquerable resolution to maintain his grasp on the trunk to which he trusts for his safety, to the very instant of death. When caught by a disabling wound, he still holds his ground against a tree, and strikes with bitterness the suspicious hand which attempts to grasp him, and, resolute for his native liberty, rarely submits to live in confinement.' Nuttall further states that this species is without much foundation charged at times with tasting maize, but in winter he observed the bird in South Carolina occasionally making a hearty repast on holly and similar berries.

The female lays about six snow-white eggs in the cavity of a tree. Two broods are said to be produced in a season.

Picus principalis.

Description.—Black with a gloss of green. Fore part of the head black, the rest of the crest crimson, with some white at the base. A stripe of white proceeding from a little below the eye, down each side of the neck, and along the back (where the two are about an inch apart) nearly to the rump. Tail black, tapering from the two exterior feathers, which are three inches shorter than the middle ones, the feathers concave below. Legs lead-colour. Bill an inch broad at the base, of the colour and consistence of ivory, and channelled. Tongue also white. Iris vivid yellow. Length about twenty inches; alar extent about thirty inches. (Nuttall.)

This is the *Largest White-bill Woodpecker* of Catesby; *Ivory-billed Woodpecker* and *Large Log-Cock* of the Anglo-Americans.

Geographical Distribution.—Brazil, Mexico, the Southern States, seldom seen to the north of Virginia, and but rarely in that state.

Habits, Food, &c.—Catesby says that these birds 'subsist chiefly on ants, wood-worms, and other insects, which they hew out of rotten trees, Nature having so formed their bills, that in an hour or two they will raise a bushel of chips, for which the Spaniards call them *Carpenteros*.' He adds that their bills are much valued by the Canada Indians, who make coronets of them for their princes and great warriors by fixing them round a wreath, with their points outward. The Northern Indians, he tells us, having none of these birds in their cold country, purchase them of the southern people at the price of two and sometimes three buck-skins a bill.

Nuttall states that it is a constant resident in the countries where it is found, in the warmer regions, breeding in the rainy season, and that the pair are believed to be united for life. 'More vagrant,' says Nuttall in continuation, 'and independent than the rest of his family, he is never found in the precincts of cultivated tracts; the scene of his dominion is the lonely forest, amidst trees of the greatest magnitude. His reiterated trumpeting note, somewhat similar to the high tones of the clarionet (*pait, pait, pait, pait*), is heard soon after day, and until a late morning hour, echoing loudly from the recesses of the dark cypress swamps, where he dwells in domestic security, without showing any impertinent or necessary desire to quit his native solitary abodes. Upon the giant trunk and moss-grown arms of this colossus of the forest, and amidst inaccessible and almost ruinous piles of mouldering logs, the high rattling clarion and repeated strokes of this princely Woodpecker are often the only sounds which vibrate through and communicate an air of life to these dismal wilds. His stridulous interrupted call, and loud industrious blows, may often be heard for more than half a mile, and become audible at various distances, as the elevated mechanic raises or depresses his voice, or as he flags or exerts himself in his laborious employment. His retiring habits, loud notes, and singular occupation, amidst scenes so savage yet majestic, afford withal a peculiar scene of solemn grandeur, on which the mind dwells for a moment with sublime contemplation, convinced that there is no scene in nature devoid of harmonious consistence. Nor is the performance of this industrious hermit less remarkable than the peals of his sonorous voice, or the loud choppings of his powerful bill. He is soon surrounded with striking monuments of his industry: like a real carpenter (a nick-name given him by the Spaniards), he is seen surrounded with cart-loads of chips and broad flakes of bark, which rapidly accumulate round the roots of the tall pine and cypress where he has been a few hours employed; the work of half a dozen men, felling trees for a whole morning, would scarcely exceed the pile he has produced in quest of a single breakfast upon those insect larvæ which have already, perhaps, succeeded in deadening the tree preparatory to his repast. Many thousand acres of pine-trees in the Southern States have been destroyed in a single season by the insidious attacks of insects, which in the dormant state are not larger than a grain of rice. It is in quest of these enemies of the most imposing part of the vegetable creation that the industrious and indefatigable Woodpecker exercises his peculiar labour. In the sound and healthy tree he finds nothing which serves him for food.'

Wilson, whose 'American Ornithology' is known to every lover of the subject and of nature, wounded one of these birds. His narrative is painful. The Woodpecker did not survive his captivity more than three days, during which he manifested an unconquerable spirit, and refused all sustenance. When he was taken he uttered cries almost like those of an infant; and no sooner was he left alone for an hour, than he so worked, that he nearly made a way through the wooden house in which he was confined. He severely wounded Wilson whilst the naturalist was sketching him, and died with unabated spirit. This unconquerable courage most probably gave the head and bill of the bird so much value in the eyes of the Indians.

The four or five white eggs are generally deposited in a hole in the trunk of a cypress tree at a considerable height, at which both the male and female have laboured, to enlarge and fit it for the purposes of incubation, till it is some two or more feet in depth. About the middle of the young are seen abroad. Besides the usual ar-l insects, this woodpecker, it is said, is fond of grapes other berries; but Indian corn, other grain, or any ard fruit, it does not touch, according to good au-ties.

Picus principalis.

an example of the South American Woodpeckers we :—

s chilensis.

cription.—Sombre with little bars of brown and h except on the lower part of the back and rump, a single colour predominates, forming a large patch e white; bill black; a grey hood, pencilled with bright grey, covers the head; cheeks rusty, and whitish; all the upper part of the body, wings, and he great quills, rusty brown barred with small whitish ; shafts of the quills golden yellow, and their in-part fulvous brown, with a white border or a single f the same colour towards the middle; breast, ab-, and flanks whitish, dotted with brown; colour of eather yellowish-white, while the middle is occupied rcle of brown deepest upon the breast. Tail-feathers id wedge-shaped, brown above with a slight fulvous ightest below; the two external and the two in-ones are pencilled with whitish sinuous bands upon edges. Colour of the tarsi greenish; that of the approaching reddish. Total length more than eleven . (Lesson.)

lity.—The woods of the province of Concepcion at M. Lesson killed many individuals upon the penin-f Talcaguano.

Chilians call this bird *Carpentero*, a name generally d by the Spaniards to the woodpeckers, both in e and America.

woodpeckers appear to have been found in Australia the South Sea Islands.

Picus chilensis. (Coquille.)

WOOD-PIGEON, one of the names for the Ring-Dove, *Columba Palumbus*. [COLUMBIDÆ, vol. vii., p. 371.]

WOOD-SORREL. [OXALIDACEÆ.]

WOOD SWALLOWS, a name given by the colonists of Australia to birds belonging to the genus *Artamus* of Vieillot: *Ocypterus*, Cuv.; *Leptopteryx*, Horsf.; *Lanius*, Linn. They are *The Swift Shrikes* of Mr. Swainson.

Although ornithologists very frequently use Cuvier's generic name, *Artamus* has the priority, and, moreover, Cuvier's term had been pre-occupied to designate a genus of insects.

The genus has been generally arranged among the SHRIKES (vol. xxi., pp. 415, 416); but Mr. G. R. Gray, although he places it under the *Dicrurinæ*, makes that subfamily the fifth and last of the *Ampelidæ*.

Generic Character.—Bill gradually arched from the base, where it is very broad. Culmen thick and convex, without any ridge; the base dividing the frontal feathers and somewhat dilated. Rictus bristled. Nostrils wide apart, naked, small, without a membrane, and pierced in the bill. Feet short, strong. Wings very long and pointed; the first quill longest. Tail short. (Swainson.)

Geographical Distribution of the Genus.—India and Australia.

INDIAN WOOD SWALLOWS.

Example, *Artamus leucorhynchos.*

Description.—Size rather larger than a sparrow, and in shape much more elongated. Head, neck, breast, back, wings, and tail black. Belly and upper part of the rump white. Under part of the wings (which are very long and reach at least an inch beyond the tail) grey. Bill greyish, conical, and very strong, slightly curved at its extremity, and its base surrounded with stiff bristles directed forwards. Legs black.

This is the *Lanius leucorhynchos* of Gmelin, *Pigreische Dominiquaine des Philippines* of Sonnerat, and *White-bellied Shrike* of Latham.

Habits.—Sonnerat states that this bird flies with rapidity, poising itself in the air like the Swallows. It is, he adds, an enemy to the crow; and although much smaller, the wood swallow not only dares to oppose but to provoke him. The combat is long and stubborn, sometimes continuing for half an hour, and concludes with the retreat of the crow. Perhaps, says Sonnerat, the crow despises this too feeble enemy, which only harasses him, and avoids his strokes by his activity, darting away and returning as he sees his opportunity.

M. Valenciennes has published a monograph of the species in the *Mémoires du Mus.* (tome vi., p. 20).

AUSTRALIAN WOOD SWALLOWS.

Mr. Gould, in the sixth part of his great and beautiful work on the *Birds of New Holland*, now in course of publication, has figured and described no less than six species of *Artamus*. Of these we select as examples, *Artamus sordidus* and *Artamus cinereus*.

Artamus sordidus.

Description.—Head, neck, and the whole of the body fuliginous grey; wings dark bluish-black, the external edges of the second, third, and fourth primaries white; tail bluish-black, all the feathers, except the two middle ones, largely tipped with white; irides dark brown; bill blue, with a black tip; feet nearly lead colour. Sexes alike in colour, but the female rather the smallest.

Young with a dirty-white irregular stripe down the centre of each feather on the upper parts, and mottled with the same on the under parts.

This, according to Mr. Gould, whose description we have above given, is the *Sordid Thrush*, *Turdus sordidus* of Latham; *Ocypterus albovittatus* of Cuvier, Valenciennes, and Gould's Synopsis; *Artamus lineatus* of Vieillot; *Artamus albovittatus* of Vigors and Horsfield; *Leptopteryx albovittata* of Wagler; *Be-wŏ-wen* of the Aborigines of the lowland and mountain districts of Western Australia; and *Worle* of the Aborigines of King George's Sound.

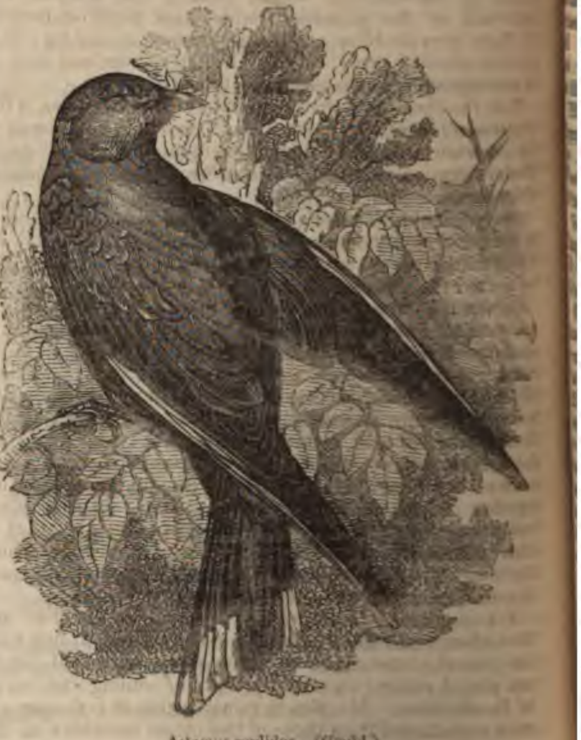
Geographical Distribution.—Mr. Gould states, that no species of the Australian *Artami* with which he is acquainted possesses so wide a range from east to west as *Artamus sordidus;* it being present in the whole of the southern portion of the continent as well as in Van Diemen's Land. The extent of its northern range, he says, has not yet been satisfactorily ascertained, beyond the certainty that hitherto it has not been received from any collection from the north coast.

Habits, Food, &c.—The same observing and enterprising ornithologist observes that it may be regarded as strictly migratory in Van Diemen's Land, where it arrives in October, the beginning of the Australian summer, and after rearing at least two broods departs again northwards in November. On the continent, he remarks, a scattered few remain throughout the year in all the localities favourable to the habits of the bird, the number being regulated by the supply of the necessary insect-food. The specimens from Swan River, South Australia, and New South Wales, present no difference, he tells us, either in size or colour; but those from Van Diemen's Land are invariably larger and of a deeper hue, a variety which Mr. Gould attributes to the superabundance of food in that more southern and humid climate.

This species breeds from September to December, and the situation of the nest is very much varied. Mr. Gould saw one placed in a thickly leaved bough near the ground, while others were in a naked fork, on the side of the bole of a tree, in a niche formed by a portion of the bark having been separated from the trunk. He describes the nest as rather shallow, of a rounded form, about five inches in diameter, and composed of fine twigs neatly lined with fibrous roots. He observed that the nests found in Van Diemen's Land were larger, more compact, and more neatly formed than those on the continent of Australia. The eggs, which are generally four in number, differ in the disposition of their markings. The dull white of the ground-colour is spotted and dashed with dark umber-brown; in some Mr. Gould found a second series of greyish spots appearing as if from beneath the surface of the shell. Medium length eleven lines, and breadth eight lines.

But the general habits of this bird are so interesting and in one instance so very peculiar, that we shall lay them before our readers in Mr. Gould's own words:—

'This Wood Swallow, besides being the commonest species of the genus, must, I think, be rendered a general favourite with the Australians, not only from its singular and pleasing actions, but by its often taking up its abode and incubating near the houses, particularly such as are surrounded by paddocks and open pasture lands skirted by large trees. It was in such situations as these in Van Diemen's Land, at the commencement of spring, that I first had an opportunity of observing this species; it was then very numerous on all the cleared estates on the north side of the Derwent, about eight or ten being seen on a single tree, and half as many crowding one against another on the same dead branch, but never in such numbers as to deserve the appellation of flocks: each bird appeared to act independently of the other; each, as the desire for food prompted it, sallying forth from the branch to capture a passing insect, or to soar round the tree and return again to the same spot; on alighting it repeatedly throws up and closes one wing at a time, and spreads the tail obliquely prior to settling. At other times a few were seen perched on the fence surrounding the paddock, on which they frequently descended, like starlings, in search of coleoptera and other insects. It is not however in this state of comparative quiescence that this graceful bird is seen to the best advantage; neither is it that kind of existence for which its form is especially adapted; for although its structure is more equally suited for terrestrial, arboreal, and aërial habits than that of any other species I have examined, the form of its wing at once points out the air as its peculiar province; hence it is that when engaged in pursuit of the insects which the serene and warm weather has enticed from their lurking-places among the foliage to sport in higher regions, this beautiful species in these aërial flights displays its greatest beauty, while soaring above in a variety of easy positions, with white-tipped tail widely spread. Another very extraordinary and singular habit of this bird is that of clustering like bees on the dead branch of a tree: this feature was not seen by me, but by my assistant, Mr. Gilbert, during his residence at Swan River; and I have here given his account in his own words. "The greatest peculiarity in the habits of this bird is its manner of suspending itself in perfect clusters, like a swarm of bees; a few birds suspending themselves on the under side of a dead branch, while others of the flock attach themselves one to the other, in such numbers that they have been observed nearly of the size of a bushel measure." It was very numerous in the town of Perth until about the middle of April, when I missed it suddenly, nor did I observe it again until near the end of May, when I saw it in countless numbers flying in company with the common Swallows and Martens over a lake about ten miles north of the town; so numerous in fact were they that they darkened the water as they flew over it. Its voice greatly resembles that of the Common Swallow in character, but is much more harsh.'



Artamus sordidus. (Gould.)

Mr. Gould gives a representation on the plate which accompanies his description of this extraordinary clustering habit. The birds in the representation at once remind one of a swarm of bees.

Swarm of Artamus sordidus. (Gould.)

Artamus cinereus.

Description.—Crown of the head, neck, throat, and chest grey, passing into sooty grey on the abdomen; space between the bill and the eye, fore-part of the cheek, chin, upper and under tail-coverts jet black; two middle tail-feathers black; the remainder black largely tipped with white, with the exception of the outer feather on each side, in which the black extends on the outer web nearly to the tip; wings deep grey, primaries bluish-grey; under surface of the shoulder white, passing into grey on the under side of the primaries; irides dark blackish-brown; bill light greyish-blue at the base, black at the tip; legs and feet greenish-grey. Sexes alike in colour, and only to be distinguished by dissection. (Gould.)

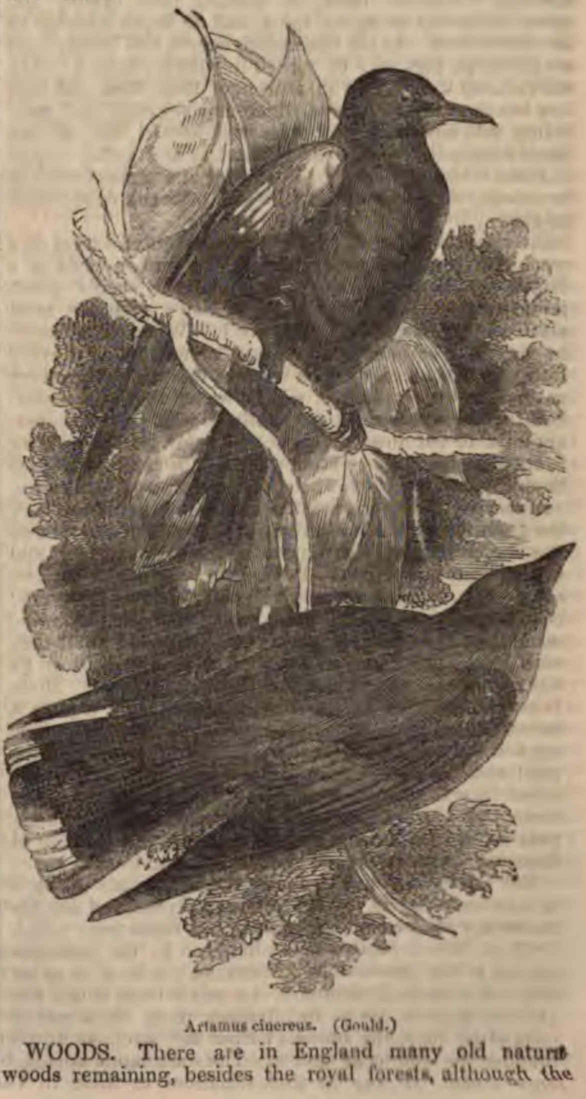
This, the largest of the Australian Wood Swallows, is the *Ocypterus cinereus*, Valenc.; and also the *Be-wö-wen* of the Aborigines of the lowland and mountain districts of Western Australia, and the *Wood Swallow* of the colonists of the same.

Geographical Distribution.—Timor and Australia. Range in the last-named country extensive. Found by Mr. Robert Brown at Broad Sound in the east, and by Mr. Gilbert on the west coast.

Habits, Food, &c.—Mr. Gould states that in Western Australia, although a very local, it is by no means an uncommon species, particularly at Swan River, where it inhabits the limestone hills near the coast and the 'Clear Hills' of the interior, assembling in small families, and feeding upon the seeds of the *Xanthorhœa*, so that insects do not form the sole diet of this species. Mr. Gould indeed observes that with such avidity does it devour the ripe seeds of this grass-tree that several may be seen crowded together on the perpendicular seed-stalks of the plant busily engaged in extracting them; but he adds that at other times, particularly among the limestone hills, where the trees are few, it descends to the broken rocky ground in search of insects and their larvæ.

The round nest is compactly formed in October and November, sometimes of fibrous roots lined with fine hair-like grasses, sometimes with grass-stems and small plants, and placed either in a scrubby bush or among the leaves of *Xanthorhœa*. Mr. Gould remarks that it is deeper and more cup-shaped than those of the other members of this group. The eggs vary much in colour and the character of their markings. Bluish-white is the usual colour, spotted and blotched with lively reddish-brown, intermixed with obscure spots and purplish-grey dashes, the markings most numerous towards the larger end. (*Birds of Australia.*)

Nest of Artamus sordidus. (Gould.)



Artamus cinereus. (Gould.)

WOODS. There are in England many old natural woods remaining, besides the royal forests, although the great demand for timber during the last war has greatly thinned them of their finest trees. When woods were abundant and covered a great portion of the land, little attention was paid to the increase or preservation of the trees: kings and lords of manors readily granted to their tenants rights of commonage, with the privilege of lopping the branches, always supposing them to be useless dead wood. The consequence of this is still to be seen in all old forests, especially the royal forests, which never were enclosed or protected. The fine old trees, whose age can scarcely be guessed at, which are very picturesque objects and a fit study for the landscape-painter, have all evidently been lopped, at some time or other, for the sake of the wood for fuel, and for want of care have probably never been in such a state as would afford fine timber for ship-building. Windsor Forest, which has only been inclosed since 1813, affords many specimens of noble trunks now hollowed out by time and the admission of water from above, which might probably still be sound and solid, had they been duly protected, and only those branches carefully cut out which were dead and showed decay. The dates of the inclosures of different parts of Windsor Great Park can be readily discovered by observing the form of the oldest trees. In many extensive woods on private estates the want of care may be readily seen at the first inspection. Oak-woods are chiefly found in stiff clay soils, where the water is apt to accumulate, by which the roots are injured, and the trees decay before they have attained their full growth. The water should be carefully let off by open drains and ditches, which should be regularly examined and cleared out every year before winter. The surface being thus kept dry, the timber, as well as the underwood, will grow much more rapidly, and the increased value of the wood will amply repay the outlay. Cattle should be carefully excluded from all woods; they destroy the young shoots by cropping them, and do much damage to the underwood. At the time when acorns and beech-mast are plentiful, pigs may be turned in without danger; they will turn up the ground in search of their food, and thus bury beech-mast and acorns, which may vegetate, and grow in time into fine trees; for it is well known that an oak raised from an acorn is always hardier and better rooted than one which is raised in a nursery and transplanted in the woods; and the same may be said of beech raised from the seed.

The sweet chesnut is one of the most useful trees in a wood, provided it has room to grow. Its timber, when of a certain age, is as durable as oak, and the shoots which spring up from the old trunks cut down give the most useful and profitable coppice-wood. When it is recollected that a coppice may be cut advantageously every tenth year, if a calculation be made of the value of growing timber after many years, it will be found that the underwood, properly managed, pays fully as well as the timber. It is usual to cut down such trees as begin to show decay at top, when the coppice is cut; but it is better to anticipate this decay, and cut them when they have ceased to increase from year to year as much as the interest of the money they would sell for amounts to. For example: Suppose that an oak standing measures fifty cubic feet, and with top, lop, and bark, and may be worth 10*l.* If it does not increase above two cubic feet in a year, it will not be profitable to let it stand: but if, by cutting down others which interfere with the spread of its branches, its growth can be promoted, it may probably increase so much as to pay a good interest on its value; in which case it would be a loss to cut it. There is a period when the increase of the wood in a tree is a maximum, and this depends on soil and situation. The head and branches contribute much to the growth of the trunk; and unless they have room to spread, the increase derived from the action of the leaves must be checked. On this depends the practice of gradually thinning out young woods as the branches spread, the object being to let in as much air as is necessary, without leaving too great a space between the head of one tree and its neighbours. As soon as the branches begin to approach towards those of another tree, room must be made, by cutting out those trees which appear inferior in shape or in health. In the management of young plantations [PLANTING], it is a question whether it is more profitable to cut down trees at the age of thirty or forty years and replace them with young plants, or to let them arrive at their full size, which, for oaks, will take 150 or 200 years. The calculation is made on the annual increase of the wood, which is said to be greatest when the tree is about thirty years old. It has been often supposed that the slower a tree grows the stronger the wood will be; but this appears to be a mistake. Some wood taken from a very rapidly-growing oak, and some from one which, having been headed down as a pollard, had grown slowly, were tried by the action of a very powerful hydraulic-press, and the wood of the quicker-growing tree was found to resist the pressure much longer before it was broken or crushed.

Although it is generally on soils unfit for cultivation that plantations of wood are made, yet there are proofs that, on a deep rich soil worth 2*l.* an acre as arable land, a plantation of oaks, well managed for fifty or sixty years, will pay a better rent than if it had been cultivated as a farm. On such land it is usual to plant oaks in the hedge-rows, where the trees, having room both for their branches and their roots, thrive well at the expense of the farmer. Most old farms consist of small inclosures surrounded with trees, chiefly oak, ash, and elm, according to the soil; and the landlord, having the benefit of their growth, only cuts them when fit for sale. The tenant is scarcely aware of the annual loss he suffers from the shade of the trees, as well as the exhaustion of his manure by the roots. If the inclosures are of the extent of twenty acres or more, a few trees here and there in the banks will not do much harm; but it would be far more advantageous to all parties if the woods and plantations were entirely separated from the arable land. A few single trees here and there in old pastures are both ornamental and useful as shelter for the cattle; but they should be extirpated in all arable fields. Clumps and woods may be made picturesque in the scenery, whereas a country consisting of small inclosures surrounded with trees only looks like an immense wood when seen from a small eminence.

Pine-trees of full size have been transplanted to form shelter and ornament to parks and pleasure-grounds. Sir Joseph Banks made some experiments in his grounds near Brentford, by cutting off the heads of old elm trees and transplanting the trunks by way of keeping up a proportion between the head and the roots, in the expectation of their growing out, but it failed entirely; and even if the experiment had succeeded, the trees would have had the appearance of pollards, and been very far from ornamental. Sir James Stewart Monteith, in Scotland, succeeded better by retaining the head, and saving, as much as possible, all the fibres of the roots; for this purpose the earth was carefully taken from about the roots, beginning at a considerable distance from the stem: the tap-roots, if any, were necessarily cut off, but all the horizontal roots were saved. The tree was taken up on a strong carriage, and placed upright on the spot prepared for its reception: this had been well dug and pulverized, and the surface-soil or turf laid aside. If the soil was not naturally rich, some manure was dug into it. If this was done some months before, and had the benefit of a winter's fallow, the success was more certain. The tree was now placed upright, taking care that it should have the same position with respect to the cardinal points as it had originally, so that what was exposed to the north before should be so still. The roots were then spread on the prepared ground, and occasionally pegged down with hooked sticks driven into the ground; fine earth was then spread over them to the depth of four or five inches or more, and well rolled or trodden down on the roots. A watering, especially with diluted urine or drainings from dunghills, served to settle the earth about the roots; and a few strong ropes tied high up the stem of the tree, and fixed to strong posts in the ground at some distance from the trunk, so as to prevent the effect of strong winds, finished the operation of transplanting. The best time is early in spring, when the leaves are beginning to expand and when showers are frequent. Thus large forest-trees fifty or sixty years old have been transplanted without any part of their branches dying off; and a park and plantation have been formed in one season, where not a tree was to be seen before. This may be considered as a valuable discovery in a country where so many new parks and pleasure-grounds are continually formed.

Wood is too valuable in Britain to be used for fuel, except in very distant and woody districts. Coals have everywhere superseded it; but wherever woods are cut down, and especially where the roots are grubbed up, they give an excellent and economical fuel for the poor, or to use in the lime and brick kilns. Where old hedge-rows are cleared in the progress of agriculture, it is a common practice to give the stumps and roots found in old banks to the poor, for the trouble of grubbing them up and levelling the ground. This work is generally done in winter; and the wood is stacked into cords six feet long, three feet wide, and three feet high, and sold, in Berkshire, from 5*s.* to 7*s.* a cord: where coals are 30*s.* or more a ton, this is a great resource.

In France and other countries where they use chiefly wood for fuel, the trees which are preferred are beech-trees, which are allowed to grow very close in the woods, so as to draw each other up and form long thin stems. They are cut down when about thirty or forty years old, and then do not average a foot in diameter; they are sawn in lengths of a yard, and thus sold, the purchaser generally having them sawn into shorter lengths and split for use. In Paris the trade in wood is one of the most extensive, and employs many hands; and fuel is becoming scarcer and dearer every year; so that unless coal-mines shall be worked to a greater extent in France, there will soon be so great a scarcity of wood, both for fuel and building, as to cause serious inconvenience, and cause much land now in cultivation to be planted. In England chiefly the timber is raised for building, and with proper attention to the old woods, and by judicious plantations of new, timber may be yet raised to a much greater amount than it is, and without encroaching on the land devoted to the crops necessary for the sustenance of man.

WOODS AND FORESTS. A considerable portion of the royal revenue consisted formerly of the rents and profits of the crown lands, which comprised numerous lordships and honours, together with forests and chaces: from the forests the principal source of profit lay in the fines or amerciaments levied for offences against the Forest Laws. [FORESTS.] The demesne lands which were retained by the king, or which came to the crown by forfeiture or otherwise, and were farmed out to subjects, were originally very extensive; but owing to the generosity or the necessities of different kings, so large a part of them was granted away, that the legislature was frequently compelled to interpose its authority in order to prevent the total alienation of the crown property. William III. had used the power of alienation so profusely, that upon the accession of his successor, it was enacted (1 Anne, st. 1, c. 7) that no grant or lease should be made of any crown lands for a longer term than thirty-one years or three lives, but permitting houses, &c. to be let for fifty years.

By the 26 Geo. III., c. 87, amended by 30 Geo. III., c. 50, Commissioners were appointed to inquire into the state and condition of the woods, forests, and land revenues belonging to the crown. By the 46 Geo. III., c. 142 (altered by the 50 Geo. III., c. 65), an office of surveyor-general of his Majesty's works and public buildings was created; but this and some other offices are now incorporated with that of 'the Commissioners of her Majesty's Woods, Forests, Land Revenues, Works and Buildings' (2 Will. IV., c. 1, s. 1), who are commonly called 'the Commissioners of Woods and Forests,' which office or board owes its present permanent shape to the statute 10 Geo. IV., c. 50 (amended and extended by 2 Will. IV., c. 1; 2 & 3 Will. IV., c. 112; and 3 & 4 Will. IV., c. 69).

The Commissioners, who are not to exceed three in number, are appointed by letters patent (2 Will. IV., c. 1, s. 1). They are to make a declaration (5 & 6 Will. IV., c. 62, s. 2, in lieu of the oath required formerly, 2 Will. IV., c. 1, s. 6) that they will faithfully and diligently execute the duties of commissioners. Their salaries are fixed at 2000*l.* per annum for the chairman or first commissioner, and 1200*l.* for the other two (10 Geo. IV., c. 50, s. 11; 2 Will. IV., c. 1, s. 7). Only one of them is allowed to be a member of the House of Commons (2 Will. IV., c. 1, s. 11).

Their powers are very large. The whole of the possessions (except advowsons) and land revenues of the crown in *England*, *Ireland* (10 Geo. IV., c. 50, s. 8), and *Scotland* (2 & 3 Will. IV., c. 112; 3 & 4 Will. IV., c. 69) are under their management: but the *property* therein still remains in the crown. (1 *Q. B. Rep.*, 352.) They are required however to observe all the orders and directions of the Lords of the Treasury touching the exercise of their powers (2 Will. IV., c. 1, s. 3).

The Commissioners have the power of appointing and removing various officers, such as receivers, surveyors, &c., whose salaries however are fixed by the Treasury (10 Geo. IV., c. 50, s. 12). They may also appoint stewards of the royal hundreds and manors to hold courts, and different manerial and forestal officers to preserve game, fish, &c.; and they may grant licences to hunt, fish, &c. (Id., s. 14).

They are empowered to grant leases of any part of the crown possessions for thirty-one years (10 Geo. IV., c. 50, s. 22); or, in case of houses, buildings, &c., or building-land, for ninety-nine years (Id., s. 23); but this power of leasing does not extend to the royal forests in *England* (Id., s. 25), except for the purpose of making railroads (Id., s. 97). The leases are required to contain certain specified provisions, and the lessees are not to be made dispunishable for waste, except in leases of mines, and at the option of the Commissioners, in leases for ninety-nine years (Id., s. 27). The leases are to be granted at a rack-rent, and no fine is to be reserved (Id., s. 28), except in building leases, in which a nominal rent may be reserved for the first three years (Id., s. 30), and a fine may be taken not exceeding one-third of the rent (Id., s. 31).

They may also *sell* any part of the crown possessions, except the forests (Id., s. 34), according to a mode pointed out (s. 35); and they may also sell rents, or manerial or forestal rights, to corporations, or trustees of incapacitated persons, who have estates subject thereto (ss. 39, 40).

They may *exchange* or *purchase* lands, &c. (Id., ss. 42, 52, 98).

They are declared to be exempt from all personal responsibility as to any covenants or contracts they may enter into in their official character (Id., s. 17).

All deeds relating to lands, &c. leased, &c. by the authority of the commissioners are required to be inrolled in the office of Land Revenue Records and Inrolments (10 Geo. IV., c. 50, s. 63; 2 Will. IV., c. 1, ss. 16, 18, 21), and to be certified by the commissioners to parliament (10 Geo. IV., c. 50, s. 125); and all conveyances and sales respecting such lands are to be free from stamp and auction duty (10 Geo. IV., c. 50, ss. 67, 68).

The Commissioners are also empowered to give certain notices and claims, and to authorize entries on land for breach of covenant, &c. (10 Geo. IV., c. 50, s. 92), and to compound, in certain cases, for rent (Id., s. 93).

Their accounts are to be audited by the commissioners for auditing public accounts, under the 25 Geo. III., c. 52 (10 Geo. IV., c. 50., s. 19).

The receivers appointed by the Commissioners of Woods and Forests must be land-surveyors (Id., s. 80). They are required to account at stated periods to the commissioners (Id., s. 81), and to transmit all sums received monthly (s. 84); and they are empowered to distrain for rent (s. 90).

Notwithstanding the management of the crown lands is thus vested in the Commissioners, and the general power of alienation has been taken from the king, a power is reserved to the crown to grant sites for churches, chapels, and burial grounds, not exceeding five acres in extent, or 1000*l.* in value (10 Geo. IV., c. 50, s. 45); and by 1 & 2 Will. IV., c. 59, s. 1, churchwardens and overseers are empowered, with the consent of the Lords of the Treasury, to inclose a portion not exceeding fifty acres of any forest or waste lands belonging to the crown, lying in or near their parish, for the purpose of cultivating the same for the use of the poor.

Besides this general control over the crown lands, certain powers are given to the Commissioners which are referable to the execution of the Forest Laws. The powers and authorities belonging to the offices of wardens, chief-justice, and justices in eyre (which were abolished upon the termination of the then existing interests by 57 Geo. III., c. 61), are vested in the First Commissioner (10 Geo. IV., c. 50, s. 95); and the commissioners are also empowered to make compensation to parties for old encroachments made upon the royal forests where they have been in uninterrupted possession for ten years (Id., s. 96).

The *verderers* of the royal forests are also required to make inquiry as to all unlawful inclosures, encroachments, &c. in their courts of attachment, and may impose fines upon the offenders (Id., s. 100), who may however be proceeded against by the ordinary course of law (s. 103). The verderers may appoint regarders, under-foresters and other officers of the forests and courts (s. 101), and may inquire into their conduct, and fine them for neglect of duty (s. 102).

Other penalties may be recovered before a justice of the peace (s. 104); and all such fines and penalties are to be applied to the expenses relating to the forests (s. 105).

As to the general revenue arising from the letting, &c. of the crown lands, the commissioners are directed to pay in the moneys received by them, to a proper account with the Bank of *England* and *Ireland* respectively (10 Geo. IV., c. 50, s. 117, 118) and the chartered banks of *Scotland* (3 & 4 Will. IV., c. 69, s. 17); and the annual income (after certain deductions) is to be carried to the consolidated fund (10 Geo. IV., c. 50, s. 113; 3 & 4 Will. IV., c. 69, s. 16). The transfer of the revenue arising from the crown lands to the consolidated fund is however the subject of a special arrangement between the crown and the subjects, terminating with the life of the king in whose reign it is made.

The 10 Geo. IV., c. 50, contains some provisions peculiar to Ireland. Leases, grants, &c. of any of the small branches of the royal revenue (s. 128), and the powers appertaining to the chancellor and council of the Duchy of Lancaster (s. 130), are exempted from its operation.

The real property of the crown may be thus classified:—

1, Honours, manors, and hundreds, not in lease.

2, Other lands in the occupation of the crown, either for the personal convenience of the king or for the public service.

3, Forests, chaces and wastes.

4, Lands, tenements and hereditaments, held of the crown by lease.

5, Fee-farm rents, issuing out of lands, tenements and hereditaments, held of the crown in fee-simple.

Of the first, fourth, and fifth classes it would be impossible to attempt any particular enumeration; the fourth consisted, at the time of passing the statute 26 Geo. III., c. 87 (A.D. 1786), of about 130 manors, 52,000 acres of land in cultivation, 1800 houses in London and Westminster, and 450 houses and other buildings in other parts of England, exclusive of houses demised with manors or forests.

The second class comprises the following royal palaces and houses:—Buckingham Palace; St. James's Palace; the Pavilion at Brighton; Windsor Castle; the palaces of Hampton Court, Kensington, and Whitehall; the King's House at Winchester; the palace of Greenwich (converted into a hospital for seamen); Somerset House (used as public offices); the palace of Westminster (Westminster Hall, including the houses of parliament and courts of law). The following palaces and buildings have been pulled down and their sites used for other purposes:—Carlton House; the Mews; Newmarket Palace. The following parks are also included in this class:—St. James's, Hyde, Bagshot, Bushey, Greenwich, Hampton Court, Richmond, and Windsor.

In the third class are included not only the royal forests which have preserved their *jura regalia*, but several nominal forests and chaces, warrens, wastes, &c. The following is a list of the real forests:—In Berks, Surrey, and Wilts, Windsor Forest; in Essex, Waltham Forest; in Gloucestershire, the Forest of Dean; in Hampshire, Bere Forest, New Forest, and the Forest of Woolmer and Aliceholt; in Northamptonshire, Rockingham, Whittlewood, and Salcey Forests; in Nottinghamshire, Sherwood Forest; in Oxfordshire, Whichwood Forest.

There has arisen incidentally out of the proper duties of the department of Woods and Forests, since it was united with the Board of Public Works, the important office of providing for the people public walks and access to the national buildings and collections. The duty of the state in this respect has only been recognised of late years, and perhaps we owe it to our intercourse with the Continent, and especially with France, that it has been at all acknowledged. It will not be out of place here to record that twenty years ago Hyde Park and Kensington Gardens were the only public places of recreation open to the crowded and hard-worked population of London; since then, beside the improvements in those two places, and the formation of new streets and squares in those parts of the metropolis of which the land either belongs to the crown or has been purchased by parliament for public improvements, there have been opened the large gardens of St. James's Park and the Regent's Park; Primrose Hill, at the north of the Regent's Park, and a large piece of land at the north-east end of London, intended to be laid out as 'Victoria Park,' have been purchased for the public. The palace and grounds of Hampton Court have been repaired and adorned, and have been thrown open gratuitously to the public, and the collection of pictures has been arranged and enlarged. For the zeal and taste displayed in these things, the nation is indebted to the department of Woods and Forests.

WOODSTOCK, NEW, a parliamentary and municipal borough in Oxfordshire, 62 miles west-north-west from London, and 8 miles north-west from Oxford. The town is situated on rising ground, on the east bank of the Glyme, a stream which is expanded into a lake in Blenheim Park. The town is in the parish of Woodstock and liberty of Oxford. The hamlet of *Old Woodstock*, though not included in the municipal borough, may be considered as forming a part of the actual town of New Woodstock.

The town contains many good stone houses, and the streets are sufficiently wide and well-paved. The town-hall was erected about 1766, at the expense of the duke of Marlborough, after a design by Sir William Chambers. It is a good stone building, with a piazza beneath it, which is used as a market-place. The greater part of the church was rebuilt in 1785, on the site of a chantry founded by King John. A round-arched Norman doorway remains in the south wall, and three massy antient columns in the interior, with grotesque heads on the capitals, support pointed arches. The living is a rectory, united with the neighbouring parish of Bladon, in the gift of the duke of Marlborough, and of the yearly net value of 329*l.* There are places of worship belonging to the Methodists and Baptists. Almshouses for six poor widows were erected in 1798, at the expense of the duchess of Marlborough. A free grammar-school was founded and endowed, in 1585, by Richard Cornwell, a native of the town.

The municipal borough, which was not affected by the Municipal Reform Act, consists of a mayor, high steward, recorder, four aldermen (besides the mayor), two chamberlains, town-clerk, fifteen capital burgesses, and an indefinite number of freemen. The constituency is self-elected. The titles to the freedom are birth, apprenticeship, and gift by the council. The borough received charters from Henry VI., Edward VI., Elizabeth, James I., Charles II. and James II., but the last charter was surrendered after the Revolution, and the governing charter is 16 Charles II. (1665). The number of freemen in 1835, including the councillors, was 200. The population of the borough was 1320.

Previous to the Reform Act Woodstock returned two members to parliament. The greatest number of electors who had polled at any time during the thirty years preceding 1832, was 145. By the Reform Act the parliamentary boundary has been much extended, and, in 1841, included a population of 7404. It now returns one member to parliament. The number of parliamentary electors on the register in 1839-40 was 369, of whom 316 were 10*l.* householders and 53 freemen. In 1835-6 the 10*l.* householders were 240, and the freemen 64, in all 304.

The only manufacture of importance is that of gloves; it is said to have declined of late years from foreign competition, but is still carried on to a considerable extent, partly in the town of Woodstock, but chiefly in the surrounding villages. The present population of the town and suburbs is about 1600. The population included strictly within the limits of the parish was, in 1841, 1421. There has been little change in the number of inhabitants for the last forty years.

Blenheim Park, the magnificent domain of the duke of Marlborough, is in the neighbourhood of Woodstock. [BLENHEIM PARK.]

(*Boundary Reports; Municipal Reports; Population Returns, &c.*)

WOODVILLE, WILLIAM, was born at Cockermouth, in 1752. He served an apprenticeship to an apothecary, and afterwards studied medicine at Edinburgh, where he graduated in 1775. After studying some time in the medical schools of the Continent, he returned to Cockermouth, where he commenced the practice of his profession. He continued here five or six years, and then removed to London. Here he was appointed physician to the Middlesex Dispensary, and in 1792 he was elected physician to the Small-Pox Hospital. Having paid considerable attention to the plants yielding medicines, he published, in 1790, a large work, in four quarto volumes, entitled 'Medical Botany,' which consisted of a series of plates representing medical plants, and containing an ac-nt of their natural history and uses. This work is im- ect both in the drawings and descriptions of plants, but as a valuable work at the time it was published, and led to the production of better works on the same ect. In 1796 Woodville commenced the publication work entitled a 'History of the Small-Pox in Great ain.' This work was never completed, on account of introduction of vaccination about this time by Jenner. Woodville had good opportunities of investigating the ms of Jenner's discovery to confidence, and came at to a conclusion unfavourable to vaccination. He how- continued to make observations, and before his death me a strenuous advocate for the introduction of vacci- on. He died in 1805.

Medical Dictionary.)

WOOD-WARBLER. [Wood-Wren.]

WOODWARD, JOHN, the author of 'A Natural His- of the Earth,' and the founder of the professorship of ogy at Cambridge, was born in Derbyshire, in 1665. studied comparative anatomy and natural history at seat of Sir Ralph Dutton in Gloucestershire, under the ction of Dr. Barwick, and received his degree of M.D. Archbishop Tenison. Woodward's attention to 'fossils' first excited by the shelly limestones of Gloucester- , from which he conceived the notions of the suc- ive deposition of strata which he afterwards applied to explanation of the structure of the earth. Previous to he had, by travelling over the greatest part of Eng- , made himself acquainted with the 'present condition he earth and all bodies contained in it;' collected the nts, insects, sea, river, and land shells;' examined the ter of mines, grottoes,' &c.; 'for the purpose of ng as complete and satisfactory information of the le mineral kingdom as he could possibly obtain.' In atural and artificial exposures of the rocks he noted journal everything memorable in each pit, quarry, or . Unable to travel in Europe amidst the commotions prevalent, he drew up a series of queries, and trans- ed them to intelligent foreigners, who might give him insight into the structure of the earth as it appeared reign regions. The result of all these inquiries was, 'the circumstances of these things were much the in remoter countries as in England;' and Woodward eeded to combine his observations into 'A Natural ory of the Earth.' This work, which appeared in 1695 icated to Sir Robert Southwell, president of the Royal ety), has had a remarkable and permanent influence he progress of English geology. It establishes great s, linked with great errors. It refutes the notion of earlier writers, such as Plot, who believed that the s, shells, and corals found in the rocks were 'mere ral substances,' never connected with or dependent e functions of life, but formed, like 'selenites, mar- es, and flints,' by a plastic force in the earth; proves to be the exuviæ of animals; and appeals to them tient inhabitants of the sea, yielding evidence of great utions in the condition of the globe.

oodward's conception of these great truths is clear. nferences concerning the nature and proximate causes e phenomena which he had examined are clouded by amental errors. For instead of the philosophical ion of antiquity revived by Steno, that the dry land in h the marine exuviæ were found had formerly been ed of the sea, and had been raised out of it by con- ons, or left by retirement of the waters, Woodward tained that these marine bodies 'were borne forth of ea by the universal deluge; that during the time of eluge all the stone and marble of the antediluvian , all the metals of it, all mineral concretions, and, in rd, all fossils whatever that had any solidity, were ly dissolved into one confused mass: the parts of this subsided according to the laws of gravity, the iest descending first, and inclosing the heavier sorts hells (as cockles, &c.); the lighter (as chalk) falling wards, and inclosing lighter shells (as echini); while an bodies, bodies of quadrupeds, birds, &c., teeth and s, &c., shells of land-snails, &c., being, bulk for bulk, er than sand, marl, chalk, &c., were not preci- ed till the last, and so lay above all the former, con- ting the supreme or outmost stratum of the globe.' dward further maintained that the strata were origi- horizontal, and that the actual irregularities of their tion were due to convulsions whose cause was seated in the earth; and in his pages appear many other curious glimpses of important truths, obscured by the general fault of his system, the reference of *all* the phenomena which he observed to one universal deluge.

This work received and deserved applause, but met with immediate opposition on good philosophical principles by J. A., M.D. (Dr. Arbuthnot), 1697. The author however remained unconvinced, and published in 1724 a defence of his system against the objections of Camerarius of Tübingen (*Naturalis Historia Telluris illustrata et aucta*). To this work Woodward appended a Classification of Earths, Stones, Salts, Bitumens, Minerals, and Metals (*Methodica Fossilium in Classes Distributio*, dedicated to Sir Isaac Newton, Pres. R. S.). In 1728, after his death, appeared an enlargement of this method, accompanied by interesting letters to Newton, Hoskyns, &c., and directions for observers and collectors. A greater and more valuable work, in two volumes, published from Woodward's MS. in 1728 and 1729 (*Attempt towards a Natural History of the Fossils of England*), closes the list of the geological publications of Woodward. The first volume of this catalogue contains notices of above 'fifteen hundred bodyes' in the first part, and a catalogue of 'English extraneous fossils' in the second part. These specimens were bequeathed to the University of Cambridge, and are still preserved therein, according to the directions of the will, by the professors on Woodward's foundation. In the second volume are described additional English and some foreign specimens, which were ordered to be sold.

Dr. Woodward appears to have been diligent and accurate in gathering information, and tolerably versed in the philosophy and science of his day, but his hypotheses are little in harmony with chemistry or mechanics, and sometimes opposed to the most obvious and ordinary facts. The sincerity and zeal with which he prosecuted geology are evinced by the noble bequest of his collections, and a fund for endowing a professorship, to the University of Cambridge; a bequest which has given the opportunity for Mitchell and Sedgwick to add to the renown of the University, and to link the name of Woodward with some of the highest and surest generalizations in geological science.

In 1707 he published 'An Account of Roman Urns and other Antiquities lately dug up near Bishopsgate,' addressed to Sir Christopher Wren, and in other respects he distinguished himself as a collector of antiquities. His professional career appears to have been prosperous. He was elected fellow of the Royal Society and of the College of Physicians and was appointed professor of physic in Gresham College. He engaged in controversy with Mead and Friend on the subject of small-pox. His death happened in 1728.

WOOD-WREN, the name of a migratory warbler which visits us in the spring and departs in September.

Mr. Yarrell, after tracing the steps of its history as a British bird through the works of White of Selborne, Pennant, and Montagu, observes that the bird is now very well known, and is at once distinguished from the true *trochilus*, or Willow-Warbler, with which it is most likely to be confounded, by the broad streak over the eye and ear-coverts of bright sulphur-yellow, by the pure green colour of the upper parts of the body, and by the delicate and unsullied white of the belly and under tail-coverts.

In addition to these distinctions, which, Mr. Yarrell observes, on comparing the two birds, will be found very obvious, he points out the fact that the wing of the Wood-Warbler is nearly half an inch longer from the carpal joint to the end of the quill-feathers than that of the Willow-Warbler, although the birds themselves differ but little in their respective whole lengths; the wings of the Wood-Warbler, when closed, reaching over three-fourths of the length of the tail, while those of the Willow-Warbler reach only to the end of the upper tail-coverts; or less than half way along the tail-feathers. The two birds here named, and a third species, the Chiff-Chaff, so called from its peculiar note, are, Mr. Yarrell remarks, the only British species included in the genus *Sylvia* as at present restricted. These, he states, differ from the warblers generally in the colour of their plumage, and in not being fruit-eaters. Their nests, he adds, are covered or domed at the top, like that of the Dipper, and the little birds creep into the hollow chamber within by a small round hole, generally left in the side.

The Wood-Warbler or Wood-Wren appears to be the *Sylvia sylvicola* of Pennant; *Motacilla trochilus* of Bewick; *Sylvia sibilatrix* of Bechstein; *Curruca sibilatrix* of Wood; *Bec-fin siffleur* of Temminck; *La Fauvette sylvicole* of Vieillot; *Lui verde* of Savi; *Grüner Sanger* of Meyer; and *Schwirrender, Grosschnäbliger, und Nordischer Laubvogel* of Brehm.

Geographical Distribution.—A Swedish summer visitor, but rare there, as it is in northern Europe generally. Of frequent occurrence in Germany, Holland, France, Provence, and Italy, in the summer. England and Wales, but not recorded in Scotland nor identified in Ireland. Supposed winter-quarters, Egypt and Asia.

Habits, Food, &c.—The song, if song it may be called, of this species is to be heard in the woodlands of England and Wales in the spring, and during the greater part of the summer, accompanied by a shivering of the wings. Mr. Yarrell well describes the note as resembling the word *twee*, sounded very long, and repeated several times in succession, at first but slowly, afterwards much quicker, and as accompanied, when about to conclude, by a peculiar tremulous motion of the wings, which are lowered by the side. A lofty elm in a hedgerow is often, he observes with equal truth, selected as the singing station, and the note is occasionally uttered while the bird wings its way from place to place.

Insects and their larvæ form its food, which is captured both on the wing and among the leaves of trees. The oval and domed nest is framed, amid the herbage on the ground, of dry grass, leaves, and a little moss, with a finer lining of grass and hairs, but no feathers, which last are present in the nests of other warblers that build on the ground, with the exception of the other two *Sylviæ* noticed above. The white eggs, most thickly speckled with purple-red and ash, are generally six in number.

Wood-Wren.

WOODY TISSUE. [Tissues, Vegetable.]

WOOL, AND THE WOOL TRADE. The term 'wool' is now applied almost exclusively to the fleece of the sheep. The distinction between wool and hair is more easily understood than described. When the wool brought to bear in the comparison is that of sheep, the distinction is tolerably well marked; but in various other animals it seems often difficult to decide whether 'hair' or 'wool' be the proper appellation for the external covering; and hence perhaps the reason for the appropriation of the term 'wool' principally to the coating of the sheep. Wool compared with hair is generally softer, more flexible, and more disposed to undergo the *felting* process, which imparts to it so much value in manufactures. Many of the wilder animals, such as the beaver, the racoon, the wild-cat, and the otter, produce both hair and wool, the hair forming the long and conspicuous outer fibres, and the shorter fibres of wool lying hidden beneath. The goats of Angora or Ancyra, of Tibet, and of Cashmere yield woolly fibres of great beauty, which not only equal those of the sheep, but greatly surpass them; this wool however, as we shall see farther on, is too costly to come prominently into competition with that of the sheep.

In a commercial and manufacturing point of view, a notice of wool may consistently be confined to that of the sheep; and for an account of the growth and qualities of sheep's wool, the attempts made to improve it, the counties in England and the countries abroad whence it is procured, and the process of shearing, very little more will be necessary than a reference to the article Sheep [pp. 356-362]. The history of wool in its unmanufactured state, as regards the legislative enactments to which the commodity has been subjected, forms however a distinct subject, and is full of instruction in reference to the principles of commercial economy. It enables us to trace the gradual growth of just opinions on such matters, and the many conflicts by which these changes were wrought. Wool as an article of wealth has been singularly exposed to these contests; for the agriculturists and the manufacturers for ages took different views of what measures in reference to the wool trade were for the national benefit, measured perhaps by what they deemed their own interests. The reason lies in this circumstance, that whereas the silk and cotton manufacturers work upon materials brought wholly from abroad, the woollen manufacturer employs materials both of home and of foreign produce; and as this applies to foreign as well as to English manufacturers, there have arisen four distinct points upon which the legislature has from time to time had to decide, viz. the free exportation of British wool; the restriction on such exportation; the free importation of foreign wool; and the restrictions on such importation. The reasons which have led the two great class interests to take opposite sides in the question, and the effects which that opposition has had on the wool trade, will be seen from the following brief details, drawn chiefly from Smith (*Memoirs of Wool*), Bischoff (*History of Wool*), M'Culloch (*Commercial Dictionary* and *Statistical Account of the British Empire*), and Porter (*Progress of the Nation*).

In the time of Edward I. a duty was imposed on the exportation of British wool; and great complaints were made on his increasing the duty in 1296 from 20*s.* to 40*s.* per bag. Lynn, Newcastle, Kingston-upon-Hull, Boston, Yarmouth, Ipswich, Southampton, Bristol, and London were appointed ports from whence wool might be shipped, and at which customs'-officers were appointed to receive the dues. When the king had terminated some of the wars in which he had been engaged, he lowered the duty from 40*s.* to half a mark per bag; but the high duty was again imposed at a subsequent period. In 1337 we hear of the first enactment for prohibiting the exportation of British wool, a measure coincident with the attempts of Edward III. to encourage the woollen manufacture in England. Subsequently the same king obtained grants of wool as the means of defraying the expenses of his wars; and the gross absurdity of his former restrictions could not be better shown than by the fact, that while he ostensibly prohibited the export of British wool, he sent his own quota for sale abroad, as he could there obtain a higher price for it than at home. Throughout the remainder of his reign Edward had frequent contests with the Commons and the merchants respecting his grants of wool, the duty payable on wool sold, and the prohibition to exportation, the contests being not between agriculturists and manufacturers, but between the king on one side and all his subjects on the other. By a statute of 27 Edw. III., the towns of Newcastle, York, Bristol, Lincoln, Norwich, Westminster, Canterbury, Chichester, Winchester, Exeter, Caermarthen, Dublin, Waterford, Cork, and Drogheda were appointed 'staples' for wool, that is, places where alone wool could be sold; 'mayors of the staple' were appointed to seal every sack of wool sold; a customs' duty of half a mark per sack was charged to 'denizens,' and of ten shillings a sack to 'aliens;' and the power of exporting was limited to 'merchant strangers,' or to Hanse town merchants.

During the reigns of Richard II. and Henry IV. there were repeated 'subsidies' of wool to the king, petitions from towns concerning the places for the staple, alterations in the customs' duty, and licences granted to particular

in respect to exportation. The same indeed may
respecting the next two reigns; but by the time of
VI. the 'merchants of the staple' appear to have
l a kind of monopoly, which was often made a sub-
complaint. Edward IV. enacted that no 'alien'
export wool, and that 'denizens' should export it
Calais; and in the next three reigns the policy
, however mistaken, seems to have arisen rather
iope of encouraging woollen manufactures in Eng-
an to fill the coffers of the king. In the reign of
VI. the landowners of England, finding the sale of
ofitable, began to inclose common lands as sheep
ges with so much eagerness as to cause great com-
o be made; and this may perhaps be taken as the
icement of a new order of proceedings, so far as
ivators took up a position really or apparently op-
the interests of the people. It was not however
time of Charles I. that the absolute prohibition of
ion was determined on seriously; and this seems
been, in the first case, not so much a measure
ed by the manufacturers, as a source of revenue
king by granting licences to favoured persons.
ie Restoration, in 1660, however, the prohibition
distinctly enacted; and, as Mr. M'Culloch remarks,
60 down to 1825, the export of wool was strictly
ed.'

onsequences of this prohibition soon showed them-
The wool-growers, shut out from a foreign market,
from diminution of price; all kinds of extravagant
ts were resorted to, to increase the consumption
a system of 'wool-running,' or smuggling, be-
ry prevalent; and many pamphlets appeared from
aking opposite sides of the question at issue. The
rists, thus restricted in respect to wool, insisted on
ibition of the import of Irish cattle, as one means
aining their rents; this disturbed the course of
tween England and Ireland; and the attempts
the instigation of the woollen manufacturers to
the use of woollen goods excited the hostility of
and linen trades; and thus the whole commercial
ecame disarranged. For nearly a century after
tment the prohibitory law ran counter to the in-
nearly all classes except the woollen manufac-
and it is exceedingly doubtful whether even they
enefit from it.

in his 'Memoirs of Wool,' has enumerated a vast
f pamphlets, published in the last century, of the
general tenor: from English wool-growers, to
t Irish wool ought not to be imported into Eng-
m English manufacturers, to show that Irish wool
t to be sent to foreign countries; from Irish gra-
show that both of these restrictions were unjust;
foreigners, to show that the non-exportation of
ool led to retaliative measures on their part. The
ral and manufacturing classes felt that they were
tive measures thrown into antagonism; and there
m time to time complaints on both sides. For
in 1752, the woollen manufacturers presented a
to the House of Commons, in which they stated
order to distinguish each grower's sheep feeding
on grounds, it has been the antient custom to put
of pitch, tar, and other ingredients, capable of
the severities of the weather, upon some con-
part of the sheep; but of late years they have in
ces loaded the fleece, as well on the sheep feed-
mmon as in inclosed grounds, with such excessive
s of marking stuff, in order to increase its weight,
manufacture has been rendered universally dif-
l too frequently unproductive.'

t sketch of what occurred in 1781 will convey a
ea of the usual state of party feeling concerning
trade, for a period long subsequent, as well as
ious, to that date. The price of wool being low,
were held in Lincolnshire and elsewhere, under
ces of the great landowners; at which petitions
nent were agreed to, praying 'that British wool
exported,' and that 'Irish wool might be ex-
om England.' Thereupon the Yorkshire manu-
met, and came to resolutions that 'the exporta-
ool would be ruinous to the trade and manufac-
England,' that 'the manufacturers would be
o leave the kingdom for want of employment,'
'the importation of Irish woollen yarn ought to be interdicted.' The worsted manufacturers were particularly vehement; for they had a notion, whether correct or not, that no other country produced long combing or worsted wools equal to that of Lincolnshire; and that if they could keep the whole of this wool in England, they might perhaps retain a monopoly of the worsted trade.

The union with Ireland, in 1800, was another cause of disagreement in the wool trade. By one of the resolutions of parliament preparatory to that measure, it was determined that the two countries should be placed on an equality, as regards bounties, prohibitions, &c., on the natural produce of each. One effect of this would be to legalize the transit of wool from England to Ireland; and the manufacturers in a body opposed it. A petition was signed by 113 manufacturing firms in the woollen districts; and Mr. Law (afterwards Lord Ellenborough) was engaged to defend the cause of the petitioners before parliament. Mr. Wilberforce subsequently opposed this clause in the bill, but without success; and thus was effected one step in the attainment of increased power on the part of the English wool-growers; and another step was made in 1802, by the imposition of a duty of 5*s*. 3*d*. per cwt. on the importation of all foreign wool. This latter measure of course enhanced the comparative price of English wool. It had long been urged that foreign wool was indispensably necessary to the manufacture of some kinds of goods, and towards the end of the last century the imports became considerable. Year after year the quantity increased, and by 1800 it reached four million pounds in the year, being about $\frac{1}{23}$th part of the quantity required in the manufacture. This alarmed the landowners, who thereupon procured the duty of 5*s*. 3*d*.

At various times the leading agriculturists made laudable attempts to improve the quality of English wool, by introducing the Spanish Merino sheep; but they still found that when their wools came into the market with those from Spain and Saxony, the latter, notwithstanding the import duty, commanded a more ready sale for the manufacture of the finer cloths. Hence an increase of the import duty was constantly urged upon the government, and such an increase was made to a small extent in 1813, by fixing the duty at 6*s*. 8*d*. instead of 5*s*. 3*d*. per cwt. But this not satisfying the landowners, renewed demands were made; and by the year 1816 parties were placed in a curious antagonism, which may be thus represented:—

Landowners' Claims.	Manufacturers' Claims.
Restricted imports.	Unrestricted imports.
Unrestricted exports.	Restricted exports.

These imports and exports relate only to wool in its unmanufactured state. The landowners wished to keep out foreign wool, that their own might command a higher price; and at the same time wished for an unrestricted foreign market for their own wool. The manufacturers, on the other hand, wished for a free import of foreign wool, because it was best adapted for their work; and at the same time wished to prevent the export of British wool, as a means of monopolizing woollen manufactures. Each party argued consistently with liberal policy in one instance, but displayed the narrow spirit of monopoly in the other: there was a right and a wrong on each side, a liberal and an illiberal; and the two parties were so far pretty equally matched.

In most of the subsequent measures taken by the two parties in reference to the wool trade, the peers and commoners belonging to Yorkshire generally took the manufacturers' view of the question; while those in the sheep-rearing counties took the opposite view; and petitions and resolutions were poured forth in abundance by both parties. In 1818 the matter was brought on in parliament by the agriculturists, and lost by only a very small majority; but in the following year the country was taken by surprise by a government proposition, which was carried by a large majority, to increase the import duty on foreign wool from 6*s*. 8*d*. to 56*s*. per cwt. This did not fail to rouse the manufacturers, who were soon in a condition to show that the high duty occasioned a considerable decline in the export of woollen goods; since, while on the one hand, the English wool, unmixed with foreign, was unfitted for the production of fine cloth, so on the other hand, the expense of using high taxed foreign wool prevented them from competing successfully with foreign manufacturers.

The depressed state of the woollen trade, partly co quent on this impolitic tax, was one of the moving causes to the disturbances in the north between 1819 and 1821; and the attention of the government was repeatedly directed to this matter, by the opposite statements of different parties. An attempt was made in parliament to get the tax repealed in 1820, but without success. On March 13, 1821, the Earl of Liverpool made an announcement in the House of Lords, in reply to petitions on the subject, which is important as being perhaps the first distinct authoritative recognition of those just principles which had hitherto been neglected by both parties. Speaking of the manufacturers, he said, 'It had originally been offered to them, before the enactment of the new duties, that if they themselves would agree to a free export of wool, then government would relinquish the duty now complained of:' that is, that the government would adopt a liberal system on the one hand, if the manufacturers would do so on the other. This was clearly the admission of an important principle, which, if acted on earlier, would have wrought valuable results. But the woollen manufacturers would not accept the repeal of the tax at the expense of what they seemed to think a greater evil—the free exportation of British wool; and consequently the attempt fell to the ground. Throughout 1822 and 1823 repeated meetings were held, speeches made, and petitions signed; and in the following year Mr. Robinson (now earl of Ripon), after alluding to the peculiar tinge of monopoly shown in the arguments of both parties, proposed to admit the export of British wool at a duty of one penny per pound, and the import of foreign wool at an equal duty—thus showing to both parties the same meed of fairness. Neither party seemed very well pleased with the proposal, but ministers brought it before parliament, and carried it into a law. In the following year, 1825, Mr. Huskisson carried some of his measures, which still further opened the woollen trade.

Two years passed over pretty quietly; but in 1828 the wool-growers renewed their old complaints, and asked for the re-imposition of the export duty as a means of affording to them higher prices for their wool. The House of Lords appointed a Committee of Inquiry, before whom were examined witnesses in favour respectively of all the four sub-parties (for the manufacturers were often alluded to as being divided into the 'long-wool interest' and the 'short-wool interest;' while the wool-growers were in some cases the 'Merino interest,' and in others the 'South Down interest'). The evidence taken before the committee appears to have convinced the government that it would be wrong policy to re-impose the import duty as a protective measure; and there has not since then been any renewal of the obnoxious duties.

Many of the legislative enactments here alluded to depend evidently on some peculiarity in foreign wool which fits it for manufacture; and this was strikingly illustrated in the evidence before the Lords' Committee in 1828, where several eminent manufacturers stated that they could scarcely find a sale for any woollen cloths if made wholly of English wool. This superiority in the Merino wool led to a laudable attempt on the part of George III. to introduce the Merino sheep into England. He produced a new breed by crossing the Merino with English sheep, and tried to combine the good qualities of both. But the wool never attained such excellence as to induce the manufacturers to give a price adequate to the trouble of rearing the sheep, and after some time the king presented his flock to various eminent graziers. In Mr. Bischoff's 'History of Wool' there are letters of so late a date as 1812, from Lord Western, the object of which is to detail his lordship's proceedings in respect to some Merino sheep presented to him by George III.: by crossing Merino rams with long-wool ewes, a breed had been produced which yields a good carcass for the market and a good fleece of long wool. It appears however that the production of *short* or *clothing* wool, for which the Merino sheep in its natural state is so valuable, has not been a proposed object of attainment in these experiments.

The wool of the goat [ANCYRA; CASHMERE; GOAT; TIBET], as a material in the manufacture of shawls, has been an object of some attention among naturalists and graziers. In the articles just referred to, the nature of this wool and the places of growth are mentioned; but it is fitting here to allude to an attempt made to naturalize in England the animals which yield this beautiful shawl-wool: the '*Transactions*' of the Society of Arts is our authority. About the year 1820 two agents were sent out by the French government to Tibet, for the purpose of bringing some of the shawl-goats to Europe. After many difficulties, a few of the goats reached Paris in 1823, from which Mr. Tower, a gentleman of Essex, procured two rams and two ewes. These he tended carefully, and by 1828 his stock increased to 27, and in 1833 to more than 50. Mr. Tower had a shawl or two made from the wool; but the quantity yielded by each animal was so small as to render the attempt a failure in a commercial point of view. Since then attempts have been made to combine the Cashmere with the Angora, but we do not know with what result.

A few statistical details may now be given to show the nature and extent of the wool-trade, in respect both to British and to foreign produce. These will be derived chiefly from Mr. Bischoff's work, which, published in 1842, brings down the information nearly to that period.

In the year 1800 Mr. Luccock estimated the quantity of wool produced in England and Wales thus:—

Short wool .	202,737	packs
Long wool .	131,794	,,
Skin wool .	58,705	,,
	393,236	,,

Mr. Hubbard's estimate for 1828 was—

Short wool .	129,917	packs
Long wool .	263,847	,,
Skin wool .	69,405	,,
	463,169	,,

a pack being equal to 240 lbs. It has often been asserted that the attempts to improve the quality of English mutton have deteriorated the *quality* of the fine wool, but increased the *quantity* of the long wool; and this seems to be borne out by the numbers here given.

Mr. Bischoff gives a table to show the quantity of foreign wool imported every year from 1741 to 1841. This we will condense to a quinquennial form, thus:—

Foreign Wool imported into the United Kingdom.

	lbs.		lbs.		lbs.
1771	1,829,772	1796	4,510,534	1821	9,770,103
1776	2,062,628	1801	7,371,774	1826	43,795,281
1781	2,478,332	1806	7,333,993	1831	31,652,029
1786	1,554,637	1811	4,739,972	1836	64,239,977
1791	3,014,511	1816	13,636,241	1841	49,710,396

These numbers sufficiently show how prone English woollen manufacture is, when left to itself, to derive aid from the use of foreign wool.

All the finer wools used to be brought from Spain; but in 1765 the elector of Saxony imported into his dominions a few Merino sheep, which have had a most surprising influence on the trade in wool. The Saxony Merinos, instead of degenerating, improved upon their Spanish progenitors, and the wool afforded by them has almost driven the Spanish wool out of the English market. This may be shown thus:—

	1800. lbs.	1810. lbs.	1820. lbs.	1840. lbs.
Wool imported from Spain .	6,062,824	5,952,407	3,536,229	1,266,905
Wool imported from Germany	412,394	778,835	5,113,442	21,812,093

From which it appears that in 1800 the imports of wool from Spain were 14 times as large as from Germany; whereas in 1840 those from Germany were 17 times as large as those from Spain, making a relative increase of 238 to 1 in favour of Germany in forty years.

Another table gives the proportions imported from different countries in nine successive years; [illegible] these are so small in amount that they may conveniently be grouped together, thus:—

Bales of Wool imported in

	1833.	1834.	1835.
From Germany	72,776	62,553	69,632
,, Spain .	20,714	13,999	8,582
,, Australia.	14,948	16,279	19,762
,, All others	12,242	44,038	37,482

	1837.	1838.	1839.	1840.
From Germany	53,359	79,320	68,682	63,270
,, Spain .	13,162	8,577	11,730	6,842
,, Australia	33,318	32,200	39,106	41,025
,, All others	66,735	60,226	86,049	74,934

ıe value of English wool from 1741 to 1790 was from o 13*d*. per lb.; the lowest price being in 1779, the est in 1772, and the most usual from 8*d*. to 9*d*. From to 1840 the price of South Down wool varied from in 1829 to 36*d*. in 1809; while that of Kent long , within the same period, varied from 9*d*. in 1829 to in 1818. In 1824 the restrictions to the exportation ritish wool were removed; the exports were 18,000 lbs. at year, 280,000 lbs. in 1827, and nearly 5,000,000 lbs. 340; thus showing that both the imports and exports ool have prodigiously increased, when the commerce is article was allowed to follow its natural course.

OOL-TREE, a species of Eriodendron, a genus of s belonging to the natural order Sterculiaceæ. The -trees are large trees, with a spongy wood which is for little besides making canoes in the districts where grow. The leaves are palmate, and the flowers are , red, white, or scarlet, and rising singly or in clusters the sides or tops of the branches. The calyx is naked, ularly 5-lobed, with the lobes usually twin; the petals , joined together, and are connected with the column e stamens at the base. The filaments of the stamens oined together into a short tube at the base, and ed into 5 bundles at the apex: these bundles are fili- and each bears 1, 2, or 3 linear or anfractuous anthers e apex, which have the appearance of one anther, are either adnate or versatile. The stigma is 5- or 6-

There are six species of Eriodendron, five of which atives of America, and one of Asia and Africa.

anfractuosum has versatile anfractuous anthers; s with 5, 7, or 8 entire cuspidate leaflets, glaucous ıth and a usually prickly trunk. This tree attains a t of 150 feet or more. There are two varieties ibed, the one growing in the East Indies and the in Guinea. They differ chiefly in the colour of their rs. The Indian species, *E. a. Indicum*, has flowers wish inside and white outside, whilst the Guinea es, *E. a. Africanum*, has large crimson flowers. In ea this tree is one of the largest and tallest of the -trees, and the trunk is employed for making the st-sized canoes.

Samamna has versatile anfractuous anthers; leaves 5-7 oblong, quite entire, acuminated leaflets; the s obovately spatulate, covered with glabrous down on outside. The flowers are cream-coloured and are d on the tops of the branches. The wool contained e fruit is called in Brazil *Samamna*, and is used for ng pillows, bolsters, beds, &c. It is found in Brazil the river Yupura.

Jasminodorum has anfractuous anthers; a jointed ; leaves with 3 ovate, acute, entire leaflets; the s reflexed; the tube of the stamens thickened at the nd entire, with the filaments 1-anthered. This plant ative of Brazil, in the province of Minas Novas. It hite flowers smelling very like to those of the jas- whence its name. The wool-trees may be grown in untry with heat. They may be propagated by cut- which will root freely in sand under a hand-glass, e plants which are produced from seeds thrive best. do not usually produce their beautiful flowers till e of large size in their native countries; therefore it rdly be expected they should flower in this country. 's Miller.)

OLD, WOUD, or WELD, is the common name o one of the species of *Reseda*, a genus of plants e of the natural order Resedaceæ, to which the mignonette belongs. The genus *Reseda*, from calm or appease, because it is applied as a tion to relieve pain, is known by the flowers pos- calyx almost divided to the base with four, five, rrow segments; the petals are cleft and equal in to the segments of the calyx; the capsule is blad- has a hole at the top when ripe. All the species g to this genus are herbaceous or slightly shrubby The species known by the name of Woold is the teola; it is also known by the names of Dyers' ellow Weed, and Wild Woad. It has lanceolate ves, furnished with a tooth on each side at the e calyx 4-cleft; the upper petal quinquefid, the etals trifid, and the lower ones bifid or simple. t is a native of all Europe in pastures, fallow- y banks, old walls, and waste places. It is abun- reat Britain, where it is often cultivated. This plant was formerly made much use of for the sake of the yellow dye which it imparts to cotton, wool, silk, and linen. The demand for this dye is not constant, so that varying quantities of it are cultivated, and it is sold for very different prices. The mode of using the plant as a dye varies. Sometimes it is gathered green, and treated as woad and indigo; but it is mostly collected when dry, and a decoction is made for the purpose of dyeing. The colouring matter of the plant has been separated by Chevreul, and called *Luteoline*. It may be obtained by sublimation in the form of long needle-like transparent yellow crystals. It is only sparingly soluble in water; it is quite soluble in alcohol and æther, and combines with both acids and bases. After boiling the plant for about three-quarters of an hour, a clear decoction is the result, which is rapidly decomposed in the air. Hence the necessity of using this dye immediately. The following table gives the result of the action of certain reagents on the decoction:—

Solution of isinglass . . .	a slight turbidity.
Litmus-paper	a faint reddening.
Potash lye	a golden yellow tint.
Solution of alum	a faint yellow.
Protoxide salts of tin . . .	a rich yellow.
Acetate of lead	ditto.
Salts of copper	a dirty yellow-brown.
Sulphate of red oxide of iron	a brown, passing into olive.

A green dye is produced by dipping blue cloths in a decoction of woold. A lac is also made from the decoction with alum, precipitated by carbonate of soda or potassa. The pigment known by the name of Dutch pink is obtained from the Reseda luteola. The following account of the mode of cultivating this plant is taken from Don's 'Gardener's Dictionary:'—'The seeds are sown usually after barley is taken off the ground in autumn, or it is very commonly sown with barley in the spring; but the first mode is the best, because the plants make some progress the first year, and in the following season they will be twice the size of those sown in spring. After the ground has been well ploughed and harrowed, the seeds should be sown broad-cast, of which one gallon is sufficient for an acre. Unless the ground is very poor, it will not require any dung. The best crops however will be the result of drilling and cultivating the crop alone. The drills may be a foot apart, and the plants six inches distance in the rows. The plants should be kept clear of weeds by hoeing. When seeds are required a small portion should be left standing for this purpose, and the plants should be pulled as the seeds ripen. The whole crop may be cleared off before the time of sowing wheat, which is the best crop to follow dyer's-woold. The crop is taken by pulling the entire plant; some pull it when in flower, others pull it earlier, but the last appears to be the best. In performing the work the plants are drawn up by the roots in small handfuls, and set up to dry after being tied with one of the stalks; sometimes however they become sufficiently dry, without being set up, by turning. These, after they have been completely dried, are tied up into bundles, and sold by the name of *Weld-cord*.'

Linnæus observed with regard to the nodding spikes of yellow flowers possessed by the woold, that they followed the course of the sun in their nutation, and that they even did this when the sky was obscured by clouds. They point to the east in the morning, to the south at noon, to the west in the evening, and to the north at night.

(Don's Miller; Burnett's *Outlines*; Ure's *Dictionary of Arts and Manufactures*.)

WOOLER. [NORTHUMBERLAND.]

WOOLHOUSE, JOHN THOMAS, an English surgeon who devoted himself principally to the treatment of diseases of the eye. For this purpose he travelled throughout Europe, and became known to the principal men of science of his day. He wrote many works on the eye and its diseases. They are all written in French, and were published in Paris, although he does not appear to have resided in France. His best works are his 'Catalogue d'Instrumens pour les Opérations des Yeux,' published in 8vo. at Paris in 1696, and his 'Expériences des différentes Opérations manuelles et des Guérisons spécifiques qu'il a practiquées aux Yeux.' This last book, which contains a good account of the various operations performed at the time it was written, was published at Paris, in 1711. His books are all written in an inflated style, and were evdently intended to advance his views in the practice of his art. He wrote against Heister on the seat of cataract, in which he contended that it was not in the crystalline lens. There is at present in the library of the College of Surgeons, London, a manuscript work by Woolhouse, entitled 'Traité des Maladies de l'Œil,' in two volumes quarto. This work is more complete than his other works, but was never published.

(*Biog. Med.;* Woolhouse's *Works*, at College of Surgeons.)

WOOLLEN AND WORSTED MANUFACTURES. The manufactures in wool and in worsted are so closely connected, in reference both to their past history and to the industrial arrangements involved in them, that it will be convenient to treat of them under one heading. Wools are divided into two great classes—*clothing-wools* and *combing-wools*, or *short-wools* and *long-wools;* and the fabrics woven from them are termed *woollens* or *worsteds* according as the one or the other is employed. Clothing-wools possess in high perfection that peculiar property which enables the fibres to 'felt' or interlace one among another, and to form thereby the dense compact material of which men's garments are so largely made in this country [Hat, p. 64; Sheep, p. 356]; whereas combing-wools, though long in fibre, are deficient in the felting property, and are therefore employed for stuffs, merinos, hosiery, and a large number of fabrics which do not undergo the felting or fulling process. The manner in which these differences affect the routine of manufacture will be seen farther on.

It is probable that no other of the textile manufactures is so antient as that of wool. Sheep were reared from the earliest times, and there can be little doubt that the use of the wool for clothing was soon adopted. If a mass of woollen fibres be pressed firmly together in a flat layer, the fibres, by virtue of their felting property, will cohere into a continuous sheet even without the process of weaving; and this property could not fail to attract notice. The passages in the Bible which seem to allude to the use of woollen garments are well known; and we have indirect evidence from various quarters to show the prevalence of a similar custom in the East generally, in early times. The spinning of the fibres was most probably effected by the fingers; while the thistle or teazle, as at present, was used to comb out the fibres; the dyeing of the threads, too, it is quite evident, was well understood by the antients. Among the Greeks and Romans the woollen manufacture was of a domestic character; but yet it would seem that the clothing of large armies must have required arrangements of a more extensive kind. The natives of India, after the epoch of the Macedonian conquests in that country, made shawl-cloths of exquisite beauty, consisting, as is supposed, of short wool woven without felting; and the Greeks and Romans may have derived some of their modes of proceeding from such a quarter. But however this may be, the Romans of both sexes wore woollen garments very generally.

The decay of the arts consequent on the irruption of the barbarians into Rome did not appear to have extended to this manufacture: woollen clothing was still made in most of the countries where the Romans had established colonies; and there are indications that in the tenth century the manufacture became the occupation of a particular fraternity in the Low Countries. The wool employed was at first the produce of their own country; but they afterwards imported wool from other countries, and carried on the manufacture to such an extent that the Low Countries became in a great measure the clothing district for Europe. Spain produced cloth for herself, and acquired, about the thirteenth century, considerable reputation for the beauty of the fabrics produced, consequent, we may suppose, on the fine wool which the Spanish sheep have for centuries produced. The Italians and French entered upon this manufacture at a later period.

In the time of William the Conqueror, an inundation which occurred in the Netherlands drove many of the clothiers into other countries, and some of them came to England. William of Malmesbury says that the king, glad of such an accession, placed these Flemish clothiers first in Carlisle and then in the western counties. From that time the mention of clothiers is frequent in the old chronicles; London, Oxford, Lincoln, Huntingdon, York, Nottingham, and Winchester, being enumerated as towns wherein the manufacture was carried on; while at other towns there were cloth-dealers who paid a licence-duty to the king for the privilege of buying and selling dyed cloths. It has been stated [Wool and the Wool Trade] that the king frequently had considerable revenues from English wool; and this circumstance led to the enactment of many laws, tending to the exclusion of foreign wool and the use of English wool only in our manufactures. Indeed an enumeration of all the laws, sumptuary and commercial, passed by our early kings in respect to the woollen manufacture, would be as remarkable for its extent as for the absurdity of the laws themselves. The exclusion of Spanish wool from English broad-cloth; the limitation of the width of broad-cloth to two yards; the determination of the width of striped cloth made at Bristol; the appointment of towns where alone cloth could be bought and sold; the appointment of the office of king's *Aulnager*, whose duty it was to attend the cloth-markets, and measure all the cloth sold, to see that there was no deficiency of length, and who received a fee for every piece of cloth to which he attached his seal; the prohibition to export woollen cloths until they had been fulled; the granting of permission to make certain coarse kinds of cloth three-quarters of a yard in width; the fixing of a leaden seal to pieces of cloth wrought in London and the suburbs—these are some of the laws by which the government tried or hoped to regulate the manufacture; and they will serve to convey an idea of the general character of others.

Edward III. brought about a great extension of the manufacture by inviting over some skilful weavers from the Netherlands. Fuller, in his 'Church History,' gives a very quaint account of the matter. English wool was said to be worked up more successfully in the Netherlands than in England; and Edward thought that by getting over some of the Flemings to this country, he could improve the native manufacture. This seems to have been done; and the following distribution of the manufacture, consequent on this immigration, shows how widely this branch of industry became spread—Norfolk, fustians; Suffolk, baize; Essex, says and serges; Kent, broad-cloth; Devon, kerseys; Gloucestershire, cloth; Worcestershire, cloth; Wales, friezes; Westmoreland, cloth; Yorkshire, cloth; Somersetshire, serges; Hampshire, Berkshire, and Sussex, cloth.

For several reigns subsequent to that of Edward III. the woollen cloths made in England appear to have been chiefly of a coarse quality; the majority of the manufacturers directing their attention chiefly to worsted fabrics; while the finer broad-cloths were imported from Brabant, a proof that the exertions of Edward, though successful in respect to the extent of the manufacture, were not so in respect to quality. By the reign of Henry VIII. the exports of English cloths became very large, insomuch that when, through foreign wars, the markets of Spain and the Netherlands were closed to the English, great complaints arose among the manufacturers, who could not sell the cloth which they sent to Blackwell Hall, a kind of Cloth Hall whence London dealers and merchants were supplied. About this time the manufacture in the counties of Somerset, Gloucester, Wilts, and Worcester was limited to corporate towns; and the most absurd laws were passed to confine it to those favoured spots; but during the reign of Elizabeth, owing partly to many of these restrictions being removed, and partly to the immigration into England of many weavers driven from the Netherlands by the persecutions of the duke of Alva, a considerable advance was made in the English manufacture. In the following reign the English dyers succeeded in obtaining a law prohibiting the export of cloth in the white or undyed state, under the expectation that they would be gainers thereby; but, like many other monopolies, it defeated its own aim; the Dutch and Germans refused to buy English cloth in the dyed state, and thus the exports fell so enormously that dyers as well as manufacturers lost by the impolitic prohibition.

During the time of the Stuarts a narrow policy almost ruined the manufacture. At one time there was an attempt to get all Spanish wool brought to this country, and to no other countries; at another time the exportation of English wool, of fullers'-earth, and other materials of manufacture, was prohibited; English clothiers refused to receive Flemings among them, from a feeling of jealousy; the London merchants procured an act 'prohibiting all foreigners from buying and selling;' and many other

s were passed, either by parliament or by corpo-
tending to cripple the free spread of the trade
nufacture. Ireland suffered severely by this mis-
system; for after being compelled to give up the
ion of cattle to England, on account of the com-
of the graziers, she turned attention to the growth
but this offended the English wool-growers; and
loths were sent to England, this roused the oppo-
the English clothiers; so that from about 1640 to
of the century there was one continuous struggle
d to bear up against the selfish policy of England
ct to wool and its manufactures.

ghout the greater part of the eighteenth century the
ture steadily increased in England, especially in
rics made of long or combing wool. When the
ns in spinning-machinery gave the extraordinary
to the cotton-manufacture, that of woollen became
omparatively into the shade; but the application
ved machinery has since increased the power of
facturers; while the great improvements in the
f German and Australian wools, combined with the
nce of a liberal policy in respect to commerce
change, bid fair to give to the woollen and worsted
tures in England a more healthy tone than they
l at the end of the last century. In a subsequent
give a few statistical details illustrative of the ex-
localization of the manufacture.

ROCESSES OF THE WOOLLEN MANUFACTURE.

been before explained that the woollen manufac-
es to such fabrics as require the use of short or
ool. This wool undergoes a very large number of
in the course of the manufacture. If we take a
road-cloth as a representative of this manufacture
, the following are the successive processes by
is produced:—

g the wool.
ing or washing.
g (when dyed he wool).
ing.
ng.
.
ling.
ng.
ing.
10 Spinning.
11 Reeling.
12 Warping.
13 Singeing.
14 Weaving.
15 Scouring.
16 Dyeing (when dyed in the cloth).
17 Burling.
18 Fulling.
19 Scouring.
20 Tentering.
21 Teazling.
22 Shearing.
23 Brushing.
24 Picking.
25 Pressing.
26 Packing.

one-half of these, in the most improved forms of
g, are effected by machinery; and the other half

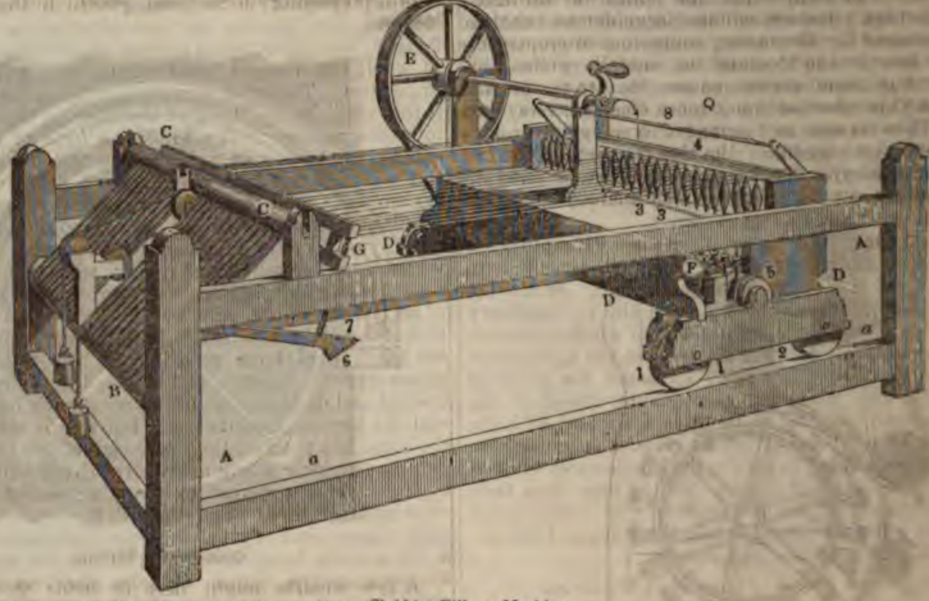
rting of the wool is the first operation, and is one
importance, since the quality of the cloth depends
n a due admixture of different kinds of wool.
k of wool contains many different qualities, ac-
o the part of the fleece whence it was taken, and
umstances; and much tact and discrimination are
in the separation. The sorter has to make his
in relation to the *fineness*, the *softness*, the
the *colour*, the *cleanness*, and the *weight* of the
d in reference to these qualities he separates the
many parcels, which receive the names of—
choice,' 'super,' 'head,' 'downrights,' 'seconds,'
,' 'coarse abb,' 'livery,' &c. With respect to
Dr. Parry found that the finest fibre is that of
we, the mean diameter of which is $\frac{1}{1370}$ of an inch;
coarsest is that of Wilts ewe, measuring $\frac{1}{500}$ of an
l woolly fibres are thicker at one end than the
t the less the difference in that respect, the more
is the wool; and this is one of the favourable
Merino wool. According to the kind of goods to
so do the several qualities in wool require to be
and hence the importance of the wool-sorter's
n.

the proper kinds are selected, they are next
scoured, to free them from the grease which in-
ttaches to them. The wool is soaked in a ley of
e and soap at a temperature of about 120°, and
s rinsed with cold water. In large manufactories
is passed between the rollers of a powerful press
ing, to free it from nearly all moisture.

loth is dyed in the wool, that operation succeeds
ing; but if dyed 'in the piece,' many other pro-
rvene; and it depends a good deal on the kind of
to which plan is followed. Supposing the dyeing to be completed, however, the wool undergoes the process of 'willying' or 'willowing,' which is somewhat analogous to the 'batting' or 'scutching' in the cotton-manufacture; the object being to open and disentangle the locks of wool, and cleanse them from sandy and other loose impurities. The most improved machine for this purpose is that made by Mr. Lilly of Manchester, which acts in the following manner:—The willy is a kind of hollow truncated cone, having an axis running through its centre; on this axis are fixed three wheels of different diameters, bearing on their circumference four longitudinal bars studded with sharp spikes. The cone revolves with a rapidity of three or four hundred revolutions per minute, within an outer cylindrical casing, whose inner surface is armed with similar spikes. The machine is fed, by means of an endless apron, with wool, which enters at the small end of the cone, and travels to the larger end by virtue of the centrifugal force produced by the rotation. As it passes onwards between and among the spikes, it becomes opened and disentangled, the fibres of each lock separated, and the impurities detached. But this is not all. When the wool has reached the lower end of the cone, it passes into a receptacle where a fan is revolving with great rapidity, by which a current of air is generated sufficient to blow away all the dust mixed with the wool; while at the same time a kind of revolving cage distributes the wool in a flat equable layer or stratum. Thus the same machine disentangles the fibres, separates the impurities, blows away the dust, and lays the wool in a smooth sheet.

Some kinds of wool require milling more than once; but this is not the case with the finer qualities. There are however frequently some impurities which cannot be removed by the willy; and such are afterwards picked out by boys or women, called 'wool-moaters,' or 'wool-pickers.' A further opening of fibres results from the process of 'scribbling;' but before this is effected, the wool undergoes that of *oiling;* it being spread out on a floor, sprinkled with olive-oil, and well beaten with staves. The *scribbling-machine* is very similar in its principle of action to the *carding-machine*, both being intended to separate the fibres completely, and to lay them in a very equable stratum. Each machine consists of several cylinders, on whose external surfaces are rows of teeth or wires. These are combined in a strong frame, and so fitted as just to touch and work against each other; the wires on one cylinder are bent in a direction contrary to those in the adjoining one; so that when all the cylinders are revolving, and wool is applied to the first one of the series by an endless apron, it is caught from tooth to tooth, carried rapidly from cylinder to cylinder, separated completely from all entanglement, and finally given forth in the shape of a delicate fleece or sheet. It becomes wound on a revolving roller, after having passed through the scribbling-machine; but when it leaves the carding-machine it presents the appearance of slender rods, cylinders, or pipes, which are called *cardings*.

These cardings are then spun into yarn for the use of the woollen-weaver; the process of spinning being generally effected by means of the *slubbing-billy* or *slubbing-machine*, and afterwards by the common jenny or mule-spinning machines; the slubbing-billy bringing the wool to the state of a soft weak thread, and the spinning-machine giving it the proper firmness and hardness for yarn. The following will give an idea of the appearance and mode of action of the *slubbing-billy*, as described by Dr. Ure: A A is a wooden frame, within which is a moveable carriage D D, running on lower side-rails *a a*, on friction-wheels 1, 2. The carriage contains a number of steel spindles, such as 3, 3, which receive a rapid motion from a long cylinder F, by means of separate cords passing round the pulleys of the respective spindles; this cylinder is a long drum of tin plate, six inches in diameter, covered with paper, and extends across the whole breadth of the carriage. The spindles are placed in a frame so as to stand nearly upright at about four inches apart; their lower ends being so formed as to act as pivots. The drum lies horizontally before the spindles, with its centre a little lower than the line of the spindle-pulleys. The drum receives motion by a pulley at one end with an endless band from a wheel E, which is placed on the outside of the main frame, and which is turned by the spinner, placed at Q, with his right hand applied to a winch; and by this movement the spindles are made to revolve rapidly. Each



Slubbing-Billy or Machine.

spindle receives a soft card or slubbing, which comes through beneath a wooden roller C C, at one end of the frame. A child is employed here, who brings the cardings from the card-engine, and places them upon an inclined cloth between B and C. These cardings, being drawn beneath the roller, are then caught between two rails at G, and there held fast. The wire 7, the lever 6, and the wheel 5, are all concerned in the loosening of the carding from the rails at a particular period in the operation. The movement then is very similar to that in Hargreave's spinning-jenny; a small portion of each carding is allowed to pass between the rails or clasp; and this portion is then drawn out or elongated to the state of a thread by the recession of the carriage towards the other end of the frame. Meanwhile the spindles have been kept in motion, by which a slight twist is imparted to the thread or slubbing. The faller-wire 8, and the rail 4, assist in regulating the winding of the thread uniformly on the spindles. The process then is thus conducted: a child, called a 'piecener,' takes the cardings from the carding-machine, and lays them on the inclined apron; they are thence carried up beneath the roller and between the clasp, and the workman or 'slubber,' by managing his moveable carriage with one hand, and the wheel which turns the spindles with the other, elongates the 'carding' into 'slubbing,' and winds it on the spindles. The pieceners are employed and paid by the slubber; and some years ago great cruelty was said to be inflicted on the children by the workmen for any neglect of their duty; but the inspectorship of factories has removed such sources of discredit to the factory system.

In the spinning of the wool, which follows the slubbing, the kind of machines employed and the general character of the processes are so similar to those exhibited in the cotton manufacture, that it will suffice to refer to COTTON-SPINNING and SPINNING for details.

The process next following that of spinning is *weaving*, by which the yarn is worked up into a textile fabric. If it be a plain cloth, the loom employed is very simple in its arrangements; if it be a twill or an ornamental fabric, the loom is somewhat more complex; but the general arrangements will be sufficiently understood by a reference to WEAVING. Hitherto woollen cloths have been principally woven by hand-weavers; but the power-loom is every year becoming more and more applied to this purpose. Some of the cloths are woven as broad as twelve-quarters, to allow not only for the shrinkage occasioned in the subsequent process of fulling, but for an edging or 'list,' made either of goats' hair or of coarse yarn, into which the tenter-hooks are thrust in the process of *tentering*.

As the wool has been dressed with oil before spinning, and with size before weaving, it becomes necessary to cleanse it from these impurities immediately after the weaving. This is the object of a second *scouring* process, in which the cloth is beaten with wooden mallets in a kind of trough or mill; soap and water being let in upon it first, and then clear water. Being then carried to the drying-room, or the tenter-ground, it is stretched out by means of hooks on rails, and allowed to dry in a smooth and extended state. It is then taken into a room and examined by 'burlers' who pick out all irregular threads, hairs, or dirt. After this it is ready for the important process of *fulling* or *felting*, which imparts to woollen goods that peculiarity of surface whereby they are distinguished from all others. A large mass of cloth folded into many plies is put into the fulling-mill, where it is exposed to the long-continued action of two heavy wooden mallets or stocks. Superfine cloth has four fullings of three hours each, a thick solution of soap being spread between each layer of cloth every time. During the violent percussions which the cloth thus receives for twelve hours, the fibres, being at each stroke strongly impelled together, and driven into the closest possible contact, at length hook into each other by means of the little serrations on their surfaces, until they become firmly and inextricably united; each thread both of the warp and weft, being so compacted with those that are contiguous to it, that the whole seems formed into one substance, not liable, like other woven goods, to unravel when cut with the scissors. This compacting process in the cloth manufacture is effected by beating, and is called 'fulling;' in the hat-manufacture it is effected by pressure and rolling, and is called 'felting;' but the two are closely analogous in principle. This process thickens the cloth remarkably, but diminishes it both in length and breadth nearly one half.*

In the fulled state the cloth presents a woolly and rough appearance, to improve which it goes through the processes of *teazling* or *raising*, and *shearing* or *cutting*; the object of the first being to raise the ends of the fibres above the surface, and of the second to cut them off to a uniform level. The raising of the fibres is effected by thistle-heads, teazling-cards, or wire brushes. Teazles are the seed-pods of the *dipsacus fullonum* [TEAZLE], having small hooked points on their surfaces; and they were formerly used in the cloth manufacture thus:—a number of these were put into a small frame with handles, so as to form a kind of curry-comb; and this was worked by two men over the surface of the cloth, which was suspended horizontally, the direction of working being first parallel with the warp, and then parallel with the weft. From the trouble required to clean the barbs of the teazles when ɘd with woollen fibres, from the weakening of their nts by the water with which the cloth was saturated, from the high price which the large demand enabled n to command in the market, numerous attempts were le from time to time to substitute metallic points; but believe that from various causes the teazles are still ferred, and are now used in a more efficacious way than nerly. The teazles are arranged on a cylinder in a chine called a 'gig-mill;' the cloth is stretched on two h-beams; the cylinder moves in one direction and the h in another, and the fibres become thereby worked or

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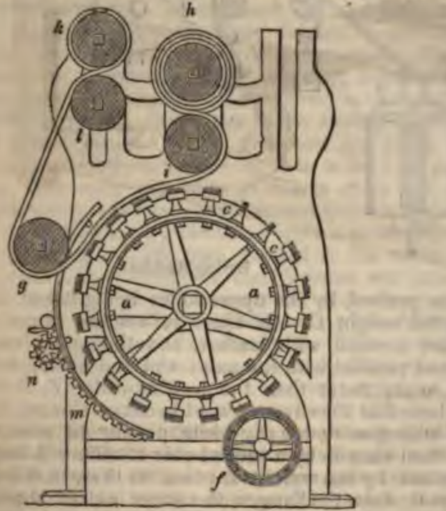
* Attempts have from time to time been made to produce a cloth fit for garments by the process of felting only, without the aid of weaving; and the great strength in the felt of a hat (similarly produced) would seem to augur well for such attempts. But hitherto the encouragement given has not been such as to render the project commercially successful.

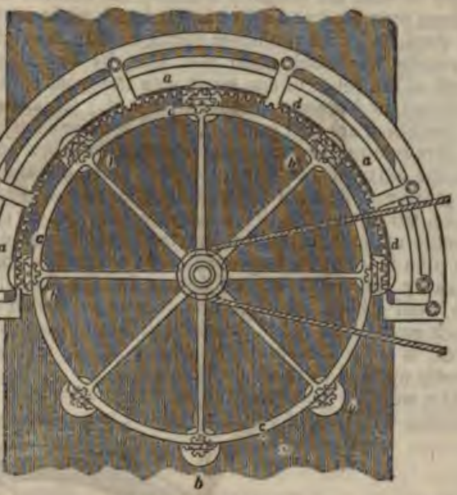


Gig-Mill.

ɔed up. The annexed cut shows the section of such chine; where the cloth, passing from a roller *h*, l the roller *i*, comes in contact with the brushes *c* on wheel *a*, and afterwards passes round *g* and *l* to the *k*; the roller *g* being so regulated by the pinion *n* he rack *m* as to keep the cloth thoroughly stretched; the revolving brush *f* being so adjusted as to clean eazling-cards *c*. In some recent machines the teazl- oints are made of wire, to obviate the waste of 3000 al teazles, which takes place in the dressing of one of cloth; but still the old teazles seem to maintain supremacy.

ɪen the ends of the fibres have been thus raised to rface, they are next sheared or cropped, a process of beauty and singularity. Originally this process was rmed by means of large hand-shears, the cloth being hed over a stuffed table, and the workman proceed- clip the ends of the fibres in a regular and equable er. This was an operation requiring great dexterity; he men who worked at it, being in the receipt of wages, were so alarmed at the introduction of shear- nachines, in the early part of the present century, erious riots occurred in the west of England. But nachines became by degrees extensively employed. consisted each of a pair of shears, as in the hand- od; but all the movements were effected by ma- ry. More recently a machine has been introduced action is regulated on a different principle, as will en from the annexed cut: *b b b* are disk-formed cut- working against a thin bar of steel *a a a*, of a semi- ar form; which cutters in their revolution travel against the edge of the bar or blade in such a way shave off the filaments standing up on the surface of oth beneath. The cloth is represented by the shaded The wheel *c c c*, set in motion by machinery, im- action to the circular cutters attached to it through edium of the rack *d d*. It is easy to see that, whether achine travels along over the cloth, or the cloth tra- along beneath the machine, every part of the fibrous e is acted upon in precisely the same way by the rotation of the wheel and the disk-cutters.

en the cloth has been raised and sheared (which tions are repeated two or three times for superfine , it is brushed by a machine consisting of a system shes affixed to cylinders; the cloth being exposed same time to the action of the brushes and of steam. subsequent operations are carried on, having for their object the imparting of smoothness, gloss, &c. to the cloth, preparatory to its being placed in the hands of the dealers.



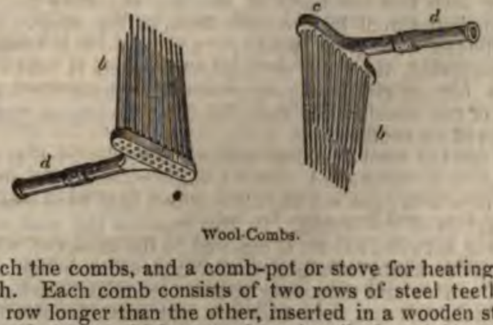
Cloth-shearing Machine.

A few remarks might here be made on the different kinds of goods coming under the denomination of 'woollen manufactures;' but it will be convenient first to notice the chief

Processes of the Worsted Manufacture.

The long wools for worsted fabrics, not requiring to undergo the felting process, pass through a circle of operations different from those hitherto noticed; since the object in view is rather to lay the fibres in a parallel position than to twist and entangle them one among another. All combing-wools are longer in fibre than the clothing-wools, but they are subject to the division into 'long' and 'short' combing-wools; the long, varying from six to twelve inches in length, being used principally for coarse worsted goods, and the short, from four to seven inches, being used for hosiery and some other purposes.

After the wool has been sorted, washed, and scoured from the adherent grease, and dried in a heated room, it is carried to a machine called a 'plucker,' containing a pair of spiked rollers, by the action of which the wool is cleansed, separated, and the fibres straightened, preparatory to the process of 'combing.' In hand-combing, which, until modern times, was the only mode followed, and which is rather laborious work, the proceedings are somewhat as follow:—The comber is provided with a pair of combs such as are here represented, a comb-post to which to attach the combs, and a comb-pot or stove for heating the teeth. Each comb consists of two rows of steel teeth, *b*, one row longer than the other, inserted in a wooden stock or head *c*, from which protrudes a handle *d*, at right angles to the direction of the teeth. Some combs have three rows of teeth. The workman first heats the teeth of one of the combs in the stove, and fixes it in the post, teeth uppermost. He then takes a small handful of wool, consisting of about four ounces, sprinkles it with oil to increase the pliancy and ductility of the filaments, and works it about between his hands to equalize the oil on every part of the fibres. The comber then takes half the bundle of oiled wool, and dashes it on the upturned teeth of the comb, till it is all deposited there, and caught between the teeth sufficiently firm to be retained. The comb with its wool is placed, points downwards, in the stove; and the



Wool-Combs.

y to others, point to the diverse applications of longol in the production of woven fabrics; while kerseymere d other names indicate distinctions in the felted-wool ods. But besides these diversities, there are others dending on various circumstances; such as the admixture woollen with worsted, or of either of them with cotton silk, in the same fabric; the dyeing of the material, metimes in the piece, sometimes uniformly in the yarn, d sometimes in a party-coloured mode called 'clouding;' d the printing of devices on one surface.

A few examples may suffice to illustrate this diversity, d may also show why it has not been deemed necessary devote separate articles to these fabrics in previous ts of the 'Cyclopædia,' except in a few cases. Plain ad-cloth is a specimen of plain weaving, followed by fulling process; whereas *kerseymere* is a twilled ric, similarly fulled. *Serges* are twills, having worsted p and coarse woollen weft. *Blankets* are made of y soft yarn, afterwards worked up into a kind of pile milling; and many varieties of coarse cloth are of logous structure. *Bombazeen* [BOMBAZEEN] is a twilled xture of worsted and silk; whereas *Poplin* is an untwilled xture, showing more silk than worsted at the surface. dern goods called *Saxonies* and *Orleans* are made woollen, sometimes mixed with cotton, and afterwards inted. *Stuff* is made wholly of worsted; while *Merino* a fine woollen twill, sometimes printed. The material lled *Cashmere*, if properly so named, is made of the shawloat wool, much in the same way as merino; but most of he fabrics so called are made of sheep's wool. *Challis* is mixture of woollen weft with silk warp, and is generally *inted. Mousseline-de-laine* was originally all wool, but is *w frequently* mixed with cotton, and generally printed. *wich crape*, unlike common crape [CRAPE], is comd of wool and silk, something like challis, but withing printed. *Crêpe de Lyon* is formed of worsted lk; and *Italian net* of worsted only. These exare only intended to indicate the sources of the s in woollen and worsted goods, for to enumerate all eties themselves would be nearly impossible. This is arly the case in respect to *Waistcoatings*, where eaving adds another to the sources of diversity.

us details have been given, at different times and in forms, to illustrate the distribution of these manuin respect to the towns where they are carried on goods produced at each; but the most satisfactory, are those given by Mr. M'Culloch, in the 'Statiscount of the British Empire;' and from that work borrow the following details.

West Riding of Yorkshire, the most important -district in England, exhibits an area of nearly 40 20 occupied by clothing towns and villages. Leeds, d, Halifax, Huddersfield, Dewsbury, and Wakefield great manufacturing centres. Mixed or coloured are made principally in the villages west of Leeds Wakefield; white or undyed cloths are made chiefly villages occupying a belt of country extending from Wakefield to Shipley. These two districts are toleradistinct; but at the margins of the two, both kinds of oth are manufactured. Flannels and baizes are the principal woollen articles made in and near Halifax, together with cloth for the use of the army. Blankets are made on the line between Leeds and Huddersfield. Bradford provides very largely the spun worsted required for the various manufactures. Stuffs are made at Bradford, Halifax, and Leeds; and narrow cloths at Huddersfield. Saddleworth furnishes broad-cloth and kerseymeres. In the eighbourhood of Batley and Dewsbury are establishments lled 'shoddy mills,' employed in the manufacture of yarn om old woollen rags, which is used in the weaving of me coarse kinds of goods.

The West of England takes rank next to Yorkshire, and merly took precedence of it. The finest kinds of broadth, from Saxony, Australia, and Spanish wool, are made Gloucestershire. The manufacture is carried on in a trict called the *Bottoms*, and in other parts of the county; town of Stroud being a kind of centre for the whole. ere are more than a hundred woollen factories in Gloutershire, besides the numerous villages of small houses abited by hand-loom weavers. Wiltshire produces very e cloths, at Bradford, Trowbridge, Westbury, Melksham, ippenham, and the surrounding villages; while cloth various kinds is made at Wilton, Warminster, Heytesbury, and Calne. Taunton, Frome, Tiverton, and the surrounding villages constitute the Somersetshire clothing district. Devonshire and Dorset have little woollen manufacture.

There is another district as distinctly marked from the two just noticed as they are from each other: this is the Norfolk district, which was long the principal seat of the 'stuff' or worsted manufacture. Indeed the name 'worsted' is said to have been derived from the name of a parish in Norfolk, where stuffs were first made; but there are not wanting those who refer it to *Ostades*, the name given to them by the early Flemish weavers. Bombazeens, crapes, camlets, and shawls have constituted the chief fabrics for which Norfolk has been celebrated; but the manufactures in this county are understood to be declining, chiefly on account of the absence of coal, which has caused a large share of the operations from both Norfolk and the West of England to be transferred to Yorkshire; indeed it is said that most of the yarn now used in Norfolk is spun at Bradford in Yorkshire.

These are the three great districts engaged in the consumption of wool; to which may be added Leicestershire, where nearly all the worsted stockings are made, employing ten or twelve thousand stocking-frames. But besides these, there are minor articles of manufacture which seem to have become located in particular spots in various parts of England. Druggets and long-ells, the latter of which were formerly much purchased by the East India Company, are made in Devon and Cornwall. Plush is made at Modbury in Devonshire. Baize, which used to be made largely in Essex, is now chiefly made at Rochdale. Salisbury produces flannels: and Witney and Chichester blankets. Kidderminster, Wilton, Cirencester, Worcester, and Axminster are the chief seats of the carpet-manufacture. Coarse woollens and druggets are made largely at Kendal, Keswick, and Ambleside. Druggets, shalloons, and serges are made at Andover, Basingstoke, and Alton; worsted shag at Banbury and Coventry; rugs at Burford; fleecy-hosiery at Godalming; bunting and crape in many parts of Suffolk.

In Wales the principal manufactures relating to wool and worsted are 'strong webs' or 'high-country cloths,' 'small webs' or 'low-country cloths,' flannels, stockings, socks, wigs, and gloves; the chief counties being Montgomery, Merioneth, and Denbigh. The 'strong webs' are used principally for workmen's jackets, ironing cloths, &c.; while the 'small webs' are largely used for slaves' clothing in the West Indies.

In Scotland the fine woollen manufacture is upon a very limited scale; but a good deal is done at Aberdeen, Stirling, Galashiels, Jedburgh, Hawick, Inverness, Kilmarnock, and Paisley, in the production of various kinds of woollen and worsted goods, such as coarse plaiding, clan-tartans, woollen-hose, blankets, flannels, and especially carpets and shawls. The manufactures of woollen and worsted goods in Ireland, owing to the unsettled state in which that country has unfortunately been placed, are quite insignificant.

MODE OF CONDUCTING THE MANUFACTURE AND SALE.

Different usages prevail in different counties respecting the connection between employers and employed, buyers and sellers, in the woollen and worsted manufactures. In the West of England the general plan of operation is this:—The master-clothier buys his foreign wool from the importer, and his English wool from the wool-stapler. He employs in all the different processes through which the wool passes in the course of manufacture, distinct classes of persons, who sometimes work at their own houses, and sometimes in the factory of the master-clothier. Each workman confines himself exclusively to a particular branch of the manufacture; and this has been supposed to have led to the excellence of the West of England cloth.

A second mode is on the factory-system, now extensively adopted in the West Riding of Yorkshire. The master-manufacturer, who sometimes possesses a large amount of capital, employs a great number of workmen in one or more buildings, under the inspection of himself or a superintendent. In this system, as in the master-clothier system, the workman has no property in the material on which he in employed.

In the domestic system, which was the one originally adopted, the arrangement is altogether different. Under this system the manufacture is conducted by a number of small masters, who are generally possessed of very limited capital, and who, besides their business as manufacturers, mostly occupy farms of a few acres, partly for the support of their families, and partly for the convenience of their manufacture. The domestic clothiers have in their houses from one to four looms, on which they employ themselves, their wives, and children, and perhaps other assistants. During harvest their wives, children, and servants are sent out into the fields to work. Formerly these clothiers used to carry the wool through all the stages of its manufacture, till it was brought to the state of undressed cloth; but of late years they have availed themselves of 'public mills,' which are established in and among the clothing-villages, for the performance of some of the processes; these mills having been erected on a joint-stock principle, by shares of 50*l.* or 100*l.* each, principally subscribed by the domestic clothiers. When machinery began to be extensively employed in the woollen manufacture, in the early part of the present century, the domestic clothiers became violently excited, under the apprehension that their trade would be taken from them by the newly-invented machines. A Parliamentary Committee was appointed to inquire into the probable operation of machinery in respect to the well-being of the domestic clothiers; and after examining numerous witnesses they made a Report, in which they detailed the distinctive features of the factory and the domestic systems, and came to a conclusion that 'the two systems, instead of rivalling, are mutual aids to each other; each supplying the other's defects, and promoting the other's prosperity.' 'Experience,' says Mr. M'Culloch, 'has proved the correctness of these conclusions. The number of small manufacturers, and the quantity of cloth produced by them, have both increased since 1806; but, as the number of factories, and the quantity of cloth made in them, have increased still more rapidly, the former constitute, at present, a less proportion of the trade.'

As respects the *sale* of the cloth, halls have been established for this purpose at Leeds, Halifax, Bradford, Huddersfield, and other towns, which are attended on the public market-days by thousands of the smaller class of manufacturers. The halls are divided into long walks or galleries, consisting of two rows of stands, each of which is marked with the name of the person by whom it is occupied. On these stands the cloth is exposed for sale; and when the market opens, the manufacturers take their stations at the stands behind their goods, the merchants or buyers passing to make their purchases through the avenues between the rows. The time during which the halls are open is limited usually to about one hour and a half; but in this short interval purchases to a very large amount are made. There are two cloth-halls at Leeds, one for the sale of mixed cloth, containing 1800 stands, and one for the sale of white cloth, containing 1200 stands. These halls are appropriated exclusively to the use of those who have served regular apprenticeships to the business of cloth-making; they are managed by trustees, and many of the stalls are the freehold property of the persons who occupy them. All the cloth sold in the halls is rough and undressed. Those by or for whom it is bought have what are termed 'finishing-shops,' where the cloth is shorn, dressed, and fitted for use. This is analogous to a system pursued by the bobbin-net manufacturers at Nottingham, where the net is sold by the maker in the rough state as it leaves the loom, and purchased by other parties, who singe, dress, and finish it ready for the market.

For the sale of various kinds of goods woven in North Wales there is a market held at Shrewsbury; but it is customary for the drapers of that town to travel into the country and buy goods wherever they find them. It is there usual also for the principal drapers to keep servants, the greater part of the year, among the manufacturers, with whom they get acquainted, assist those who are poor with loans to purchase wool, and superintend the making and dressing of the goods. At Welshpool a flannel-market is held once a fortnight. To this market the manufacturers used to bring their goods; but now a set of middle-men go about the country, and buy all the flannels the manufacturers have to sell. At the Welshpool market nothing is sold on credit, every piece being paid for as soon as measured; and a similar system prevails in the other woollen markets of Wales.

EXTENT OF THE MANUFACTURE AND NUMBER OF OPERATIVES.

The Custom-house returns enable us to form something like a correct opinion of the quantity of cloth which is manufactured in England yearly; but the amount of capital invested and the number of persons engaged have been very variously estimated. In 1739, the writer of a pamphlet on the subject of wool estimated the number of persons engaged in the woollen manufacture at 1,500,000, and their wages at 11,737,500*l.* per annum; this estimate was obviously an over-charged one. Dr. Campbell, in 1774, thought that there might probably at that time be 1,000,000 persons employed in the manufacture in England, that the value of the wool used was 3,000,000*l.* per annum, and that this value was increased to 12,000,000*l.* by the processes of manufacture. In 1800 the woollen manufacturers, in committee before the House of Lords, made the extravagant estimate that there were then 1,500,000 persons directly engaged in the manufacture, that an equal number were collaterally employed in it, that the value of the wool used was more than 6,000,000*l.* sterling, and that of the manufactured goods nearly 20,000,000*l.* sterling. In 1815 Mr. Stevenson supposed that there were half a million persons employed, receiving 9,600,000*l.* per annum wages; and that this sum, added to the value of the raw material, the interest on capital, the manufacturer's profit, &c., gave 18,000,000*l.* as the annual value of the cloth produced. Mr. M'Culloch (*Statistical Account*, p. 627) forms an estimate on the following data:—That there are about 150,000,000 lbs. of wool worked up yearly; that this may be worth about 7,500,000*l.*; that the value of the manufactured goods is three times that of the raw wool, making therefore 22,500,000*l.* per annum; the this value is thus made up:—

Raw material . .	£7,500,000
Oil, soap, dye-stuffs, &c. .	1,600,000
Interest, profit, &c. . .	4,650,000
Wages . . .	8,750,000
	£22,500,000

And dividing this amount of wages at the rate of 22*l.* a year to each operative on an average, he arrives at the number 334,600, which he thinks a probable approximation to the number of persons employed in the woollen manufacture in this country. Mr. Chapman (one of the Assistant Hand-Loom Commissioners, and the author of the able article on 'Wool, and its Manufactures,' in the new edition of the 'Encyclopædia Britannica') makes an estimate in that treatise which agrees pretty nearly with that of Mr. M'Culloch; although at the first glance the two estimates seem discordant. He thinks that, in 18[illegible], the number of families directly dependent on the manufacture were:—

In the West Riding of Yorkshire	85,096
In the West of England . .	20,851
In Norfolk and Kendal . .	17,570
In the hosiery district . .	20,464
In all other places . .	20,000
	163,981

Then, taking the average number of persons in a family at 5⅓, he arrives at an aggregate of 874,565 persons directly supported thereby. He further supposes that this number must have increased, by 1841, to 226,298 families, or 1,218,424 individuals. Mr. M'Culloch's estimate is of the number of persons *employed*, while Mr. Chapman's is of the number of persons *supported*; and this may explain the apparent discrepancy between the two estimates. As to the value of the manufacture, Mr. Chapman proceeds thus:—226,298 families, earning on an average 17*s.* 6*d.* per week each family, which amounts to 10,296,559*l.*; and the relation between this and the other items of the cost he thus states:—

Value of wool employed .	£10,000,000
Oil, dye-stuffs, soap, &c. .	1,500,000
Wages . . .	10,296,559
Wear and tear, profit .	4,359,311
	£26,155,870

We shall conclude with a few extracts from Mr. Bischoff's tables. For about a century, from 1725 to 1820, all the cloths made and 'fulled' in the West Riding were mea-ed and stamped by officers appointed for that purpose; from the returns made, it appears that there were ed, in the West Riding, the following number of pieces road and narrow cloth, in the years named:—

	Broad.	Narrow.
In 1726	26,671	..
1736	38,899	..
1746	56,637	68,775
1756	33,590	78,318
1766	72,575	78,893
1776	99,733	99,586
1786	158,792	123,025
1796	240,770	151,594
1806	290,269	175,334
1816	325,449	120,901

he woollens and worsteds exported in 1820, 1830, and 0, or rather to January 5th in the following years, were ollow:—

	1820.	1830.	1840.	
ol	35,242	2,951,000	4,810,387	lbs.
n yarn . .	11,081	1,108,023	3,796,644	lbs.
ths of all sorts	288,228	388,269	215,746	pieces.
pped coatings	59,644	22,377	16,094	pieces.
seymeres .	78,944	34,714	27,122	pieces.
ze	37,183	49,164	36,044	pieces.
ffs	828,824	1,252,512	1,718,617	pieces.
nnels . . .	2,567,496	1,613,099	1,613,477	yards.
nketing . .	1,288,109	2,176,391	2,162,653	yards.
peting . .	525,990	672,869	758,639	yards.
ol and cotton	407,716	1,099,518	3,628,874	yards.
rsted hosiery .	50,390	111,146	96,946	dozen pair.
dries . . .	£39,313	£54,038	£164,034	value.
clared value	£5,587,758	£4,728,666	£5,327,853	

he most striking features in this table are the large ease in the exports of sheep's wool, spun yarn, and ed wool and cotton fabrics.

n the parliamentary documents for 1842, the declared ie of manufactured wool exported in 1841, independent aw wool, is set down at 5,748,673*l*. Of these exports e were sent to the United States the value of 1,521,980*l*.; Germany, 883,878*l*.; to the East Indies and China, 710*l*.; to British America, 515,344*l*.; to South Ame- , 468,070*l*.; to Brazil, 329,984*l*.; and to Holland, 769*l*.; the other countries enumerated, twenty-three umber, having taken comparatively small quantities. importance of peaceful relations between this country America is shown—in this, as in a hundred other in- ces—by the fact that one-fourth of all our exports in steds and woollens is to the United States. It is also thy of note that, in 1841, no less than 7,544,196 lbs. of ish wool were exported to Belgium alone, out of a l export of 8,471,235 lbs.

VOOLLETT, WILLIAM. This excellent engraver was n at Maidstone in Kent, in 1735. He learned his art of n Tinney, an obscure engraver in London, but he soon pted a style of his own, acquired early a great reputa- as a landscape engraver, and was appointed engraver eorge III. No artist ever used together more effec- ly the etching-needle and the graver: in foliage, water, in rocks, Woollett was particularly successful, and is unrivalled; but in figures, and especially in flesh, he less so. In the latter part of his life Woollet took to orical engraving; and also in this department he has duced some of the finest plates of which the English ool of engraving can boast: the Death of General lfe, and the Battle of the Hogue, both after West, are sidered his best historical pieces, and they are cer- ly plates of extraordinary merit. Of his landscapes masterpieces are those which he engraved after Wilson: are nine in number, namely, Phaeton, Niobe, Celadon Amelia, Ceyx and Alcyone, Snowdon, Cicero at his a, Meleager and Atalante, Apollo and the Seasons, and tude, a companion-piece to Cicero at his Villa. In the plate he was assisted by Ellis, and in the Meleager in the Apollo by Pouncey. He engraved also after ide, Zuccarelli, the Smiths of Chichester, Stubbs, and rs; and he executed some plates after views drawn nature by himself. Woollett died in London in 1785, l 50, and was buried in old St. Pancras churchyard: e is a monument to him in the cloisters of Westminster Abbey. He is spoken of as a man of admirable character and a very amiable disposition. The following anecdote, said to have been told by West (*Library of the Fine Arts*, vol. iii.), evinces an extraordinary degree of perseverance and patience: Woollett, when he had finished his plate of the Battle of the Hogue, took a proof to West for his inspection: at first the president expressed himself perfectly satisfied with the plate, but, upon a longer examination, he observed that in some parts alterations might be made, and in others additional colour might be added, which would, in his opinion, improve the effect of the plate; and taking a port-crayon with black and white chalk in it, he showed in a few minutes the effect he wished to be produced, remarking at the same time that it was of no great consequence, but it might improve the appearance of the plate. Woollett however immediately consented to make the alterations and additions pointed out,—'But how long will it take you, Mr. Woollett?' said the president. 'Oh! about three or four months,' replied the engraver: 'and the patient creature,' said West, when relating the circumstance, 'actually went through the additional labour without a murmur.'

WOOLSTON, THOMAS, was born in 1669, at Northampton, and was the son of a respectable tradesman of that city. He went from a grammar-school to Sidney Sussex College, Cambridge, where, after taking the degrees of Bachelor of Arts and Master of Arts, he was elected a fellow of his college, and continued to reside as such. He entered into holy orders, and in due time took the degree of Bachelor of Divinity. In 1705 he published his first work, entitled 'The Old Apology of the Truth for the Christian Religion against the Jews and Gentiles revived.' No publication again proceeded from him till after an interval of fifteen years spent in laborious study of the works of the fathers within the walls of his college; and in the year 1720 he published three Latin tracts, one of which, entitled 'De Pontii Pilati ad Tiberium Epistola circa Res Jesu Christi gestas, per Mystagogum, was an endeavour to prove that the letter of Pontius Pilate which had been transmitted by the fathers was a forgery, without denying that a letter had been written to Tiberius; and the two others were letters written, under the title of 'Origen Adamantius Renatus,' to Doctors Whitby, Waterland, and Whiston, on the interpretation of the Scriptures. About the same time he published two tracts, in the form of letters to Dr. Bennet, and under the name of Aristobulus, one on the question 'Whether the Quakers do not the nearest of any other sect of religion resemble the Primitive Christians in principles and practice?' and the other being 'A Defence of the Apostles and Primitive Fathers of the Church in their Allegorical Interpretation of the Law of Moses, against the Ministers of the Letter and Literal Commentators of this age;' and he immediately followed up these publications by writing an answer to them. The letters to Dr. Bennet, and the answer to the letters, abounded in attacks upon the clergy, which, together with the spirit of allegorical interpretation of the Scriptures pervading as well the latter of the two letters, as his previous letters addressed to Doctors Whitby, Waterland, and Whiston, exposed Woolston to much suspicion and attack from the clergy. His next publication, in 1722, was one not calculated to give offence, being a tract entitled 'The exact Fitness of the Time in which Christ was manifested in the Flesh, demonstrated by Reason, against the Objections of the Old Gentiles and of Modern Unbelievers,' which had been written twenty years before, and read in Sidney Sussex College chapel. In 1723 and 1724 he published four pamphlets, under the title of 'Free Gifts to the Clergy,' and then an answer to them, all directed against the clergy. In 1726 he entered into the controversy raised by Anthony Collins's 'Grounds and Reasons of the Christian Religion,' by the publication of a work to which he gave the name of 'Moderator between an Infidel and Apostate,' and two 'Supplements to the Moderator.' The lengths to which he carried his allegorical interpretation of the Scriptures in these last publications, denying the reality of the miracles wrought by Christ, brought upon him a prosecution by the attorney-general. This prosecution was stopped at the intercession of Mr. Whiston. Nothing daunted, he proceeded in proclaiming his views as to the allegorical character of the miracles, in 'Six Discourses on the Miracles of Christ,' which were addressed to six bishops—Gibson, bishop of London; Chandler, bishop of Lichfield; Smalbroke, bishop

e form, with 24 sides, the diameter being 120
was originally erected in Carlton House Gardens,
e IV. when prince regent, for the reception of
sovereigns when they visited England in 1814,
afterwards presented by him to the garrison at
. The centre of the cone which forms the top of
ing is supported by a pillar, round which are
specimens of old English weapons, such as
ts, wheel-locks, bills, partizans, old swords, &c.
arts of the building are cannon, howitzers, models
d places, Indian arms, and a variety of other mili-
naval curiosities.

peyard is at the east end of the town, in which
the largest size are made.

the buildings above described there are the Royal
arracks, the Barracks of the Royal Sappers and
nd the Royal Ordnance Hospital.

Magazine, Nos. 92, 442, 445, 447; *Population*
&c.)

TON-BASSET. [WILTSHIRE.]

ESTER, a city and capital town of the English
the same name, is situated on the river Severn,
of 100 miles in a direct line west-north-west of
or 112 miles by the road. The boundary of
was formerly determined by a wall which com-
ear Edgar's Tower, at the Castle gate, passed
k of St. Peter's to a gate which was called Sid-
, and thence to Friars' Gate, which stood near
it city prison; it curved inwards on the north-
e present corn-market, round the hop-market,
ge built in 1313, and fortified with a strong
ich stood near it. It then followed the course
er to the Priory gate, and thence to the Castle
This work may still be traced in some places.
e six gates (besides the tower on the bridge):
was taken down in 1787. The present limits of
f Worcester extend from north to south about
es, and nearly two miles from east to west.
wing parishes are comprised within this boun-
l Saints, St. Alban, St. Andrew, St. Clement (a
was in the old city), St. Helen, St. Martin (in
Nicholas, St. Swithin, the extra-parochial district
ckhouse, Claines (in part), St. John (in part),
el and the extra-parochial district of the College
St. Peter's (in part), and the tithing of Whit-
ched to the parish of Claines. The first nine
omposed the city previous to the Boundary Act,
nited for the maintenance of the poor by an act
1792. The latter five were added by the Boun-
nearly the whole are built over, and there is no
nt of rural district within the increased limits.

er is built almost entirely of red brick, with the
of some public buildings, the churches, and
which are of a soft and commonly a reddish
ndstone. The principal streets are broad, airy,
ful; their appearance is clean and neat; the
ous and well provided; and, like the dwelling
good repair. The chief thoroughfares are Bridge
oad Street, Sidbury, College Street, the Cross,
Street, and the Tithing. Besides the cathedral,
twelve churches—St. Nicholas, St. Martin's,
n's, All Saints, St. Andrew's, St. Alban's, St.
St. Helen's, St. Peter's, St. Clement's, and St.
St. John's is the parish church of what may pro-
ermed a suburb of Worcester, and is on the op-
k of the Severn to the main portion of the city.
Roman Catholic chapel, and places of worship
denominations of dissenters, including the Wes-
uakers, Baptists, Independents, and Calvinists.
al existed here in the time of the Saxons; but
med insufficient for its purpose, and was super-
a new cathedral, built by Oswald, the bishop, in
s building being destroyed by fire, a fresh edifice
rose under the auspices of Bishop Wulstan in
is cathedral likewise twice suffered from fire.
second conflagration, for sixteen years it re-
n a dilapidated state. Repairs, so great as to
esh consecration necessary, were then completed,
nuary, 1218, the church was re-opened in the
of the king. Various alterations and additions
e in 1224, and again in 1830.

ter cathedral is built in the form of a double cross, with double transepts. The tower, which is 193 feet high, rises from the intersection of the western transept with the nave and choir. The nave, which appears to be the oldest part of the present building, is divided from the aisles by ten clustered columns on each side, surmounted by pointed arches. The roof is groined, and ornamented with flowers, heads, and other forms of decoration. The height of the nave is 67 feet, the length 174 feet, and the width 30 feet. The choir has also a handsome groined roof; the altar-screen is of stone, and the pulpit is also of stone, both richly sculptured. The tomb of King John is in the centre of the choir. There is a Lady-Chapel, which corresponds in date and style with the choir. The total length of the cathedral is 425 feet; the greatest width is 145 feet. The west transept is 128 feet; the east transept is 120 feet. The exterior is plain, but a fine effect is produced by the apparent lightness of the architecture, and by the pinnacles, which rise not only from the tower, but from almost every termination of the building. The cloisters form a quadrangle on the south side; on the east side is the chapter-house, which contains the cathedral library. The cathedral is in an indifferent state as to repair, and costs a considerable sum yearly for that purpose. Many of the restorations which have been made in former times in various parts of the interior, are in the most incongruous and unsuitable styles.

The corporation of Worcester cathedral consists of a dean and ten prebendaries or canons. There are also eight minor canons, a schoolmaster and usher, and two or three other officers. The total yearly income, on an average of three years ending in 1831, was 12,088*l.*; the annual expenditure, by the same average, was 3609*l.*

The other principal buildings are, the county courts, lately erected, the county gaol, the infirmary, Edgar's Tower, and the guildhall. In the guildhall is a large room, which is used for public entertainments. The present bridge over the Severn was built in 1780.

Fuel is both plentiful and cheap: there are water-works and gas-works, and the city is well lighted.

The livings in the city of Worcester, estimated on an average of three years ending 1831, were—St. Alban's, rectory, in the gift of the bishop of Worcester, with a net yearly income of 74*l.*; All Saints, rectory, in the gift of the crown, with a net yearly income of 138*l.*; St. Andrew's, rectory, in the gift of the dean and chapter of Worcester, with a net yearly income of 165*l.*; St. Clement's, rectory, in the gift of the dean and chapter of Worcester, with a net yearly income of 101*l.*; St. Helen's, rectory, in the gift of the bishop of Worcester, with a net yearly income of 136*l.*; St. Martin's, rectory, in the gift of the dean and chapter of Worcester, with a net yearly income of 378*l.*; St. Nicholas, rectory, in the gift of the bishop of Worcester, with a net yearly income of 260*l.*; St. Peter, vicarage, with Whittington, curacy, in the gift of the dean and chapter of Worcester, with a net yearly income of 233*l.*; and St. Swithin's, rectory, in the gift of the dean and chapter of Worcester, with a net yearly income of 170*l.*

According to the Education Returns (1833), Worcester contained eight infant-schools, with 501 children; thirty-nine daily schools, with 1130 males and females; six national schools, with 667 males and females; one daily free grammar-school, founded by Queen Elizabeth, with 25 males; nine day- and boarding-schools, with 230 males and females; one boarding-school, with 59 males; and twelve Sunday-schools, with 1687 males and females.

A manufacture of cloth was once carried on here to a considerable extent, but was in the course of time abandoned. The glove trade subsequently employed a large number of the poor inhabitants; but this manufacture also has declined, and is gradually diminishing. China is made here: there are three different factories of some celebrity. The principal inns are the Star and Garter, the Unicorn, and the Crown.

Worcester, previous to the Municipal Reform Act, in 1835, was a corporation consisting of a mayor and six aldermen, 24 capital councillors (of whom the aldermen were part), 48 capital citizens, and an indefinite number of free citizens; the corporation was self elected, and the titles to admission to the freedom were birth, apprenticeship, and gift by the council. The number of freemen, in 1835, was 2800, and the population of the borough was 18,590; the population of the actual town and suburbs at the same time (1835) was 27,000. The governing charter was 19 James I. The borough is now divided into five wards, with 12 aldermen and 36 councillors. The number of burgesses on the roll at the first registration, in 1835, was 1622; the number on the roll in 1837 was 1406, besides whom there were 944 freemen who were parliamentary electors, though not burgesses.

Worcester, previous to the Reform Act, returned two members to parliament. The right of voting was in the citizens; the largest number of electors who had polled at any election during thirty years preceding 1831, was 2173 in 1826. Under the Reform Act Worcester still returns two members to parliament. The number of electors on the register in 1835-6 was 2579; in 1839-40 the number was 2561, of whom 1034 were 10*l.* householders, 947 were freemen, and 580 were entitled to vote for more than one qualification.

The limits of the city of Worcester and the parliamentary borough are co-extensive. The population of the city, as given in the Population Returns for 1841, was 25,401, of whom 11,614 were males and 13,787 were females. The population, as returned for the parliamentary borough, was 26,306, which is said to be a more correct return of the actual population than the above, as given for the city.

History.—Lambarde, an antiquary contemporary with Camden, remarks, in his 'Alphabetical Description of England,' that he never met with a place that had so great experience in the calamities of the intestine broils of the kingdom and other casual disasters as the city of Worcester. An early city was destroyed by the Danes, and rebuilt about 894 A.D. by Ethelred. In 1041 the town was plundered and partly burnt by the troops of Hardicanute, which were sent to force the reluctant inhabitants to pay a tax which the king had imposed. In 1074 a body of troops under Walter de Lacy and the barons of Hereford were assembled here to quell a conspiracy against William the Conqueror, and to guard the passes of the Severn against the rebels. In 1088 Bernard Neumarck unsuccessfully besieged the city. In 1113 the city, not excepting the castle and the cathedral, was consumed by fire. In 1133 a great part of the city was again burnt by a casual fire, and the cathedral damaged. In 1139 the forces of the Empress Maude attacked the city, forced an entrance on the north side, and fired and plundered it. In 1149 King Stephen burnt the city, but the castle, which had been strongly fortified, resisted his attempts. The remains of one of the forts then razed may be seen on Red Hill near Digley: another stood on Henwick's Hill, from which the Welsh road was commanded. Eustace, his son, vigorously besieged the castle, but was as vigorously repulsed; in revenge he fired the town. In 1157 Worcester was fortified against Henry II. by Hugh Mortimer, but afterwards submitted. In 1189 the city again suffered severely from fire. In 1216 the king's troops, with the earl of Chester, plundered the city, which had revolted. King John was buried here in this year. In 1225 a great tournament was held here. Bishop Blois excommunicated all persons concerned in it.

In 1263 Robert Ferrars, earl of Derby, Peter de Montfort, earl of Leicester, and other barons of their confederacy, besieged and took Worcester. The church was spared, but the houses rifled. In 1264 King Henry III. was brought to Worcester by Simon, earl of Leicester, into whose hands he had fallen at the battle of Lewes. In 1342 and 1349 the inhabitants were afflicted with the plague. In 1401 Worcester was burnt and plundered by Glendwr's troops with their French auxiliaries, whom Henry IV. drove back into Wales. In 1484 there was an unusual and destructive flood of the Severn. In 1485 executions took place here, and 500 marks were paid as a ransom for the city, which was seized by Henry VII. In 1534 the city suffered from an earthquake, and in the following year it was scourged by the sweating sickness; in 1637 there was again a pestilence. In 1642 Worcester was besieged by the parliamentary forces. Lord Coventry and Sir William Russell commanded the garrison, and were reinforced by a strong body of horse under Prince Rupert and Prince Maurice. Colonel Fiennes commanded the attack, overcame an obstinate resistance, and took possession of the town. The royalists retreated towards Herefordshire. Various excesses were committed by the insurgents; the cathedral was plundered, and the inhabitants were required to raise a loan of 3000*l.* for the use of the parliament. Defeat neither changed the opinions nor weakened the resolution of the citizens. In 1643 they again raised money for the king's cause, the walls were repaired, fresh cannon were mounted, and other evidence given of renewed resistance to the parliament. Another siege was sustained in 1646, which, after many sallies and many skirmishes, was concluded by a treaty. A third and most important battle was fought here by the same contending parties in 1651. In the month of August Charles II. dispersed the small adverse garrison, which were in possession of the town, and occupied it and a district to the west of the Severn with his army. He was closely watched by Cromwell, who encamped on Red Hill, about a mile eastward of the city. While the assault was conducted with vigour and ability, the defence on the part of the Royalists displayed neither courage nor judgment: it is asserted by some writers that Charles led his cavalry in person; but it would appear otherwise from Lord Clarendon's account. The result was a total defeat of the royalists and the rapid flight of the king, which was effected with great difficulty.

The site of the castle which from time to time sustained so many sieges and so frequently changed governors is on the south side of the cathedral. There are no architectural remains whatever. A small part of an old ecclesiastical house, the nunnery of Whitstane, now called 'The White Ladies,' is still standing; *Friar Street* takes its name from a house of Franciscans which formerly existed here, and the remains of whose building were demolished in 1823. The Dominicans, Penitents, Black Friars, and Friars of the Holy Trinity had likewise their establishments.

(Nash's *Worcestershire*; Green's *Antiquities of Worcester*; *Report on Municipal Corporations*; *Boundary Reports*, &c.)

WORCESTER COLLEGE, Oxford. This college, originally Gloucester Hall, was founded in 1714, pursuant to the will of Sir Thomas Cookes, of Bentley Pauncefort in Worcestershire, Bart., for a provost, six fellows, and six scholars, the scholars to be elected from the schools of Broomsgrove, Feckenham, Worcester, Hartlebury, or Kidderminster, or, in default of persons properly qualified in these schools, from any other endowed school in the county of Worcester. The schools have a priority of claim in the order in which they stand. A preference is to be given in all instances to the founder's kin. No one is qualified to offer himself as a candidate who has not been at one of the aforesaid schools for at least two years previous to the election. Two of the fellows on this foundation may continue laymen, provided they proceed to degrees either in law or medicine. The provost and the three senior fellows of the foundation are the electors.

The college has since received considerable endowments:—

James Finney, D.D., prebendary of Durham, left by his will, in 1727, provision for two fellowships and two scholarships for natives of Staffordshire.

George Clarke, D.C.L., Fellow of All Souls College, and one of the representatives in parliament for the University, left by his will, in 1734, estates for the endowment of six fellowships and three scholarships, the scholars to be elected 'out of such persons as are born of English parents in the provinces of Canterbury or York, and none other.' A preference is given, cæteris paribus, to the orphans of clergymen of the Church of England. The 'library-keeper,' who is always one of the fellows of this foundation, 'may not go into orders, if the provost and four of the six senior fellows shall think fit to dispense with them.' The provost and six senior fellows (who may be present) of the foundation of Sir Thomas Cookes and Dr. George Clarke are the electors.

Sarah Eaton, daughter of Byrom Eaton, D.D., formerly principal of Gloucester Hall, left by will, in 1731, estates for the foundation of seven fellowships and five scholarships. Candidates for scholarships on this foundation must produce certificates signed by the bishops of their respective dioceses, by the ministers of their parishes, and by two or more respectable inhabitants of the same, that

e sons of clergymen of the Church of England, and
sistance to support them in the University; the
and five senior fellows (who may be present) of
dations of Sir Thomas Cookes and Mrs. Sarah
e the electors.'

llows of the college are, in all instances, elected
he scholars of their respective foundations, and
take holy orders, except those dispensed with by
tes before mentioned.

are likewise two exhibitions left by Lady Holford,
f exhibitions from the Charterhouse, and one by
for a native of Yorkshire.

undation at present consists of a provost, twenty-
ws, sixteen scholars, and three exhibitioners; the
of members upon the college-books, Dec. 31st,
s 270.

tronage of this college consists in the vicarage of
ch or Denchworth, in Berkshire; the rectory of
on, in Bucks; the rectory of Dyndor, in Hereford-
e rectories of Whitfield, in Northamptonshire,
admerton, in Oxfordshire; the rectory of Neen
Shropshire; and the rectories of Higham and
in Somerset.

sitors are the bishops of Oxford and Worcester,
ice-chancellor of the University.

emarkable that this, which is the most modern of
ng colleges in Oxford, occupies the site of one of
st seminaries of religious education. In the year
John Giffard, lord of Brimesfield, purchased of
itallers of St. John of Jerusalem some land and
s in what was then called Stockwell Street, on
founded a college for the reception of the novices
the Benedictine abbey of Gloucester. Hence
acquired the name of Gloucester College; but it
frequently called Gloucester Hall. Within very
the monks of Gloucester, at the founder's request,
d their exclusive right and title to this place, the
nent was enlarged, and it became a place of
tudy for all the novices of the Benedictine com-

eneral chapter of the Order, held at Abingdon in
equal tax was imposed on all the greater abbeys
aternity for building lodgings for their respective
which, with the aid of contributions from private
were soon erected, being divided from each other,
guished by appropriate escutcheons and rebuses
doors, some of which remain to this day.

the dissolution of monasteries in the time of
III., on making Oxford a see, Gloucester Hall
short time converted into the episcopal palace;
he year 1559 it was purchased by Sir Thomas
e founder of St. John's College, who gave it the
St. John Baptist's Hall, though it continued even
e more generally known by its old appellation.

mas White's intermediate establishment acquired
rable degree of reputation, though with some in-
ns, under the government of twelve successive
s, the last of whom, admitted in 1712, became the
vost of the present foundation of Worcester

the eminent men connected with Sir Thomas
oundation who received their education in Glou-
ll, were Thomas Coryate the eccentric traveller,
m Digby, Thomas Allen the mathematician, and
the poet.

g can present a more striking contrast than the
new buildings of Worcester College as seen from
court.

esent chapel occupies the site of that which be-
Gloucester College, erected in the fifteenth cen-
Abbot Whethamsted of St. Albans, and pulled
Edward VI.'s time by Sir John Williams, Knight,
s Lord Williams of Thame. The modern edifice,
plain as a structure, forms part of the general
st suggested by Dr. Clarke for rebuilding the
lege. It was begun, together with the hall and
1720. The re-construction of the college how-
eeded slowly. The range of new buildings on
side of the inner court, containing the provost's
and the apartments of the fellows and scholars
larke's and Mrs. Eaton's foundations, were not
d till 1776. The present hall, forming the south
he entrance-court, corresponding with the chapel opposite, was not finished till 1784. The south side of the inner court is still occupied by the old buildings which belonged to Gloucester Hall.

(Gutch's and Chalmers's *Colleges and Halls of Oxford;* Ingram's *Memorials of Oxford,* 'Worcester College;' *Oxford University Calendar* for 1843, pp. 344-351.)

WORCESTERSHIRE, an inland county of England, is bounded on the north by Staffordshire and Shropshire, on the east by Warwickshire, on the south by Gloucestershire, and on the west by Herefordshire. There are several detached portions of this county: the most important contains the town of Dudley, and is surrounded by the county of Stafford. Another detached portion, lying in a south-easterly direction from the main body of the county, contains the market-town of Shipston-on-Stour. There extends in this direction likewise a narrow promontory of Worcestershire, containing the towns of Broadway and Blockley. The greatest length of this county is about 29 miles, in a direction from north-east to south-west; its greatest breadth is about 22 miles, in a line running from east to west. Worcester, the county town, is distant from London by the nearest turnpike-road 112 miles. The principal traffic is by the railways. The area of Worcestershire is 718 square miles, or 459,710 acres. The gross population, in 1831, amounted to 211,365, being an average of about 272 persons to a square mile. On comparing this amount with the similar average in each of the contiguous counties, we find, with two exceptions, the population of Worcestershire to be the most dense. The population of Gloucestershire, according to the returns of that year, was about 307 to a square mile; of Herefordshire, 122; of Shropshire, 165; and of Staffordshire, 347. In 1841 the gross population returned was 233,336. In respect of size it is the thirty-fifth of the English counties. In amount of population (1841) it is the twenty-fifth.

Surface.—Worcestershire is generally a flat country; on the eastern and western sides are two nearly parallel ranges of hills, which partly bound and partly intersect it: the intermediate space is for the most part a fertile plain. The eastern range of hills commences in the north in the Clent Hills (a portion of which are in Worcestershire and a portion in Staffordshire), extends to the north-west of Bromsgrove, and forming near Redditch the boundary between this county and Warwickshire, terminates to the north of Evesham. The western chain commences in the neighbourhood of Bewdley, and runs southward by Abberley and Martley to the great chain of Malvern Hills, in which it terminates. The principal hills not comprised in or bordering on these chains are Bredon Hill, situated about three miles south of Pershore, Broadway Hill, near the town of that name, in the south-eastern extremity of the county, and a small line of hills extending from Croome northwards towards Worcester.

Rivers.—The principal rivers are the Severn, the Avon, the Teme, and the Salwarp.

The Severn, having in two places formed the boundary of Shropshire with Worcestershire, enters the latter county at Bewdley: the bearing of its course is for the most part southerly: passing the towns of Stourport, Worcester, and Upton, it becomes near Ripple the boundary of Gloucestershire and Worcestershire, which county it finally quits at Chaseley Rye. It is navigable for vessels of eighty tons as far as Worcester, and for barges of fifty to sixty tons above that city. Some attempts have been made to improve the navigation, but no result has yet been accomplished. This river is famous for its salmon, and abounds with eels, lamperns, and lamprey.

The Avon enters the south-eastern border of the county near Cleeve Prior, forms afterwards for a short space its boundary with Warwickshire, and following a sluggish serpentine course to Evesham, Fladbury, and Pershore, becomes the boundary of Gloucestershire near Bredon, quits Worcestershire at a promontory about a mile from Tewkesbury, and soon afterwards falls into the Severn. It has been rendered navigable by locks throughout the whole length of its course through Worcestershire, which is nearly 20 miles. Vessels of sixty tons can reach Stratford-upon-Avon.

The Teme, which bears more the character of a mountain stream than the rivers that have been before mentioned, first comes into contact with Worcestershire at its western extremity; it passes the town of Tenbury, and forms here, as during other parts of its course, the boundary of Worcestershire with Herefordshire. It falls into the Severn near Powick, about three miles south of Worcester: it is not navigable. The stream is good for fishing, and trout and greyling are abundant.

The Salwarp, a smaller river than those above mentioned, rises to the north of Bromsgrove, flows through Droitwich, and falls into the Severn near Claines.

Roads.—The principal roads are from Birmingham through Bromsgrove, Droitwich, Worcester, Severnstoke, and Upton to Tewkesbury, Cheltenham, and Gloucester: this line was formerly the main communication between Birmingham and Bristol, but the traffic upon it has very greatly diminished since the construction of a parallel line of railway from Birmingham to Gloucester. Another important line runs from Dudley to Stourbridge, Kidderminster to Stourport; or, leaving Stourport on the left, through Hartlebury and Ombersley to Worcester. From Worcester to Malvern there is considerable traffic on a road communicating with Ledbury and Hereford. There are likewise good turnpike roads which connect the county-town with Tenbury and Bromyard: mail-coaches which formerly travelled along them to Ludlow and Leominster were discontinued in 1842. At the same time a mail from London through Oxford, Broadway, Bengeworth (a suburb of Evesham), Pershore to Worcester, was taken off the road and the letters forwarded by railway. Worcester is distant from Birmingham by road 26 miles, from Cheltenham 26, from Oxford 58, from London 112, from Bromsgrove 13, from Ledbury 16, from Bromyard 14, from Tenbury 22.

Railways.—The chief railway in this county intersects it diagonally from north-east to south-west, and communicates on the one side with Birmingham, on the other with Tewkesbury, Cheltenham, Gloucester, and Bristol. The line runs nearly parallel with the turnpike-road leading from Tewkesbury to Worcester and Birmingham, on the south-east. The part of the line nearest to Worcester is about three miles distant, at Spetchley, where there is a station.

A portion of the London and Birmingham Railway likewise traverses the parish of Yardley, the north-eastern extremity of the county. There are tram-roads, on which horses are worked, in the coal-districts, but none of them are long or of great importance; only a small portion of that which extends from Stratford-on-Avon to Moreton passes through Worcestershire.

Canals.—The northern part of the county is intersected by several canals, which are of great commercial importance. The chief canal reaches from Birmingham to Worcester, passing through the salt-district of Droitwich, and having two branches, one to Dudley by way of Halesowen, and the other from King's Norton to Stratford-upon-Avon. From Dudley there is a canal to Stourbridge, Kidderminster, and Stourport, at which last place it opens into the Severn; it was projected to carry on this canal to Leominster and Kington in Herefordshire, but only a portion of the work, from Wooferton to Tenbury, and thence to the neighbourhood of Mamble, has been executed: funds are wanting for the undertaking, and it is not likely that it will ever be completed.

Geology.—The geology of Worcestershire has been fully detailed by Mr. Murchison, in his valuable work on the 'Silurian System.' The county is composed for the most part of new red-sandstone, lias, and oolite; other formations are visible in the chain of the Malvern Hills, in the districts bordering on Tenbury, Bewdley, and Dudley, and in the Lickey and neighbouring hills in the northern part of the county. The new red-sandstone comprehends that district which is watered by the Severn, together with the north-eastern portion of the county: its lower beds being found round Witley, Stourport, Kidderminster, Bromsgrove, and Alvechurch; and the higher, called the Keuper beds, round Droitwich, Worcester, and Upton. The lias formation is found at Pershore and Evesham, and in the vales watered by the Avon; it extends from Foster's Green to the limits of the county near Tewkesbury. The portion of the Malvern Hills within the boundary of Worcestershire consists of trap; while the Silurian rocks, the Caradoc sandstone, Ludlow rock, and Wenlock limestone appear in the northern portion of the chain. The lower coal and ironstone beds are found at its termination, to the north of Abberley Hill, in the Forest of Wyre. Here also is found the old red-sandstone formation upon which Tenbury stands, and which is the prevailing stratum throughout the adjoining county of Hereford. Bewdley is situated near the junction of the lower red-sandstone with the coal-field of the Forest of Wyre. The town of Dudley stands on the thicker coal-measures, Wenlock limestone appearing on its north-west, and trap at Rowley Hill on the south-south-east. In the Lickey range there appear 'altered Caradoc sandstone,' the lower coal-beds, and trap; the latter rock forming the range connecting with the Clent Hills of Staffordshire. In the neighbourhood of Droitwich and Stoke Prior are saliferous beds, from which a large quantity of salt is manufactured. A full and interesting account of them is given in a pamphlet by Dr. Hastings. They are likewise described by Mr. Murchison, in his 'Silurian System' (p. 31), to which work we refer our readers for very accurate accounts of the coal-fields and remarkable geological phenomena of the county. In a paper by Mr. Leonard Horner, in the 'Geological Transactions,' there is a full and interesting account of the geology of the Malvern Hills.

Agriculture.—The climate of Worcestershire, especially in the middle, south, and west of the county, is remarkably mild and healthy, and the fruits of the earth are brought to early maturity. The vales of Severn and Avon are but little raised above the level of the sea; and it has been observed, that an elevation of sixty yards makes a difference in climate equal to a degree of latitude towards the north, soil and other circumstances remaining the same. The higher parts of the county, between Bromsgrove and Birmingham, have consequently a later harvest. The higher hills, such as the Malvern Hills, are proportionally colder and later. They tend to shelter the vales between them from the cold winds, and add to the mildness of the climate there.

The Vale of Severn, which extends about 30 miles in length from north to south, contains some extremely rich alluvial soils, which from their situation are admirably adapted for rich pastures. The banks of the Avon also, which falls into the Severn near Tewkesbury, are rich, and consist mostly of meadows and pastures.

The Teme winds through the county for about 30 miles. Along its banks are many hop-gardens and orchards, a sure proof of a good deep soil, and the lower parts form rich meadows. Several lesser streams run in their own valleys, the soil along their banks being generally good, except in a few instances in which bogs have been formed by the stagnation of the waters, with their accompanying peat. Except where the higher hills rise in peaks the surface is in general gently undulating. One-half of the county consists of rich loams and clay soils. The lands which are met with near Kidderminster are some of them productive, and others very poor, as about Mitten and part of Wolverley. The mixed springy gravels and gravelly loams to the north of Bromsgrove are less fertile; and there the harvest is later and more uncertain. Upon the whole, few counties in England contain so much good land, and, as a consequence, fewer wastes. Viewed from the hills, the valleys give the idea of very successful cultivation. The soils of this county may be arranged, without pretending to great accuracy, as follows:—

	Acres
Light land, sand, sandy loam, gravel, and gravelly loam	120
Mixed friable loams adapted to general culture, fit for turnips, hops, fruit, &c. .	12
Strong clay loams, which, where they are dry, are adapted to hops, fruit, wheat, and beans, but too strong for turnips .	
Natural meadows along the course of the rivers	
Upland pastures, parks, and plantations .	
Woodlands, roads, villages, towns, and water	
Wastes and commons . . .	

The farm-houses in Worcestershire are gene [illegible] stantially built, but they are often inconvenient [illegible] with respect to the land, owing to their old di [illegible] common fields, which are now mostly inclose [illegible] modern erections are an exception: but, in ge [illegible] offices and buildings for the convenience of the f [illegible] not of the best construction.

The farms are most of them small, which [illegible] antient cultivation; but they are gradually enlar [illegible]

several of them under one tenant. Leases are not
lly granted by the proprietors, or demanded by the
, except where improvements are intended, in which
ey are usually for 21 years. Those who grant new
when it has been their custom to have only tenants
are apt to load them with conditions, which at best
less, and only impede improvements. All that is
d is some security against over-cropping at the end
lease, and against wilful damage done to the land.
ay be easily secured by submitting to a survey, and
ng to pay damages on deterioration of the land;
ing the sale of hay and straw, except on condition
hasing a proportional quantity of dung, bones, lime,
be laid on the land, and all the dung made in the
r to be left and paid for at a valuation by the suc-
tenant, which will secure a proper quantity. The
tation of the tithes for a rent-charge greatly tends
urage improvements, the whole profit of which is
to the improver without participation. It is a very
lief to the cultivators of hops.

ploughs in common use in Worcestershire have two
attached to the beam, as in the Rutland plough.
re usually drawn by three horses, and easily ma-
n soils which are not stony. In the vale of Evesham
heavy swing-ploughs were formerly used, but have
ay gradually to lighter ploughs with one or two

In the light sands a double plough making two
at once has long been in use, but if it is drawn by
ses, it occasions no saving of labour. It is only
here one man can plough with two or at most
orses abreast, which are guided by reins. Thus a
d at least one horse is saved, and good work is

ther agricultural implements in use were formerly
rts, waggons, rollers, and harrows. All the new
ents have been only lately recommended; and their
introduction goes on slowly, many disappoint-
aving arisen, owing to a want of sufficient skill in
urers to use them properly.

wing the heavy lands is still the general practice in
all that has been said and written against this
sary waste of labour, without any return, as some
: but the defenders of occasional fallows have ex-
e on their side, and will not altogether abandon a
which has hitherto been thought economical, as
essential. On light soils roots and hoed crops
a proper substitute for a clean fallow; but peas and
r vetches, which alone can be introduced as fal-
ps on heavy land, will not always prevent the ac-
tion of root weeds, which an occasional clean and
rred fallow readily destroys. But to tie down a te-
have a certain portion of the farm fallowed every
an unnecessary restriction, for which a prudent
will demand some allowance in the rent.

otations vary according to the nature of the land.
richest soils the following is very profitable, but
more manure than is made by the crops, viz:—
barley, clover, potatoes, wheat. The potatoes, if
rn nothing in the shape of manure compared to
y require; but they sell well wherever the popu-
large, as near manufacturing towns; and there
an always be obtained for back carriage. Wheat
good after potatoes as after clover: but with due
to the tillage, and the use of the land-presser
soil is too loose, a good crop of wheat is often
after potatoes: and the two valuable crops suc-
each other bring a considerable profit to the far-
making potatoes a part of the fallow crop, barley
after it, which is often better; but this diminishes
th of turnips sown, and the consequent manure
cattle and the sheep. In this case the rotation
turnips and potatoes, barley, clover and tares,
n the next course the potatoes will be where the
ere before, and vice versâ. The clover will be
he part which had tares, and thus potatoes, tares,
r only recur every eighth year.

the soil is heavy and not rich, the most common
fallow, wheat, beans, barley, clover, and grass
ie three or four years. When the land is broken
sown with oats, and then fallowed, to begin the
ain. This is a good system, but not so much
as it should be. The clover is often broken up
year, and succeeded by wheat, which, in this
case, will be but a poor crop. It would be better to lay down the land with clover and grass-seeds sooner after the fallow, and to take the wheat and bean crops when it had been recruited by feeding with sheep. The crops might be the same, but arranged in a better order. Where the land is of a proper consistence to bear good beans, this crop may be drilled or dibbled on the grass lands when first broken up, and be succeeded by wheat, if there be no couch-grass, and if the beans have been carefully hoed.

Rye is cultivated chiefly to cut green for cattle or to feed early ewes and lambs. It was formerly an important crop, when rye bread was the principal food of the labourer: but now he will have nothing but pure wheaten bread; so that rye is only cultivated on very loose sandy soils, where wheat will not succeed so well, and it is chiefly sold as seed to produce early green fodder. The Siberian winter barley is as early, and, in general, a heavier crop; but it is not so much sown as rye.

The average produce of wheat in Worcestershire is higher than in many other counties, which proves a superior average soil. The old Worcester bushel contained 9 gallons, and the bushel of wheat weighed 70 lbs. This produced 56 lbs. of flour, and made 70 lbs. of bread.

The wheat is reaped by the sickle, and a long stubble is usually left, which is afterwards mown or raked up for litter. The mowing of wheat is not yet very common, but when the labourers shall have learnt the use of the cradle-scythe, it will no doubt be more generally adopted. There are many advantages in mowing wheat. None of the straw is wasted; the harvest is sooner finished; and the seeds of weeds are more easily destroyed, by sifting them out of the corn and straw, while they may be steamed and increase the food of pigs and poultry. [WHEAT.] The practice of fallowing during two successive winters and sowing barley in the second spring, has been adopted by some farmers with great success, sheep having been folded on the land the last winter. Thus the land is made very clean and manure is saved. The barley thus raised is good in quality; and the grass-seeds come up well after the folding. Oats are not so general a crop, and no more are usually sown than will supply the wants of the farmer's horses. Beans are set or dibbled in by women, who use a line to set them by. They are hoed three times, and, in general, the return is abundant, frequently 40 to 45 bushels per acre from 3 bushels set. The produce of beans is greater than the wants of the county require.

Vetches are a valuable crop in lands which are too heavy for turnips, either to give them to sheep in a fold or to soil horses with in the stables. If they are sown at regular periods, so as to keep a constant succession of them from May to November, which may easily be done by sowing winter tares once a fortnight from September to November, and spring tares from February till May, in such quantities as the stock may require. Thus not only is there a great saving in fodder—for the horses require no oats if they have good vetches with the pods and half-formed seeds—but much excellent manure is made for the land. Vetches may be looked upon for heavy soils as turnips are for the lighter. They require less tillage and hoeing, and clean the land by smothering the weeds. The land should always be well manured for them to secure a heavy crop. It is not advisable to wait for a second growth of vetches: as soon as they are cut or fed off, the land should be ploughed; and if no intermediate crop is sown, it can be worked as a fallow for the next crop, which may be wheat, beans, or barley, according to circumstances.

Potatoes are raised in great abundance in this county, and supply the markets of Birmingham and Staffordshire. There are many varieties of early and late potatoes which have provincial names, but which it would be difficult to describe, as their qualities change in different soils. Turnips used formerly to be sown broadcast, and some farmers still adhere to the practice; but all the best farmers, especially where the farms are large, adopt the system of sowing in drills.

Wolverley sands have long been famous for the growth of carrots and for raising carrot-seed. The ground is trench-ploughed. The seed is mixed with sand to prevent its adhering by its edges, which have small hooked fibres all round. A drill is opened by a machine, and the seed is deposited by hand. A machine that will drill carrot seed is still a desideratum. The time of sowing is in March. Great attention is paid to hoeing and weeding as soon as the plants appear; for the weeds are very apt to get the start of them. This makes the cultivation expensive; but the return is very great, without much exhausting the soil. They sell readily for two shillings per cwt. on the spot, and a crop of fifteen to twenty tons per acre is not uncommon, that is, from 30*l.* to 40*l.* per acre. A part is used for culinary purposes in the towns, and a part given to horses, who are very fond of them, and thrive well upon them. The orange-carrot of the large varieties is that usually sown. The Belgian white carrot is more productive, but not so saleable in towns. Flax is not cultivated as it should be in the richer soils: this is owing to the prejudices of landlords or their agents, who prohibit its cultivation as exhausting the land: under proper regulations it might be a source of great profit both to the landlord and the tenant; and it may be laid down as a general rule, that what is profitable to the tenant will in the end be advantageous to the landlord, and that the interests of both may be consulted without many prohibitions or restrictions.

Hop-yards occupy some extent, and are attended with great risks, as well as, occasionally, with very great profits. The commutation of the tithes, as observed before, has been very advantageous to the hop-farmer. The cultivation of this plant is a perfect garden culture, chiefly by the spade. Much manure is used if the land is not naturally very rich. Deep meadow-land trenched up produces the most abundant and certain crops. Composts of rotten dung mixed with sods, and sometimes with woollen rags, are used by the best hop-growers. [HOPS.] The average expense of the cultivation, exclusive of the duty, is about 12*l.* per acre. The extent of hop-grounds in the county was about 6000 acres in 1807. In a soil so well suited for orchards as is found in certain parts of Worcestershire, it is surprising that the cultivation of fruit-trees is so far behind other improvements. The old orchards are filled with trees which once were vigorous, but show great symptoms of age and decay: some fresh plantations have been made, but even in these no great attention has been paid to have fruit of the best quality, especially apples for cider. The trees stand too near each other to bear abundantly, and they are seldom sufficiently protected from injury by cattle turned out to feed on the herbage. Formerly fruit-trees were planted in hedgerows, which only enticed depredations, and did more harm by their shade on the land than their produce was worth. These have been mostly cut down. The deep loams on a subsoil of soft sandstone are the most favourable for orchards. These are found in the western part of the county. The best loam inclines to a marl. The stocks are obtained from the nurseries, where they are raised from crab-trees, and sold from 8*d.* to 1*s.* 6*d.* each when seven or eight feet high. They are grafted after they have been planted some time. The head is sawn off, and the scions inserted in the manner called *crown-grafting* or *saddle-grafting*. They begin to bear in about five years. In the choice of grafts, sufficient attention is not always paid to the age of the tree from which the graft is taken; and thus many disappointments arise, from the young trees showing all the symptoms of the diseases of age. It is not recollected that the life of the graft is probably only a continuation of the life of the parent tree; and if this is old and exhausted, the graft will soon show the same defects and diseases. Most of the favourite old sorts, such as the golden pippin and several others, are now nearly extinct, and no grafting can renovate them. The only means of obtaining fine sorts is to sow the seeds, and let the wild tree show fruit: in many hundreds of wild apples one may be found that is good; and this can be perpetuated by grafting for a couple of centuries, and no more: cultivation and judicious pruning will greatly increase the produce. The common method of making cider is by crushing the apples by means of a heavy stone rolling in a stone trough, and moved round by manual labour or by a horse. Pear-orchards are common in Worcestershire.

There is much fine timber growing in the hedgerows, whether advantageously to the proprietor or farmer may be matter of doubt: elms predominate, and grow to a large size where they have room. There are also some woods and plantations of oaks and ash, the underwood of which forms valuable coppices. In many of the parks and pleasure-grounds which surround the seats of the nobility and gentry are many splendid trees preserved for ornament; and the whole country, when viewed from an eminence, gives the idea of a thickly timbered country, and of great richness.

Draining has been practised for a long period on many of the principal estates, chiefly on Elkington's system, which is excellent for carrying off deep-seated springs; but the modern method of thorough draining was not so well understood. Many of the low grounds on retentive subsoils would be much benefited by this operation, and nowhere would it repay the outlay better. Paring and burning the surface of boggy land, where the grass is coarse and sedgy, is practised with success by some farmers who are not restricted by their landlords. The first crop is potatoes, which always do well in the ashes; the next is wheat or oats; and the land should then be laid down again with the best grass-seeds: a previous dressing with lime will much improve the subsequent pasture.

There are not so many irrigated meadows as one would expect along the banks of so many rivers and smaller streams: this is owing in part to the rights of certain mills erected on every stream, which prevent the free use of the water at all times. Where irrigations have been established, the water has been brought from a considerable distance by canals, which supply several farms on one estate. The water is let on and off under strict regulations, and the effect on the grass in spring is wonderful. There is no doubt that many more water-meadows might be formed, without interfering with the mills; and many of the latter are small and insignificant, and do more harm by obstructing the course of the water, than they afford profit to the owners, who are generally also proprietors of the land around.

There is no peculiar breed of cattle in Worcestershire. They are chiefly obtained from Herefordshire and South Wales. The Holderness breed has been introduced, as it is everywhere else: but few pure cattle are bred in the county; they are all mostly crossed without much judgement. The best and most profitable breeds to stock the rich pasture are the Herefords and Devons, which get into excellent condition by a summer's run, and are then finished in the stalls with hay, turnips, and oil-cake in winter: very fat beasts are sent up to Smithfield and to Birmingham every year from this county.

The sheep are mostly of the Leicester breed, which suit the rich pastures. On the Malvern Hills are some small hardy sheep, without horn, with grey faces and legs, which, when fatted at a proper age, make excellent mutton. The Cotswold, and a cross between them and the Ryeland sheep, are approved of by some: they have good carcasses, and bear large fleeces.

The horses for farm-work are mostly of the strong black breed. Oxen are seldom used on a farm. A little cross of pure blood would greatly improve the pace and courage of farm horses. They would be lighter and more active, and thus do more work.

As is generally the case in deep rich loamy soi[illegible], such as are found in the vale of Evesham, the roads [illegible] ere formerly very badly maintained. In 1792 a club of [illegible] gentlemen and farmers was established for the especial [illegible] purpose of attending to the roads, and regular rules and re[illegible]gulations were drawn up. Some of the members being appo[illegible]inted surveyors of the roads, and availing themselves of th[illegible]e power of the highway act, without any oppressive de[illegible]mand for statute duty, or additional highway rates, but [illegible]imply by seeing the duty fairly and properly done, made an[illegible] repaired the roads so, that, from being nearly impassable, [illegible] they soon became excellent; and the most determined gru[illegible]blers and opposers of all improvement were forced to [illegible]admit the great advantage of good communications, and th[illegible] econo[illegible] of horses in consequence of good roads.

The following fairs are held in Worcestershir[illegible] :—Al[illegible]church, April 22, August 10; Belltroughton, [illegible]rst M[illegible]day in April, Monday before St. Luke's; Bewdley, [illegible] April [illegible] December 10, for hogs, December 11, cattle, &c. [illegible] Bro[illegible]ley, Tuesday after Easter week, October 20, hiring [illegible] Oct[illegible]grove, June 24, October 1; Droitwich, Good Frid[illegible]tober 2[illegible]ber 28, December 21; Dudley, May 8, August 5, O[illegible] Whit[illegible] Evesham, February 2, Monday after Easter wee[illegible] Septem[illegible]Monday, September 21; Feckenham, March 26, [illegible] week[illegible]ber 30; Kidderminster, Holy Thursday, and thre[illegible]

er 4; King's Norton, April 25, September 5;
ter Tuesday, June 26, Tuesday before All
ber 1; Redditch, first Monday in August;
22, Tuesday after October 10; Stourbridge,
h 29, September 8; Stourport, weekly, on
rom September to Christmas, for hops; Ten-
, July 18, September 26; Upton, Midlent
tsun-Thursday, July 10, Thursday before
Worcester, Saturday before Palm Sunday,
ster week, August 15, September 19.

weekly markets are:—Bewdley, Saturday;
uesday; Droitwich, Friday; Dudley, Satur-
, Monday; Kidderminster, Thursday; Per-
; Shipston, Friday; Stourbridge, Friday;
dnesday; Tenbury, Tuesday; Upton, Thurs-
r, Saturday, Wednesday, and Friday.

owns, &c.—Worcestershire is divided into
—Blackenhurst, Doddingtree, Halfshire, Os-
Pershore, which include about 170 parishes.
EWDLEY, BROMSGROVE, DUDLEY, EVESHAM,
NSTER, are described in separate articles.
cipal towns are the following:—

parliamentary and municipal borough, is
small river Salwarp, 116 miles north-west
6½ miles north-north-east from Worcester.
ated in a narrow valley, through which the
t contains three parishes, St. Andrew, St.
St. Peter, and parts of Dodderhill, Marl-
alwarp. The total population of the bo-
was 2832, of whom 1346 were males, and
les. The number of houses was 531 in-
1 uninhabited. The entire population of
vards of 3000, a part of the town being be-
of the borough, the population of which
s 225. The population of the borough in
The Exchequer-House, where the duties
, is an antient structure with stained-glass
re are two prisons. The living of St. An-
Mary Wilton, is a rectory, in the gift of the
rage net annual income of which is 230*l*.
t. Peter is a vicarage, in the gift of Earl
average net annual value of 160*l*.

the Municipal Corporations Act in 1835,
Droitwich consisted of two bailiffs and an
er of burgesses, the number of whom in
The governing charter was 22 James I.
now consists of 4 aldermen and 12 coun-
umber of burgesses or municipal electors in

the Reform Act Droitwich returned two
liament. The greatest number of electors
at any election previous to 1831 was 19.
one member to parliament. The number
he register in 1835-6 was 298; in 1839-40
s 357, of whom 346 were 10*l*. householders.
tary borough, which is now extended con-
nd the limits of the municipal borough,
41 a population of 6588.

de of Droitwich arises from its salt-springs,
has been made from time immemorial, but
s been much increased since about 1725,
pits to a greater depth, where the brine was
ch salter, and from which it rose as before
The quantity of salt now made is not less
s a year. The Worcester and Birmingham
y Droitwich, and communicates with the

made Droitwich one of their stations called
mentioned in Domesday-Book on account
ed from its salt-springs. The charter of 22
to preceding charters, none of which are
existence: but a copy of a charter of King
Nash's 'History of Worcestershire,' vol. i.,

rn, eight miles south-west from Worcester,
-town, but contained in 1841 a population
ing 150 visitors. It is much resorted to by
ly for its medicinal springs, St. Ann's Well
, but for the beauty and salubrity of the
e wells are between Great Malvern and
which latter is a small village about three
th. The Malvern Hills, which are in the
hbourhood, vary from one to two miles in width, and rise in most parts with a very gentle ascent; they afford extensive and beautiful views into Wales and the adjoining English counties. The living is a vicarage, of the average net annual value of 181*l*. The church, which formed part of an extensive monastery, is a fine Gothic building of cathedral form, 170 feet long by 60 feet wide; the tower, 124 feet high, in the centre of the building, is surmounted with battlements and pinnacles, and has six bells with chimes. The architecture of the whole structure is very rich and light. When the monastery was dissolved by Henry VIII., the inhabitants bought the church and made it parochial. Of the rest of the monastery nothing remains except a gateway, which is in a good state of preservation. The monastery was originally endowed by Edward the Confessor.

Pershore is a market-town, nine miles south-east from Worcester, on the west bank of the Avon, which is here navigable for boats. The town is well-built and well-paved. The inhabitants are chiefly employed in the manufacture of stockings. The town consists of the parishes of St. Andrew and Holy Cross, exclusive of their townships; the population in 1831 was 2536; in 1841 it was 2813. St. Andrew's is a small church, with a square tower containing six bells. The church of Holy Cross has a lofty square tower with eight bells, and there are some antient monuments in the interior. The living of St. Andrew's is a vicarage, to which are attached the curacies of Holy Cross, Besford, Defford, Bricklehampton, and Pinvin, in the gift of the dean and chapter of Westminster, and of the average net yearly value of 200*l*. There are ruins of a Benedictine abbey.

Shipston-on-Stour is a market-town situated on the river Stour, in an outlying portion of the county, in Warwickshire, about 27 miles east-south-east from Worcester, direct distance. It was formerly a very large sheep-market, and Sheepston has become Shipston. The town has no trade of any consequence. The living is a rectory united with the rectory of Tidmington, in the gift of the dean and chapter of Worcester and Jesus College, Oxford, alternately, of the average net yearly value of 700*l*. The church is dedicated to St. Edmund. The Baptists, Methodists, and Quakers have each a chapel. The population in 1831 was 1632; in 1841 it was 1846, including 103 persons in the Shipston-on-Stour Union workhouse.

Stourbridge is a market-town, which derives its name from its bridge over the Stour. The bridge is of stone, and forms the communication between Worcestershire and Staffordshire, of which counties the river is here the boundary. The town is rather irregularly built on a gentle declivity, but the general appearance is handsome. The market-house is a spacious modern structure. There is a small theatre. The church was built by subscription in 1742. The living is a curacy in the parish of Old Swinford, in the gift of the inhabitant householders of the town, of the average net yearly value of 134*l*. There are places of worship belonging to the Independents, Methodists, Baptists, Presbyterians, Quakers, and Roman Catholics. There is a free grammar-school, founded by Edward VI., and said to be richly endowed, but no return of the number of scholars was given to the commissioners for inquiring into the state of education in 1833: there were nine other daily schools and two Sunday-schools. The population in 1831 was 6148; in 1841 it was 7481, of whom 3654 were males, and 3827 were females. The manufactures consist chiefly of iron, glass, and fire-bricks. A bed of sand, 150 feet below the surface, is used for making the glass, and is sold to a considerable amount for the same purpose in other places. The bricks are made of the Stourbridge clay, which has long been celebrated for its excellence in resisting the action of fire; crucibles are also made of it. Stourbridge has excellent navigable communication by means of a branch from the Dudley canal.

Stourport, 10 miles north of Worcester, is a handsome and well-built market-town, in the chapelry of Lower Milton, in the parish of Kidderminster and lower division of Halfshire hundred. It has become a thriving place within the last eighty years, before which period it was a small and insignificant hamlet. Its prosperity is entirely owing to local improvements in inland navigation. It is situated near the confluence of the Stour and Severn; and the Staffordshire and Worcester Canal, which communicates with Dudley, Stourbridge, and Kidderminster, enters the Severn at Stourport. There is an extensive basin, opened in 1771, with wharfs and warehouses for the accommodation and as a general dépôt of the trade between the west and central portions of the kingdom. Stourport is a great mart for hops, corn, and apples. The market-day is Wednesday; and there are several fairs in the course of the year for horned cattle, hops, &c. The houses are chiefly built of brick, and the general appearance of the town is neat and thriving. The iron bridge over the Severn consists of a single arch, of 150 feet span, and fifty feet above the surface of the river. The inhabitants of Stourport attend divine service at Milton; the living of which place is a perpetual curacy held with Kidderminster. The population of Milton chapelry was 3012 in 1841. Stourport is a polling-place for the county.

Tenbury, formerly called Temebury, a parish and small market-town in the upper division of the hundred of Doddingtree, 17 miles north-west of Worcester. It is situated on the southern bank of the river Teme, which separates Worcestershire from Shropshire, and is here crossed by a stone bridge of six arches. The Kyre, a small but rapid stream, which falls into the Teme at the upper end of Tenbury, often occasions inundations in the town: this river is also crossed by a handsome bridge. The surrounding country is rich and fertile, and the grass-lands, hop-yards, and orchards are very productive. Mineral-springs have been discovered in the neighbourhood. The Leominster Canal passes near the town, and supplies it with cheap coal from the Clee Hills: this canal was intended to have passed from Herefordshire to Stourport, but the original design has never been completed. There is a considerable trade in hops, cider, and perry; and the making of malt is carried on to some extent. The town consists chiefly of three streets, with an ancient corn-market, and a butter-cross of modern erection. The old church was carried away by a flood in 1770, and the present edifice was erected in 1777. The living is a vicarage. The market-day is Tuesday, and there are fairs in April, May, June, July, and September, for horned cattle, horses, and sheep. The entire parish comprises 5450 acres, and in 1841 contained 1849 inhabitants, namely, Tenbury parish, 1177; Berrington hamlet, 207; Sutton hamlet, 186; and the hamlet of Tenbury Foreign (252), with Kyrewood (27). Tenbury is a polling-place for the county.

Upton, a neatly-built and thriving market-town, in the lower division of the hundred of Pershore, 8½ miles south of Worcester. It is situated on the bank of the Severn, in a flat and fertile plain. The river is here navigable for vessels of 100 tons burthen; there is a basin for barges and a wharf for loading and unloading; and a considerable trade is carried on. A market-house, including under the same roof an assembly-room and a court-room for the use of the magistrates, has recently been erected. The stone bridge of six arches and the old church were injured during the civil wars, and in 1756 the latter was taken down and the present edifice erected. The living is a rectory, in the gift of the bishop of Worcester, valued at 917*l*. per annum. There are two day and Sunday national schools, one for boys and one for girls, the former supported by subscriptions and the latter by an endowment. The population of the parish was 2696 in 1841. Upton is one of the polling-places for the county.

Worcestershire is in the Province of Canterbury, and for the most part in the diocese of Worcester; 15 parishes and 8 chapelries are in the diocese of Hereford. The diocese is divided into 10 deaneries.

The principal benefices are—

	Net Value.	Patron.
Alvechurch .	. £1,025	Bishop of Worcester.
Astley . . .	623	Trustees of D. J. Cooks.
Bedwardine . .	635	Dean and Chapter of Worcester.
Belbroughton .	1,244	St. John's College, Oxford.
Blockley . .	762	Bishop of Worcester.
Bredon . . .	1,498	Rev. John Keysall.
Dudley . . .	614	Lord Ward.
Eastham . . .	920	Rev. Chas. Turner.
Fladbury . . .	721	Bishop of Worcester.
Hanbury . . .	1,188	J. J. Vernon, Esq.
Hartlebury . .	2,400	Bishop of Worcester.
Kidderminster .	1,416	Lord Ward.
Northfield . .	1,170	Rev. J. Fenwick.
Redmarley D'Abitot .	900	Mrs. Niblett.
Ripple . . .	. £1,186	Bishop of Worcester.
Shipston-on-Stour	700	Dean and Chapter of W
Stoke Severn .	746	Lord Coventry.

The yearly revenue of the bishop of Worceste
average of three years ending in 1831, was 69
expenditure, by the same average, was 347*l*., leav
yearly income of 6569*l*.

This county is in the Oxford circuit: a ch
lately (1843) taken place in the order in which
in this circuit are visited by the judges. For m
the assizes at Worcester were held immediately a
of Oxford and before those of Staffordshire: the ju
go from Oxford to Worcester and thence to G
Stafford is the last town in the circuit. Among
towns and principal villages are Broadway, Be
Little Malvern, Blockley, Eckington, Redditch, St
Alvechurch, King's Norton, Martley, and Fe
Thirteen unions have been formed by the Poor
missioners under the Poor Law Amendment Act
of Guardians meet at Bromsgrove, Droitwich,
Evesham, Kidderminster, King's Norton, Mar
shore, Shipston, Stourbridge, Tenbury, Upton,
cester.

The principal gentlemen's seats are—Croome,
to Lord Coventry; Hagley Park, the residence of
tleton; Witley, the property of Lord Ward, and
(1843) the residence of the Queen Dowager
Grange, belonging to the Hon. Robert Clive; H
Castle, the episcopal residence of the bishop of th
Ombersley, belonging to Lord Sandys; Westw
Madresfield, Bordesley Park, Stanford Court, P
Overbury Park, Hanley Court, Kyre, and
Hall.

Manufactures and Commerce.—Iron is large
factured at Dudley, in the neighbourhood of wh
are likewise extensive coal-mines. In the nort
of the county a very large quantity of nails are
there are likewise factories for fish-hooks and nee
pets of many descriptions and qualities are made a
minster; glass is manufactured at Stourbridge;
ing glove-trade is carried on at Worcester, and p
manufactured to a considerable extent. The p
of the southern and eastern part of the county
occupied with agriculture.

History.—The etymology of 'Worcester' is w
plausibility adduced from 'Wyre-Cestre,' the
Castle of Wyre, under which name a considerab
still exists in the neighbourhood of Bewdley. Of
history of the county little is accurately known:
however many evidences of its occupation by the
During the Heptarchy, Worcester was the princi
cian see, and the inhabitants of the district we
ecclesiastical government. After the Conquest the
government was changed. Earls of Worcester were
and had the civil power confided to them. Of th
first was Urso d'Abitot, one of William the Conque
lowers and favourites. This earl had many succes
retained or lost their lands according to the amou
fluence of the party which they had adopted in the
ment. During the war between Stephen and the
Maud, and subsequently during the resistance of th
to King John, the possessions of the earls of W
frequently changed masters. 'On the re-establis
John's power, the Church of Worcester, to whom
was very partial, laid hold of that opportunity of e
their precincts, by which they so much diminishe
commodations of the castle, as to render it no long
the habitation of the sheriff and his retinue, fro
time it began to fall into decay.' The greater p
the land was at that time in the hands either of th
or a few barons. Of the latter property great f
took place after Perkin Warbeck's rebellion; of th
when Henry VIII. dissolved the monasteries.
deprivations were made in consequence of the part
of several gentlemen in the county in the Pow
Some of the conspirators in that plot retreated to
apprehended at Hendlip, an old house, of a cur
struction, well fitted for concealment, situated
Droitwich and Worcester. During the Parliamen
Worcestershire was on several occasions overru
contending parties. [WORCESTER.]

Antiquities.—The antiquities of this county ar able. Three Roman roads have been traced: Ick- Street, which ran from Alcester northwards to Staf- hire; a second road, which passed from Tewkesbury pton, Worcester, and so to Shropshire; and the eway, which is the boundary of the county for some ace on its eastern frontier. Antient encampments be traced at Malvern, at Bredon, and on the hills at lbury and Witchbury. There are many remains of siastical houses; the chief are St. Wulstan's, at ester, and the abbeys of Malvern, Bordesley, and ham. The most remarkable churches are the ca- al at Worcester, the churches at Evesham, Malvern, wich, Eastham, Naunton Beauchamp, Stockton, and ch Leach. (Nash's *Worcestershire*; Green's *An- ties of Worcester*; *Corporation and Boundary Re-*, &c.)

Statistics.

pulation and Occupations.—The county of Worcester sses a variety of manufactures in hardware, carpet- ng, gloves, and china; and in 1831 it ranked the teenth in the list of English counties which had the st proportion of their population engaged in non- ultural occupations. The proportion of the agricultural lation was 35·2 per cent. in 1831, and comprised 2636 piers of land employing labourers, 1260 occupiers not oying labourers, and 14,590 agricultural labourers. The nder of the male population, aged 20 and upwards, distributed as follows:—8024 employed in manu- res; 13,693 in retail trades and handicrafts; 2085 alists, bankers, and members of the professions; non-agricultural labourers; 1525 domestic servants; males aged 20 and upwards, 4338; and there were female servants. As the returns of Occupations the census of 1841 are not yet published, we give llowing details from the Population Tables for 1831: t Dudley, Stourbridge, and Old Swinford collectively, bout 450 men employed at the forge, who make , chains, and the heavier kinds of iron tools and inery; at Wolverley, Cradley, Belbroughton, and ebury, about 280 men manufacture gun-barrels, edge- and files; at Tardebigg 360 men make needles and ooks, 187 at Feckenham, and a few at Alvechurch, -with-Bradley, Inkberrow, and Beoley; at Droitwich ans are made; watch-springs, in small quantity, at ore; and the number of nailers througnout the county rly 3000—of these, 1169 at Bromsgrove, 575 at Dud- 39 at Old Swinford, 162 at Cradley, 122 at Nathfield, King's Norton, 87 at Worley-Wigorn, 55 at Belbroughton, 50 at Stourbridge, and 42 at Pedmore. At Kidderminster (including the Foreign of Kidderminster and the chapelry of Lower Milton) 2300 men are employed in making carpets, and preparing materials for that manufacture; at Worcester, and in its suburbs, nearly 1000 men and a much greater number of females are employed in making gloves; the finest description of china-ware is also made at Worcester, employing about 50 men, and many females in the burnishing and other delicate operations; at Bewdley, King's Norton, and Yardley various articles are made, in moderate amount, chiefly of the hardware kind.'

If the registered baptisms, marriages, and deaths bore the same proportion to the actual population as in 1801, the population of Worcestershire, in the undermentioned years, would have been as follows:—51,739 in 1570; 72,285 in 1600; 78,650 in 1630; 87,312 in 1670; 104,132 in 1700; and 102,910 in 1750. The population actually enumerated at the following decennial periods was as under:—

	Males.	Females.	Total.	Increase per Cent.
1801	67,631	71,702	139,333	
1811	78,033	82,513	160,546	15
1821	90,259	94,165	184,524	15
1831	103,383	107,982	211,365	15
1841	114,664	118,672	233,336	10·4

From 1801 to 1841 the population increased 94,003, or 40·2 per cent. In the three years ending June, 1841, the proportion of marriages to the population was 1 in 114; births 1 in 29; deaths, 1 in 48; the proportion for England being respectively 127, 31, and 45. In the same three years, the proportion per cent. of persons married under 21 years of age was 16·37 for women and 6·12 for men; and in England and Wales 13·78 for women, and 4·69 for men. (*Fourth Report of the Registrar-General.*) It appears from the Census Returns of 1841, that 183,964 persons, or 78·8 per cent. of the population, were born in the county; 46,175 persons, or 19·7 per cent., in other counties of England and Wales; 383 persons, or 1 person per 1000, in Scotland; 1411 persons, or 6 per 1000, in Ireland; 16 persons were born in the colonies; 236 were foreigners and British subjects born in foreign countries; and the place of birth of 1151 persons was not ascertained. The number of persons to a square mile was 322 in 1841. The number of parishes is stated to be 173 in the Population Returns for 1841; and the population is separately given for 286 separate places. The population, &c. of each hundred and borough in 1841 is shown in the following table:—

HUNDRED, &c.		AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
									Under 20 years.		20 Years and upwards.			
		English Statute Acres.	In-habited.	Un-inhabited.	Building.	Males.	Females.	Total of Persons.	Males.	Females	Males.	Females.	In this County.	Elsewhere.
nlhurst	(Hundred)	17,340	741	36	5	1,773	1,631	3,404	819	708	954	923	2,730	674
ngtree .	,,	67,960	3,578	266	9	8,248	8,380	16,628	3,603	3,713	4,645	4,667	13,372	3,256
ire . .	,,	112,180	18,316	927	232	46,791	47,214	94,005	22,742	23,038	24,049	24,176	72,861	21,144
dalow .	,,	159,795	9,297	407	54	21,899	22,306	44,205	9,980	10,045	11,919	12,261	35,566	8,639
re . .	,,	97,210	5,662	218	18	13,858	14,359	28,217	6,487	6,323	7,371	8,036	22,931	5,286
ich . .	(Borough)	1,660	531	21	0	1,346	1,486	2,832	606	635	740	851	2,506	326
m . .	,,	2,150	885	62	5	1,979	2,266	4,245	951	991	1,028	1,275	3,403	842
minster .	,,	1,060	2,859	295	6	7,156	7,243	14,399	3,380	3,395	3,776	3,848	11,691	2,708
ster . .	(City)	355	5,050	670	19	11,614	13,787	25,401	5,113	5,730	6,501	8,057	18,904	6,497
Totals . .		459,710	46,919	2,902	348	114,664	118,672	233,336	53,681	54,578	60,983	64,094	183,964	49,372

1831 the number of inhabited houses was 41,646, oc- d by 45,512 families, and there were 302 houses ng, and 2066 uninhabited.

nty Expenses, Crime, &c.—Sums expended for the of the poor: 1748-49-50 (annual average), 9134*l.*; 26,906*l.*; 1783-84-85 (average), 34,509*l.* The sum ded in

01 was 71,235*l.*, being 10*s.* 2*d.* for each inhabitant.
11 .. 101,109 ,, 12 7 ,,
21 .. 83,761 ,, 9 1 ,,
31 .. 83,513 ,, 7 10 ,,
41 .. 62,958 ,, 5 4½ ,,

each of the following years ending 25th March, penditure for the relief of the poor was as under:—

1835.	1836.	1837.	1838.	1839.	1840.	1842.
68,887*l.*	58,788*l.*	54,706*l.*	53,668*l.*	62,188*l.*	60,530*l.*	63,277*l.*

The expenditure for the year ending 25th March, 1834, was 81,612*l.* The total difference in the sum expended in that year and 1842 was 27,822*l.*, or 29 per cent.: namely, in relief and maintenance, 18,345*l.*, or 22 per cent.; in suits of law, &c., 2572*l.*, or 68 per cent.; and in miscellaneous expenses, 6915*l.*, or 65 per cent. The number of poor-law unions is 13, comprising 218 parishes, which had a population of 211,365 in 1831: a number of these parishes are in the adjacent counties. Each of the undermentioned places is the centre of a union; and the sums expended in the year ended 25th March, 1840, under the heads of in-maintenance, out-relief, and establishment and salaries, were as follows:—

Name of Union.	Population in 1831.	In-Maintenance.	Out-Relief.	Establishment and Salaries.	Total.
		£.	£.	£.	£.
Bromsgrove . .	19,843	923	3,759	1,881	6,563
Droitwich . .	15,687	712	3,091	1,221	5,024
Dudley . . .	66,009	1,083	7,284	1,499	9,866
Evesham . .	12,567	477	3,356	727	4,560
Kidderminster .	29,908	1,278	4,590	1,869	7,737
King's Norton .	14,701	728	1,630	944	3,302
Martley . . .	13,093	629	2,957	1,070	4,656
Pershore . . .	12,563	404	2,706	799	3,909
Shipston-on-Stour	19,030	686	6,164	1,609	8,459
Stourbridge . .	35,911	723	3,992	1,626	6,341
Tenbury . . .	7,109	220	1,594	606	2,420
Upton-on-Severn	15,496	640	3,490	643	4,773
Worcester . .	26,542	1,414	2,620	1,603	5,637

The number of persons relieved in these unions during the quarters ending Lady-day, 1841 and 1842, were as follows:—In 1841—in-door, 2459; out-door, 17,288; total, 19,747, of whom 5069 were adult able-bodied paupers: in 1842—in-door, 2927; out-door, 19,748; total, 22,675, of whom 6228 were adult able-bodied paupers. The proportion in 1841 of the total number of paupers to the total population was 7 per cent., which is 2 per cent. less than the average for England. The expense for in-maintenance and out-relief was 62,243*l*. for the year ending Lady-day, 1842, being an increase of 6 per cent. on the preceding year. There were 265 lunatics and idiots chargeable on the poor-rate in 1836, or 1 in 798; in England, 1 in 1033: and in August, 1842, the number chargeable was 284. In 1835-6 there were 1058 bastard children chargeable on the poor-rate, or 1 in 200 of the whole population; in England 1 in 215. The number of illegitimate births in 1830 was 345, or 1 in 19; the proportion for England being 1 in 20. The number affiliated in 1834-5 was 127, and 62 in 1835-6.

The annual value of real property assessed to the property-tax in 1815 was 799,605*l*.; property assessed to occupiers, 609,734*l*.; and the profits of trades, professions, &c., were assessed at 274,458*l*. In 1825-6 the centesimal proportion of the various descriptions of property assessed was:—land, 74·9 parts; dwelling-houses, 18·9 parts; mills, factories, &c. 3·7 parts; manorial profits, &c. 2·5 parts. The net rental or annual value of real property assessed to the poor-rate in 1841 was as follows:—

On landed property . .	£605,610
Dwelling-houses . . .	323,007
All other kinds of property .	66,625
Total . .	£995,242

The total amount levied for poor-rates in the above year was 96,185*l*., being a rate of 1*s*. 11*d*. in the pound on the annual value of real property assessed. The total annual value of real property in the county in 1841 amounted to 4*l*. 5*s*. 3*d*. for each inhabitant; or 1*l*. 6*s*. 4*d*. per acre.

The county-rate levied at different periods, and the principal disbursements for the same periods, are shown in the following table:—

	1801.	1811.	1821.	1831.	1838.
	£.	£.	£.	£.	£.
Income . .	4,975	5 808	7,036	8,578	10,766
Expenditure:—					
Bridges . .	33	180	366	695	57
Gaols . .	258	14,357	415	371	290
Prisoners .	1,145	700	1,821	3,726	3,195
Prosecutions	644	425	1,667	2,823	3,837
Constables and Vagrants .	463	288	600	674	524

The particulars of the county expenditure in 1834 are as follows:—Bridges, building, repairs, &c. 168*l*.; gaols, houses of correction, and maintaining prisoners, 3,269*l*.; prosecutions, 3140*l*.; clerk of the peace, 611*l*.; conveyance of prisoners before trial, 529*l*.; conveyance of transports, 321*l*.; vagrants, apprehending and conveying, 297*l*.; constables, high and special, 290*l*.; coroner, 246*l*.; miscellaneous, 419*l*.: total, 9295*l*.

The length of streets and highways, and the expenditure thereon, were as under in 1839:—

	Miles.	
Streets and roads repaired under local acts	44	
Turnpike roads	428	
All other highways	1464	
		1936
Amount of rates levied		£16,269
Expended in repairs of highways .	£15,862	
Law and other expenses . . .	62	
Total expenditure		£15,925

The number of turnpike trusts, in 1840, was 22; the income from tolls, 35,051*l*.; parish compositions in lieu of statute duty, 57*l*.; and total income, 42,824*l*., including 6995*l*. borrowed on security of the tolls. The total expenditure for the same year was 35,820*l*., including a debt of 5660*l*. paid off, and 4501*l*. for improvements. The bond and mortgage debts amounted to 117,084*l*. In 1839 the debt was equal to 2·9 years' income; for the whole of England the proportion of income to debt being 4·5 years; the proportion of unpaid interest to the total debt was [illegible] per cent.; in England 12 per cent.

The church-rates amounted to 5436*l*. in 1839; and 3070*l*., applicable to the same objects, were derived from 'other sources,' the amount from estates and rent-charges, included under this head, being 1196*l*. in 1832. The sum of 8800*l*. was expended in 1839 for the purposes of the establishment, of which 4591*l*. were for repairs of churches. There was a debt of 7885*l*. secured on the church-rates.

Crime.—Number of persons charged with criminal offences in the septennial periods ending 1819, 1826, 1833, and 1842.

	1813-19.	1820-26.	1827-33.	1836-42.
Total . .	1208	1331	1994	3424
Annual average .	172	190	284	489

The numbers committed, convicted, and acquitted, in each year from 1834 to 1842, were as under:—

	1834.	1835.	1836.	1837.	1838.	1839.	1840.	1841.	1842.
Committed .	377	278	328	409	427	460	627	[illegible]	[illegible]
Acquitted .	112	69	109	127	131	128	182	[illegible]	[illegible]
Convicted .	265	209	219	282	296	332	445	397	[illegible]

In 1841 the proportion of persons committed, to the total population of the county, was 1 in 389; in England and Wales, 1 in 508.

Of 609 offenders (507 males and 102 females) tried at the assizes and sessions in 1842, there were 48 charged with offences against the person; 38 with offences against property committed with violence; 463 (including [illegible] cases of simple larceny) with offences against property committed without violence; there were not any charged with malicious offences against property; 14 were charged with forgery and uttering base coin, and 46 with various misdemeanours. Of 418 persons convicted, 1, against whom sentence of death was recorded, was transported for life; 6 other offenders were also transported for life; 13 for periods above ten and not exceeding fifteen years; 13 for periods above seven and not exceeding ten years; and 50 for terms of seven years; making 83 transported. None were sentenced to imprisonment for periods exceeding two years; 8 were imprisoned for a period not exceeding two years; 48 for above six months and not exceeding one year; and 264 for six months and under; and 15 were whipped. Of the 191 persons acquitted, 99 were found not guilty on trial; in the case of 71 no bill was found; and in 21 instances there was no prosecution. Of the total number of persons committed, 45 per cent. were between the ages of 15 and 25; 16 per cent. between 25 and 30; and 16 per cent. between 30 and 40 years of age. The degree of instruction was not ascertained in as many as 23 cases: 200 males and 50 females could neither read nor write; 265 males and 44 females could read [illegible] write imperfectly; 16 males and 7 females could read and write well; and 4 males had received a superior education. The proportion of uninstructed criminals in the county on an average of several years was 96·5 per cent.; in England and Wales, 89·3 per cent.

Savings' Banks.—There are nine of these institutions in the county, and the proportion of depositors to the population is higher than usual, there being 1 depositor in about 20 persons; and 1 depositor under 20*l*. in [illegible]. The average amount invested by all classes of depositors was 33*l*. in 1841: in England, 29*l*. The number of depositors and amount of deposits in each of the following years were as under:—

	1836.	1837.	1838.	1839.	18[illegible]
No. of depositors	8,811	9,111	9,640	10,021	10,[illegible]
Am. of deposits	£300,399	£309,827	£328,561	£340,757	£351,[illegible]

The distribution of the sums invested in 1830, [illegible] 1840 is shown in the following table:—

		1830.		1834.		
	£	Depositors.	Deposits. £	Depositors.	Deposits. £	Depositors.
Not exceeding	20	3,335	25,835	3,768	28,772	5,4[illegible]
"	50	1,970	60,778	2,228	68,683	2,8[illegible]
"	100	1,036	68,538	1,098	69,179	1,3[illegible]
"	150	367	43,872	383	45,[illegible]	[illegible]
"	200	163	27,949	203	24,300	[illegible]
Above " . .	200	116	28,089	82	20,616	84
		6,933	255,700	7,672	267,329	10,[illegible]

eposits of 105 friendly societies, not reckoned above, ed, in 1840, to 11,001*l.*; and 7118*l.* were invested by ritable institutions.

ive Franchise.—The actual number of county voters ed, in 1835, in the eastern division was 5867, and the western division; and in 1839-40 the numbers ed were as under:—

	E. div.	W. div.	Total 1839-40.	Total 1835-6.
ders of every class .	4909	3370	8279	7764
lders and customary ts . . .	221	196	417	403
lders for life or term rs . . .	117	151	268	321
ants at will . .	1005	838	1843	1814
and mortgagees .	32	7	39	88
d by office . .	10	4	14	31
d duplicate qualifi- s . . .	34	2	36	58
	6328	4589	10,917	10,479

tion.—Summary of Returns made to Parliament —

	Schools.	Scholars.	Total.
hools . . .	77		
of infants at such schools; om 2 to 7 years:—			
Males . .		903	
Females . .		1021	
Sex not specified .		411	
			2,335
ools . . .	474		
of children at such schools; om 4 to 14 years:—			
Males . .		7,310	
Females . .		5,581	
Sex not specified .		2,632	
			15,523
Schools . .	551		
children under daily in- on . . .	..	..	17,858
chools . . .	252		
of children at such schools; om 4 to 15 years:—			
Males . .		9,202	
Females . .		9,707	
Sex not specified .		1,796	
			20,796

Maintenance of Schools.

of	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
ls	1	20	6	379	63	1171	7	765
ls	87	3364	29	2,381	339	7856	19	1922
ols	9	667	235	19,118	1	35	7	885
...	97	4051	270	21,878	403	9062	33	3572

ools established by Dissenters, included in the le, are—

		Scholars.
ols . . .	18, containing	1,000
hools . .	81 „	8,939

ools established since 1818 are—

other daily schools	278, containing	8,843
hools . .	144 „	11,973

libraries of books are attached to 35 schools. -six Sunday-schools, attended by 849 children, ed from places where no other school exists. ree schools, containing 1828 children, were both d day schools. The number of boarding-schools r, and the scholars are included in the above re- total number of children returned as attending d day schools of all kinds is 38,654; in 1841 the ber of children in the county between the ages 0 was 19,312, and 17,690 were between 10 and 37,002; or from 3 to 15 the total number of the county was 43,149. On an average of ending June, 1841, the number of persons mar- igned the register with marks was 46 per cent. and 61 for the women, the average for Eng- respectively 33 and 49.

WORD. [NOTION, NOTIONAL; VERB.]

WORKHOUSE. Relief to the indigent is of two kinds, in-door relief and out-door relief. In-door relief is relief in the workhouse. At first workhouses appear frequently to have combined the character of a bridewell. In the reign of Edward VI. the poor of London were classed into three great divisions, and the third comprised the 'thriftless poor,' namely, 1, the rioter that consumeth all; 2, the vagabond that will abide in no place; 3, the idle person, as the strumpet and others: and the king, who had been moved to the necessity of alms-deeds by a sermon of Bishop Ridley's, provided hospitals for 'the poor by impotency' and 'the poor by casualty,' and Bridewell was allotted to the 'thriftless poor.' The workhouse at Hamburg, one of the oldest institutions of the kind in Europe, is still called the Correction and Poor House. The Canterbury Local Act, passed in 1727, expressly orders the bridewell and workhouse to be kept up within the same precincts; and they were only separated under an act passed in 1842. A century and a half ago it was common for writers to speak of the workhouse as a place where idlers and vagabonds were set to work. (See 'Workhouse,' Johnson's *Dictionary*.) The general character of our early statutes relating to the poor was harsh, and indigence was treated as a penal offence.

One of the great objects of the 43 Eliz., c. 2, the foundation of our present poor-laws, was to provide employment for the destitute. The overseers and justices of the peace were directed to set to work children whose parents were unable to maintain them; and also adult persons who had no means of maintaining themselves, and who used no ordinary and daily trade of life; for which purpose, with the fund raised for the relief of the poor, a convenient stock was to be purchased of flax, hemp, wool, thread, iron, and other ware and stuff. The 43 Eliz. also authorised overseers and churchwardens to build cottages on waste land for the poor to inhabit, and to place inmates, or more families than one, in one cottage or house, such cottages or houses to be used thereafter only for the poor. In many places the poor-house or workhouse was, and is still, called the House of Industry, as the object was to render it a place of occupation for the destitute poor. Great expectations were entertained of deriving a profit from their labour. The workhouse became a linen or woollen factory; or sacks, nets, and a variety of other articles were manufactured. Sometimes land was rented or purchased, and the inmates of the workhouse were employed in agricultural labour. The final extinction of poor-rates was regarded as a not impossible result of these schemes of workhouse industry. In 1704, when the popularity of these schemes was at its height, De Foe clearly pointed out their inevitable operation, and especially their effect on independent labour; but he was scarcely heeded. Nearly a century afterwards houses of industry were erected in Suffolk on a grander scale than the mansions of the wealthy. Instead of being employed as a test of destitution, these workhouses were intended to provide occupation for all the unemployed. The result may be stated in a few words. In 1835 they were visited by Mr. Kay Shuttleworth, then an Assistant Poor-Law Commissioner. 'The yards were surrounded with extensive workshops; large rooms in the main building were filled with machinery; but the only busy thing in the establishment was the spider, which had spun its web on the spinning-wheels.' (For further details of the complete failure of these establishments, see the *Second Annual Report of the Poor-Law Commissioners.*)

Just previous to the passing of the Poor-Law Amendment Act, in 1834, the poor-houses (miscalled workhouses) presented, generally speaking, only accumulated instances of mal-administration. Absence of classification, discipline, and employment, and extravagant allowances, rendered them prolific nurseries of pauperism and vice. Some of the cases of workhouse corruption would be ludicrous, had they not exhibited practices so thoroughly demoralizing. In by far the greater number of cases, say the Commissioners of Poor-Law Inquiry, in 1834, the workhouse was 'a large almshouse, in which the young are trained in idleness, ignorance, and vice; the able-bodied maintained in sluggish and sensual indolence; the aged and more respectable exposed to all the misery that is incident to dwelling in such a society without government or classification; and the whole body of inmates subsisted on food far exceeding both in kind and in amount not merely the diet of the independent labourer, but that of the majority of the persons who contribute to their support' (p. 31). And yet, by 30 Geo. III., c. 49, passed in 1790, the right of visiting any workhouse at all times of the day was conferred on justices of the peace and clergymen; and on their representation the overseers were liable to be summoned at quarter-sessions, when the justices could make orders and regulations for the remedy of any defects in the workhouse management. The chief recommendation of the Commissioners of Poor-Law Inquiry in 1834 was to *unite* parishes 'for better workhouse management.' This is the origin of the Poor-Law Unions. As soon as the Poor-Law Commissioners were appointed, they immediately directed their attention to the general adoption of the workhouse system. Their 'main reliance for the discouragement of pauperism, and for the establishment of independent habits amongst the labouring classes, is founded on the workhouse system.' (*Second Annual Report*, p. 5.) Out-door relief is prohibited in a number of Unions. The old parish workhouses and wretched parish cottages occupied by paupers have been sold. New workhouses, capable of containing from one hundred to five hundred inmates and upwards, have been erected in nearly every Poor-Law Union, Boards of Guardians being assisted by loans of Exchequer bills, to be repaid in twenty years. Rules and regulations for the government of Union workhouses have been framed by the Poor-Law Commissioners. In the first place, a suitable classification of the inmates is effected. They are at least divided into the following classes:—1, those infirm through age or any other cause; 2, able-bodied men and youths above the age of fifteen years; 3, boys above the age of seven and under that of fifteen; 4, women infirm through age or any other cause; 5, able-bodied women and girls above the age of fifteen years; 6, girls above the age of seven and under that of fifteen; 7, children under seven years of age. The subdivision may be carried still further, at the discretion of the guardians, if the workhouse will admit of it. The maximum number of persons to be admitted in each house is fixed by the Commissioners. To each class is assigned a ward, and communication between the different wards is not allowed. Married couples are separated, exceptions being made in certain cases in favour of classes 1 and 4. The father or mother of any child in the same workhouse is allowed to see such child daily in a room appointed for the purpose. Mothers of children under seven years of age are permitted to have access to them 'at all reasonable times,' and so long as any mother is suckling her child she is to have access to it at all times. The children of proper age are instructed in reading and writing and the principles of the Christian religion. The dietary of each workhouse is fixed by the Commissioners, and it varies in different districts, regard being paid to the general dietary of the independent labourers of such district. If required to do so by a pauper, the master or matron is bound to weigh the allowance of provisions served out to any pauper in the presence of the said pauper and two other persons. The accuracy of the following passage, taken from the 'Second Annual Report of the Poor-Law Commissioners' (p. 5), will not be disputed by any one who has visited a Union workhouse. The Commissioners say—'The necessary effect of our rules and regulations is to supply the inmates of a workhouse with wholesome food and sufficient clothing, a better bed than they are used to lie upon, a cleaner and a better ventilated room than they are used to inhabit, an immediate supply of medical attendance in case of illness, and to establish a degree of order and cleanliness unknown in a labourer's cottage. These are all superior to what the pauper has been accustomed to; and it is owing mainly to the effect produced by the classification which is necessary to be observed in a workhouse, and to that degree of order and restraint which our rules enforce, that the workhouse principle is rendered really effective.'

The officers of a workhouse are—1, the master; 2, the matron; 3, a chaplain; 4, a schoolmaster and schoolmistress; 5, a medical officer for the workhouse; 6, a porter; besides such assistants as the Board of Guardians may consider necessary. These officers are appointed by a majority of the guardians, but the Poor-Law Commissioners determine the amount of their respective salaries. The guardians may suspend the master, matron, chaplain, schoolmaster, schoolmistress, or medical officer for the
workhouse, reporting such suspension, with
thereof, to the Commissioners; and they may at
miss any other servant of the workhouse. The
the several classes are to be kept employed ac
their capacity and ability. Punishments may b
on refractory paupers by the master, with or
direction of the guardians, by alteration of diet
period not exceeding 48 hours, or by confineme
more than 24 hours. The right to inflict punishme
a workhouse is recognised by common law.
under 12 is to be confined in a dark room or
night. Corporal punishment must be inflicted
after the offence, and the particulars of the cas
entered in a book kept for the purpose; and no fe
is to be subject to corporal punishment. Any pa
quit the workhouse on giving a 'reasonable not
merly a notice of three hours was required.

The admission of a pauper into a workhouse
by one of the following modes:—1, By a written
order of the Board of Guardians, signed by th
2, by a provisional written or printed order sig
relieving officer or overseer; 3, by the master of
house, or the matron in his absence, or even by
without any order, in case of sudden and urgent
Orders for admission cannot be given:—1, By
not acting as a member of the board; nor, 2, by
of the peace; nor, 3, by a rate-payer of the pari
any person may bring cases of sudden necessity be
master of the workhouse, and he is bound to adm
In Unions where the Poor-Law Commissione
sanctioned regulations respecting mendicity, vagra
mendicants are admitted into the workhouse by
from a rate-payer of any parish in the Union.
metropolis any person brought to the workhous
policeman is *primâ facie* evidence of urgent want,
is the duty of the master to admit him.

In the quarter ending Lady-day, 1842, the num
in-door paupers relieved in England and Wal
221,956, of whom 83,692 were able-bodied persons.
expense of in-maintenance was 828,086*l*. The 'es
ment charges' of each Union workhouse are appo
on a certain principle to the different parishes
Union. The Court of Queen's Bench has decide
Union workhouses are rateable to the poor.

Under the Irish Poor-Law Act about 130 work
have been erected, and some of the largest will
2000 inmates.

(*General Orders of the Poor-Law Commissioner*
ley's *Poor-Law Statutes*; *Annual Reports of the Po*
Commissioners.)

WORKINGTON. [CUMBERLAND.]

WORKSOP. [NOTTINGHAMSHIRE.]

WORLD. [UNIVERSE.]

WORLIDGE, THOMAS, an English painter an
born at Peterborough in Northamptonshire, in 17
was first a pupil of Grimaldi, and then of Boitard,
of La Fage. Worlidge is chiefly known for his
and etchings in imitation of Rembrandt: he co
some of Rembrandt's most celebrated prints:
very good copy by him of the so-called Hundred

Worlidge drew in black-lead, and with india
vellum, with extraordinary neatness. He made
one hundred and eighty beautiful drawings of
gems. His etchings, which are all in the style
brandt, amount to one hundred and forty: there
several good portraits by him, likewise exact imi
Rembrandt. Some of his admirers in his own
to call him the English Rembrandt. Walpole a
have thought little of his powers: he says, 'Tho
lidge for the greater part of his life painted po
miniature; he afterwards with worse success
them in oil; but at last acquired reputation and
etchings in the manner of Rembrandt, proved to
easy task by the numbers of men who have cou
that master so as to deceive all those who did
his works by heart. Worlidge's imitations and
in black-lead have grown astonishingly into fash
best piece is the whole length of Sir John Astle
from Rembrandt: his print of the Theatre at O
the act there, and his statue of Lady Pomfret's C
very poor performances.' Worlidge's wife worked
in needlework with great skill. Worlidge died
mersmith in 1766.

ıer, *Manuel des Amateurs*, &c.; Walpole, *Anec-*
f Painting, &c.)

RM-GRASS. [SPIGELIA.]

RM-SEED. [SPIGELIA.]

RM, OLAUS, Latinized *Wörmius*, a distinguished
historian and antiquarian, was born on the 13th of
88, at Aarhuus in Jutland, where his father was alder-
is family was originally from Guelderland. He was
d successively at the schools of Aarhuus, Lüneburg,
merich on the Lower Rhine, where he lived three
nder the care of some learned relations and friends
ather. In 1605 he went to the university of Mar-
Hesse, where he studied divinity, but he afterwards
inity for medicine, and visited successively the uni-
s of Giessen, Strassburg, Basel, and Padua. The
tion of the German students at Padua chose him
ocurator and consiliarius anatomicus. After having
d through Italy, he went to Montpellier and Paris,
both places he attended the medical schools. In
e became acquainted with Isaac Casaubon. He
ted the Netherlands and England. He was going
the degree of M.D. at Marburg, in 1611, when the
compelled him to retire to Basel, where he became
f medicine in the course of the same year. As he
ied history and languages with great success, he was
ed, in 1613, professor of Literæ Humaniores in the
ty of Copenhagen, where he lived till his death,
g successively literature, medicine, chemistry, and
Five times he held the office of rector of the
ty. Cardinal Mazarin bestowed a pension upon
nd King Christian IV. of Denmark made him a
the chapter at Lund in Scania, and appointed him
te physician, which office he held till his death,
he successor of Christian IV., Frederick III. He
the 31st of August, 1654. Olaus Wormius is best
s an historian and antiquarian, although his merits
sician were far from being inconsiderable. He is
n the history of anatomy by the bones of the skull
fter him *ossa Wormiana*, which he particularly de-
though he did not, as is commonly supposed, dis-
em. The chief object of his studies was the earlier
nd antiquities of Denmark, and in this department
btained a high rank. He also wrote on the history of
His collection of Scandinavian and especially
ntiquities was very rich; he made another collection
s referring to the natural history of Denmark and the
countries. These collections are described in the
m Wormianum,' Leyden, 1655, fol., which was
y William Worm, the son of Olaus. Albert Bar-
n his work 'De Scriptis Danorum (Liber Posthu-
. 112, &c., gives a complete catalogue of the works
Worm: the principal are—I. Works on medicine,
history, &c.: 1, 'Liber de Mundo: Commentarii
otelem,' Rostock, 1625, 8vo.; 2, 'Exercitationes
e,' Copenhagen, 1623, 4to.; 3, 'Selecta Controver-
Medicarum Centuria,' Basel, 1611, 4to. II. Works
ry, antiquities, &c.: 4, 'Literatura Danica anti-
, vulgo Gothica dicta,' &c., Copenhagen, 1636,
51, fol.; 5, 'Fasti Danici,' Copenhagen, 1626,
1, fol.; 6, 'Monumentorum Danicorum Libri VI.'
gen, 1643, fol.; 7, 'Lexicon Runicum et Appen-
Monumenta Danica,' Copenhagen, 1650, fol. This
of great repute, and almost indispensable for those
dy Scandinavian antiquities. 8, 'De Cornu Aureo,'
gen, 1641, fol. This work gives a description of
golden horn of beautiful workmanship, adorned
merous figures and ornaments in rilievo, which was
ossession of the kings of Denmark till it was stolen
lted down in the last century. 9, 'Historia Nor-
Vernacula,' Copenhagen, 1636, 4to. This history
n superseded by the excellent work of Torfaeus on
ry of Norway.
Olai Wormii,' in the first volume of *Olai Wormii*
e, ed. Thomas Bartholin.)

MS. [ANTHELMINTICS; ENTOZOA; INTESTINA;
.]

MS, an antient city, now the capital of a canton
province of Rheinhessen, of the grand-duchy of
armstadt, is situated in 49° 37′ N. lat. and 8° 22′
, near the left bank of the Rhine, which formerly
its walls, in a beautiful country, called by the
ngers the Wonnegau (the land of delight). The
said to have originated with a Roman fortress, called Borbitomagus, or Augusta Vangionum. After its destruction by the Vandals and Huns, it was rebuilt by the Franks about 475; it was called Worms, and became the seat of a count (Gaugraf), and subsequently of the dukes of Franconia, who styled themselves Counts of Worms. It was afterwards the residence (at least for a considerable time) of Charlemagne, who held in its vicinity those primitive legislative assemblies which, meeting in May, were called Mai Lager, or Champs de Mai, in one of which assemblies the war with the Saxons was resolved on. Some of the Frankish and Carlovingian kings also resided here. Several diets of the German empire were held at Worms, among which were that of 1122, at which a convention was concluded between the emperor Henry V. and Pope Calixtus II.; that of 1495, which abolished the right of private war; and that of 1521, at which Luther appeared before the emperor Charles V. Towards the end of the middle ages the city, as a member of the Confederation of the Rhenish cities, acquired great importance in the feuds between the neighbouring princes. Its industry, its commerce, and its great population, which in the time of the Hohenstaufen amounted to 60,000, and even after the Thirty Years' War was still 30,000, made it rich and powerful; but in the two next centuries its prosperity rapidly declined, chiefly in consequence of the frequent wars between Germany and France. In 1689 it was burnt by Melac, by the order of Louis XIV., and only the fine old cathedral resisted the efforts made to destroy it. Since that time it has never recovered; some portions have been indeed rebuilt, but within the ample circuit of its decayed walls are large enclosures, some waste, some converted into vineyards and gardens, which were once covered with populous streets and fine buildings. Though the city offers therefore but a shadow of its former greatness, it is however pleasing to know that the progress of decay has been stopped, and that since the beginning of this century there has been an improvement. The population was in 1801, 4800; in 1820, 6246; and it is now 8500 inhabitants, of whom the great majority are Lutherans. In 1810 there were 570 Roman Catholics, 310 Calvinists, and 450 Jews; these latter have been long established here, and enjoy privileges not allowed them in other parts of Germany. The most remarkable edifice is the venerable cathedral, which was founded in the eighth century, but not completed till 1110; or, as some state, begun in 996 and finished in 1016. It is a plain Gothic building, with two towers at each end.

Worms is the seat of the provincial tribunals and of the consistory: it has a gymnasium and several schools; and manufactories of sugar-of-lead and tobacco, several tanneries, and a good trade in corn, cattle, and wine grown in the vicinity, of which that called 'Liebfrauenmilch' (or 'Our Lady's milk') is so named from its being produced in the neighbourhood of the Liebfrauen Kirche ('The church of Our Lady').

(Brockhaus, *Conversations Lexicon*; Hassel, *Handbuch* vol. v.; Murray, *Handbook of Northern Germany*; Stein, *Geog. Lexicon*; Stein, *Handbuch* by Hörschelmann; Fred. von Raumer, *Die Hohenstaufen und ihre Zeit*; F. von Raumer, *Geschichte Europa's, seit dem Ende des 15 Jahrhunderts.*)

WORMWOOD. [ARTEMISIA.]

WORONESCH. [VORONETZ.]

WORONICZ, JAN PAWEL, archbishop of Warsaw, and one of the most eminent Polish writers of his time, both in poetry and pulpit eloquence, was born in 1757. Educated in one of the Jesuit seminaries, he entered that order at an unusually early age, and, on its abolition (1772), into the 'Society of Missionaries.' Here he soon began to attract the attention of some of the higher clergy, more especially of the bishop of Cholm, then vice-chancellor, who intrusted him with preparing many important official papers, for which services he was rewarded with the deanship of Lvov. On the partition of Poland, in 1795, he retired to the small town of Kazimierz, where he took upon himself the duties of a parish priest, and where, being in the neighbourhood of Pulawy, the country-seat of the Princess Isabella Czartoryiski, he became acquainted with that accomplished woman. It was then that, inspired both by her society and by the enchanting scenery which Delille has celebrated in his 'Jardins,' he produced his 'Sybylla;' the idea of which was suggested by the so-called 'Temple of the Sibyl,' at Pulawy, and which is esteemed the finest specimen of historical poetry in the language. When the duchy of Warsaw was established in 1808, he was made both a member of the council and dean in the chapter of the cathedral; and through the influence of the Czartoryiski family, was nominated by the emperor Alexander to the bishopric of Cracow in 1815. Twelve years afterwards the emperor Nicholas raised him to the dignity of archbishop of Warsaw and primate of all Poland; but he was then labouring under infirmities which induced him to go abroad for medical advice, and while thus travelling, he died at Vienna, October 4th (o.s.), 1829.

Besides his 'Sybylla,' he wrote several other poetical compositions of merit, and one of them, 'Sejm Wislicki,' or the Diet of Wislica, though only the fragment of what was perhaps intended to be an historical epic, is thought by some to display greater power than his first more celebrated production. His poetical fame however is fully rivalled by that of his prose writings. 'His sermons,' says Szyrma, the author of the 'Letters on Poland,' 'excel in a boldness of conception akin to those of Herder, and seem to be the instantaneous emanations from the pure source of religious morality—the more impressive, as they are couched in an energetic dithyrambic language, like that of the prophets of old.' They were published at Cracow, 1829, in 8vo., under the title of 'Kazania, czyli Nauki Parafjalne.'

(*Entziklopeditcheskii Leksikon; Letters on Poland.*)

WORONZOW (VORONTZOV), COUNT MIKHAIL ILARIONOVITCH, Russian chancellor and diplomatist, was born July 12th, 1714, and at the age of fifteen obtained an appointment as page at the court of the grand-duchess Elizabeth, in whose elevation to the throne he some years after (1741) took a principal part. His services on that important occasion secured him not only the empress's favour, but various orders and marks of honour from foreign potentates. The office of vice-chancellor, under Bestuzhev-Rumin, was however so little agreeable to him, that he sought to decline it by travelling abroad under pretext of ill-health, yet after so passing about two years in Germany, Italy, France, and Holland, he returned and undertook its duties. He had not long done so, before he was accused (1748) of plotting to depose Elizabeth, and place the grand-duke Peter (III.) on the throne, but he succeeded in fully exculpating himself with the empress.

Ten years later, on the downfall of Bestuzhev-Rumin, he became chancellor, and, so long as he held that arduous office, showed superior ability as a statesman; but after Catherine II. had ascended the throne, his influence waned, at least the enmity of several of the more powerful nobles towards him showed itself in such manner, that he sought to avoid worse consequences by absenting himself, as formerly, under the pretext that travelling was necessary for his health (1763), and Panin was appointed to act as his deputy in the meanwhile. On his return to Russia, finding his opponents no better disposed towards him than before, he solicited permission to resign office altogether, and retired to Moscow, where he died Feb. 13 (o.s.), 1767.

Woronzow had many of the qualities that mark a superior statesman, and was in other respects a man of a noble character. He patronized the literature of his country in the person of Lomonosov, to whom he erected a monument, besides purchasing all the manuscripts and papers he had left. Count Michael's only offspring was a daughter, married to Count Alexander Strogonov; but he was the uncle of three females, the most distinguished of their time for beauty and for talents: these were the daughters of his elder brother, Count Roman Ilarionovitch (1707—1783),—Maria, the beautiful Countess Buturlin; Elizabeth, the wife of Colonel Polyansky; and Catherine, the no less eccentric than accomplished Princess Dashkov.

(*Entziklopeditcheskii Leksikon;* Bautiesh-Kamensky, *Slovar, &c.*)

WORSLEY, SIR RICHARD, BART., was born in 1751, in the Isle of Wight. His father was Sir Thomas Worsley, and Richard succeeded to the title when he was about eighteen years of age. He soon afterwards travelled on the Continent, and remained a considerable time at Rome, where he purchased a variety of pieces of sculpture and other remains of antient art.

Sir Richard Worsley, after his return to England, sat in the House of Commons for many years as one of the representatives of the borough of Newport in the Isle of Wight. He was comptroller of the royal household to George III., and also held the office of governor of the Isle of Wight, where he died in 1805.

Sir Richard Worsley published a 'History of the Isle of Wight,' London, 4to., 1781, with engravings. The history is natural, civil, military, commercial, and antiquarian; but except in mere matters of historical detail, most of them dull enough, Worsley's work has been superseded by Sir Henry Englefield's 'Description of the Isle of Wight, with Observations on the Geology, by T. Webster,' London, folio. Sir Richard Worsley also published 'Musæum Worsleianum; or, a Collection of antique Basso-Relievos, Bustos, Statues, and Gems; with Views of Places in the Levant, taken on the spot in the years 17[illegible], 86, and 87,' London, 2 vols. folio, 1794-1803. He was assisted in the arrangement and description of his collection by Ennio Quirino Visconti. It was printed by Bulmer, and at the time of its publication was considered to be, in typography and embellishments, one of the most splendid works which had issued from the English press. Very few copies were printed; some authorities say only fifty, but others two hundred and fifty, and the total expense to Sir Richard was about 27,000*l.*

(Watt's *Bibliotheca Britannica;* Brunet, *Manuel du Libraire; Ency. Americana; Biog. Universelle;* Dibdin's *Bibliomania.*)

WORSLEY. [LANCASHIRE.]

WORSTED. [NORFOLK.]

WORSTED MANUFACTURE. [WOOLLEN AND WORSTED MANUFACTURE.]

WORT. [BREWING.]

WORTHING. [SUSSEX.]

WOTTON, EDWARD, was born at Oxford in 14[illegible] He studied at the university of Oxford, and took his Bachelor's degree in 1513. He was subsequently ap[illegible]pointed, by Bishop Fox, Greek lecturer at Corpus Christi [illegible] College. In this position he remained till 1520: he then [illegible] travelled into Italy, and having visited the principal [illegible] cities, he graduated in medicine in the university of [illegible] Padua, in 1523. He took his degree of Doctor of Me[illegible]dicine [illegible] Oxford in 1525, and became a Fellow of th[illegible]e College of Physicians of London. He was afterwards [illegible] appointed physician to Henry VIII. He devoted much [illegible] after [illegible] to the study of natural history, and published [illegible] at P[illegible] in 1552, a work entitled 'De Differentiis An[illegible]imal[illegible] This work is spoken highly of by Gesner. It doe[illegible]es not [illegible]tain any new matter of his own, but was an epito[illegible]me o[illegible] natural history of his day. It is written in elega[illegible]nt [illegible] He began a history of insects, but this work w[illegible]as [illegible] published. He died in 1555. (Hutchinson's *Bi[illegible]iogra[illegible] Medica.*)

WOTTON, SIR HENRY, was born 30th Marc[illegible]ch, [illegible] O. S., at Bocton Hall, 'commonly,' says his bio[illegible]grap[illegible] Isaac Walton, 'called Bocton or Bougton Place,' [illegible] in more modern accounts written Boughton Hall, in th[illegible]e pa[illegible] of Boughton-Malherbe, in the county of Kent. H[illegible] ancestors, several of whom had held distinguished e[illegible]mploy[illegible]ments in the state, had been seated for many gene[illegible]tions [illegible] His father, Thomas Wotton, Esq., was twice married [illegible] first, to Elizabeth, daughter of Sir John Rudstone, Knig[illegible]t, by whom he had three sons; Edward, knighted by Eliz[illegible]beth, and in 1603 raised to the peerage as Baron Wotton by James I., and James and John, also both knighted by Elizabeth; secondly, to Eleonora, daughter of Sir Willi[illegible] Finch, of Eastwell in Kent, and widow of Robert Mert[illegible] Esq., of the same county, by whom he had Henry, the subject of the present notice.

Henry's first teacher is stated to have been his mother; he then had a resident tutor; afterwards he was sent to Winchester school; thence, at the age of sixteen, he was removed to Oxford, and admitted a gentleman commoner of New College; finally, two years after, in 1586, he transferred himself to Queen's College. The first year he was a member of this society he composed, at the desire of the provost, a tragedy entitled 'Tancredo' (in what language is not stated), which, according to Walton, was greatly admired; but it has not been printed. Walton says that about the twentieth year of his age he proceeded *Master* of Arts, on which occasion he read with great applause three lectures, in Latin, on the eye; and Wood, although he could not discover any record of his admission to this degree, notes that on the 8th of June, 1588, he put up a again there is probably some mistake. According to the same authority, he was, in 1619 and the following year, sent again abroad, first as ambassador extraordinary to the duke of Savoy, and then several times into Germany upon the affairs of the elector-palatine; 'after which,' it is added, 'being remanded a third time to Venice, with directions to take the round thither through Germany, he returned not to England till the year of King James's death,' that is to say, in 1625. But he was certainly back here by 1624 at the latest: Walton says that he came to London 'the year before King James died;' and even the account in the 'Biographia Britannica' proceeds, somewhat inconsistently, to inform us that 'not long after his arrival, upon the death of Mr. Thomas Murray in 1623, he succeeded him in the provostship of Eton College.' Walton's narrative implies that this place was given him by King James, who had previously, it seems, granted him the reversion of the place of master of the rolls, then held by Sir Julius Cæsar; but Wotton, who was in a state of great pecuniary necessity, required, we are told, a present support, and very gladly resigned his reversion upon getting a grant of the provostship. He was not instituted however, it appears, till 26th July, 1625, some months after the death of James. Conceiving himself bound by the statutes to enter into holy orders, he had himself ordained deacon in 1627; and he retained his office till his death in December, 1639. Walton has given a very interesting account of the manner in which he employed the leisure of his latter years; he did not neglect recreation and society, but most of his time was dedicated to study and devotion, and whatever ambition of politics, power, and honours had formerly actuated him, seems to have been, from the time he obtained this shelter in his broken fortunes and wearied old age, completely extinguished.

Sir Henry Wotton's principal writings are contained in the collection entitled 'Reliquiae Wottonianae,' first published by Izaak Walton, with a Life of the author, in 8vo., in 1651, and afterwards, with additional matter in each impression, in 1654, 1672, and 1685. The principal pieces of which it consists are—a treatise, long held in great esteem, entitled 'The Elements of Architecture,' originally published at London, in 4to., in 1624; 'A Philosophical Survey of Education, or Moral Architecture' (dedicated to Charles I.); Characters of some of the English kings (intended as materials for a History of England); a Latin Panegyrical Address to King Charles on his return from Scotland in 1633 (first published in folio, at London, in 1633), with an English translation by a friend of the author; 'A Parallel between the Earl of Essex and Villiers, Duke of Buckingham' (first published in 4to., at London, in 1641); 'A View of the Life and Death of the Duke of Buckingham' (first published in 4to., at London, in 1642); some religious Meditations; and a number of Letters and Poems. More of his letters are in the 'Cabala;' and there are some poems attributed to him which are not in the 'Reliquiae.' His 'State of Christendom' has been already mentioned. The literary reputation of Sir Henry Wotton rests now principally on his poetry, which, although consisting only of some short pieces, is distinguished both by its general correctness, and in its happiest passages by a dignity of thought and expression scarcely attained by any of his contemporaries. In his lifetime he was famous for his pointed sayings; but here the manner, as usual, probably went as far as the matter in creating the impression that was produced. There seems to be nothing either very sharp or very deep in his favourite sentence, his authorship of which he directed should be recorded on his tomb, 'Disputandi pruritus ecclesiarum scabies' ('The itch of disputation is the scab of churches').

WOTTON, WILLIAM, D.D., chiefly remarkable as an instance of strength of memory, and early progress in the acquirements mainly dependent upon that faculty, was born 13th August, 1666, at Wrentham in Suffolk, of which parish his father, the Rev. Henry Wotton, was rector. When a mere child he showed an extraordinary faculty for learning languages; and by the time he was five years of age he had, under the tuition of his father, who was a good scholar, attained considerable facility in reading and translating Latin, Greek, and Hebrew. Sir Philip Skippon, who knew him, in a letter written about this time to Ray, the naturalist, says, 'He is not yet able to parse any language, but what he performs in turning the three learned tongues into English is done by strength of memory; so that he is ready to mistake when some words of different signification have near the same sound. His father hath taught him by no rules, but only uses the child's memory in remembering words: some other children of his age seem to have as good a fancy and as quick apprehension.' In April, 1676, some months before he was ten years old, he was admitted of Catherine Hall, Cambridge, where he made rapid progress, not only in the languages, adding the Chaldaic, Syriac, and Arabic to the Latin, Greek, and Hebrew, but also, it is asserted, in logic, philosophy, mathematics, chronology, and geography. In 1679 he took his degree of B.A.; and in the winter following he became the subject of general attention and wonder by being brought up to London on the invitation of Dr. Gilbert Burnet, then preacher at the Rolls, and introduced by him to all his learned acquaintances. Among other persons, he was in this way made known to Dr. William Lloyd, bishop of St. Asaph, who was so highly pleased with a feat of memory which Wotton performed, repeating *verbatim* a sermon preached by the bishop, that he took him down with him to St. Asaph, and kept him there for the summer, employing him in drawing up a catalogue of his library. He then returned to Cambridge, where, by the interest of Dr. Turner, bishop of Ely, he obtained a fellowship in St. John's, and where he took his degree of M.A. in 1683. In 1691 he commenced B.D.; the same year Bishop Lloyd gave him the sinecure living of Llandrillo in Denbighshire; and he was soon after made chaplain to the earl of Nottingham, then secretary of state, who in 1693 presented him to the rectory of Middleton Keynes in Buckinghamshire.

In 1694 Wotton published his first and best remembered work, his 'Reflections on Antient and Modern Learning,' which is a defence of the superiority of the antients, in answer to Sir William Temple, who had shortly before, in one of his Essays, taken up the opposite side of the question, in arguing against Perrault's 'Parallèle des Anciens et Modernes,' which had appeared at Paris in 1687. Wotton's performance is famous both for having called forth from Swift his 'Battle of the Books,' in aid of his friend Temple, and as having also originated the great controversy about the so-called 'Epistles of Phalaris:' the authenticity of the 'Epistles,' which had been assumed by Temple, was disputed by Wotton; and it was in an appendix to the second edition of the 'Reflections,' which appeared in 1697, that Bentley published the first draught of his celebrated 'Dissertation,' demonstrating the spuriousness of the 'Epistles,' with a special reference to the edition of them brought out by the Hon. Charles Boyle in 1695. Wotton was distinguished for extent and variety rather than accuracy or profoundness of learning, and his judgment was of no remarkable power; the inherent value of the 'Reflections,' accordingly, is not considerable. Nor of many other books which he afterwards published is there any that is now held in esteem, with the exception perhaps of his 'View of Hickes's Archaeological Treasury of the Antient Northern Languages,' which was partly drawn up by Hickes himself and was published in 1708, and of which a second edition appeared in 1735. His edition of the antient Welsh laws, with a Latin translation, which appeared in a folio volume in 1730, after his death, under the title of 'Cysreithjeu Hywel Dda, ac erail; or, Leges Wallicae Ecclesiasticae et Civiles Hoeli Boni et aliorum Walliae principum,' has been lately superseded by the much more accurate and comprehensive publication of the Record Commission, 'The Antient Laws and Institutes of Wales' (edited by Aneurin Owen, Esq.), fol., Lond., 1841. Wotton acquired such a command of the Welsh language as to be able to preach in it. In 1707 he was made a D.D. by Archbishop Tenison. He died at Buxted in Essex, on the 13th of February, 1726. His easy temper and entire inattention to economy reduced him to great difficulties in the latter part of his life. He left a daughter, who became the wife of the Rev. William Clarke, canon-residentiary of Chichester.

(Chalmers's *Biographical Dictionary*, and the *Works mentioned in this article*.)

WOTTON-UNDER-EDGE. [GLOUCESTERSHIRE.]

WOU-WOU, a name by which the Sumatran natives distinguish the *Ungka-Puti*, or *Hylobates agilis*.

A very interesting specimen was brought to this country by Mr. Hugh Cuming, and presented to the Zoological Society of London by that gentleman, together with other

uals; among them the Argus Pheasants, which
. This Gibbon, whose death has been followed
f its playmate, the Orang, while cutting her per-
teeth, was most active and amusing. [UNGKA-
. xxv., p. 513.]
D. [WOOLD.]
LFE, PETER, a chemist, who lived chiefly in
and died in 1806. So little is known of his
that even the place of his birth does not appear to
en recorded. He was a fellow of the Royal So-
d contributed four papers to its 'Transactions,' the
which are - 1, 'Experiments on the Distillation of
olatile Alkalies, &c.; showing how they may be
d without loss, and how thereby we may avoid
able and noxious fumes;' 2, 'Experiments to show
re of Aurum Mosaicum;' 3, 'Experiments on a
uring-substance from the Island of Amsterdam
outh Seas;' 4, 'Experiments on some Mineral
es.'
pparatus described in the first of these papers has
e name of its inventor from oblivion, and yet the
ent appears to have been first devised by Glauber,
robably unknown to Woulfe, and a representation
given at the end of the preface to Glauber's works
89).
LFE'S APPARATUS. The purposes to which
pplied is sufficiently described in the preceding
Under various forms, and with several modifica-
is much employed in chemical operations. The
ent, first described by its inventor in the 'Phi-
l Transactions,' is inconvenient in form; we shall
give a description of one of several improve-
which it has been subjected. A retort *a* (*Fig.* 1)
ed and secured by means of lute to the first re-
which has a right-angled glass tube, open at both
ed into its tubulure; and the other extremity of
is made to terminate beneath the surface of dis-
ter, contained, as high as the horizontal dotted
the three-necked bottle *c*. From another neck of
le a second pipe proceeds, which ends, like the
er water contained in a second bottle *d*. To the
eck a straight tube, open at both ends, is fixed,
s lower end may be a little beneath the surface
uid. Of these bottles any number may be em-
hat is thought necessary. The materials being
d into the retort, the arrangement completed,
joints secured in the manner to be presently de-
he distillation is begun. The condensable vapour
n a liquid form in the balloon *b*, while the evolved
es through the vent-pipe, beneath the surface of
r in *c*, which continues to absorb it till saturated.
e water of the first bottle can absorb no more,
passes, uncondensed, through the second right-
be into the water of the second bottle, which, in
becomes saturated. Any gas that may be pro-
hich is not absorbable by water, escapes through
-tube *e*, and may be collected, if requisite, in
r filled with and inverted in water in the pneu-
ough. This is represented in *Fig.* 2 by *f*, *f*,

sing the bottles to be destitute of middle necks,
sequently without the perpendicular tubes, the
would be liable to be interrupted by an accident;
consequence of diminished temperature, an ab-
or condensation of gas should take place in the
and of course in the balloon *b*, it must necessarily
at the water of the bottles *c* and *d* would be forced
ressure of the atmosphere into the balloon, and
into the retort, which might cause a dangerous
n; but, with the addition of the central tubes, a
t quantity of air rushes through them to supply
dental vacuum. This inconvenience however is
re effectually obviated by Welther's tube of safety
b, which supersedes the expediency of three-necked
The apparatus being adjusted, a small quantity
r is poured into the funnel, so as to about half fill
b. When any absorption happens, the fluid rises
all till none remains in the tube, when a quantity
mediately rushes in and supplies the partial vacuum
n the other hand, no gas can escape under ordi-
cumstances; because any pressure from within is
followed by the formation of a high column of liquid in the perpendicular tube, which resists the egress of the gas.

We have already observed that various modifications of this apparatus have been proposed, an account of which may be seen in different chemical treatises: the above description is taken almost entirely from Dr. Henry's 'Elements.'

Fig. 1.

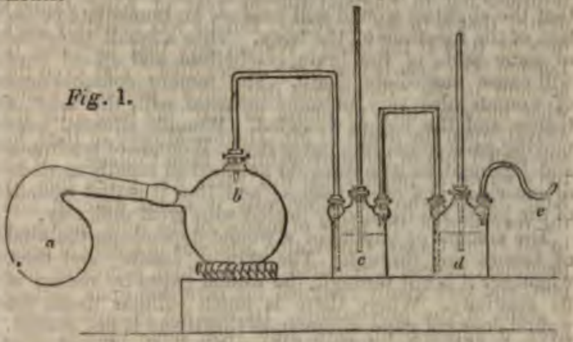
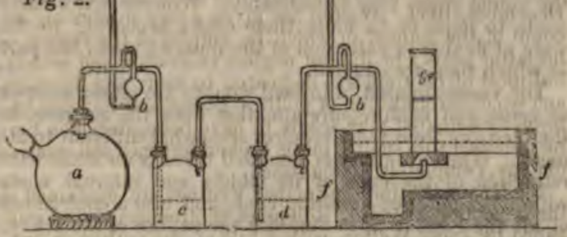


Fig. 2.



WOUNDS, in Surgery, are solutions of the continuity of the soft parts of the body effected by some external agent, and attended with a greater or less amount of bleeding. Wounds vary in their character according to the kind of instrument by which they have been produced, as well as the greater or less amount of force with which it has been applied. In order to facilitate the description of treatment surgical writers have divided wounds into several kinds. Thus they are spoken of generally under the terms incised, punctured, contused, lacerated, poisoned, and gunshot wounds. Wounds of particular parts requiring peculiar treatment are also described, as of the head, throat, chest, &c.

Incised wounds, *cuts*, or *incisions* are produced by cutting instruments, and are free from contusion and laceration. *Punctured wounds* or *stabs* are caused by pointed weapons, as bayonets, lances, nails, thorns, &c. penetrating deep into the flesh. *Contused* and *lacerated wounds* are produced by the violent application of hard blunt and obtuse bodies to the soft parts; and under this head might be included *gunshot wounds*. *Poisoned wounds* are those which are complicated with the introduction of a poison into the wounded part. Wounds are more or less dangerous according to the extent of soft parts they involve, the parts they occur in, and the state of health of the individual wounded. In small wounds, unless poisoned, the system generally suffers little in consequence, but when a large amount of soft parts are injured, symptoms of fever come on from twenty to thirty hours after the receipt of the wound, which require attention on the part of the surgeon, as, according to the constitution and circumstances of the patient, the fever may vary greatly, and require opposite modes of treatment. This fever is called symptomatic, and in most cases is inflammatory.

Incised Wounds.—The effect of a cut on any part of the body is to produce a gaping space, from which blood in most cases issues, and pain is felt. The blood arises from the blood-vessels of the part having been cut through or wounded, and the pain is caused by a similar injury to the nerves. The amount of blood that issues from a wound, as well as the pain, will always depend upon the nature of the part which is injured. Some parts of the body are very copiously supplied with blood-vessels which have few nerves, and *vice versâ*. So that neither pain nor bleeding is constant according to the size of the wound. The immediate danger of incised wounds does not so much arise the skin about the wound cannot be kept too clean and free from impurities of every kind.

Punctured Wounds.—These wounds are dangerous from their depth, and the internal effusion of serum and blood which usually attend them. In consequence of this, these wounds are frequently followed by severe inflammation and suppuration. These results used to be attempted to be obviated by the practice of dilatation. This however is severe practice, and only justifiable in cases of the existence of a foreign body. Setons are recommended by the French surgeons for these wounds, but there are so many objections to them, that they are seldom used by surgeons in this country. Whether these wounds unite by the first or second intention, they require to be healed upon the same general principles as incised and gunshot wounds.

Contused and Lacerated Wounds.—These result from the collision of blunt, obtuse, hard bodies, being forcibly driven against the living textures. Although these wounds may occur independent of gunshot, it is in the class of wounds called gunshot that the best examples of lacerated and contused wounds occur. The rapid introduction of powerful machinery into the manufactures of this country renders contused and lacerated wounds of very frequent occurrence in our large towns. In these wounds there is seldom much bleeding, arising from the coats of the arteries becoming twisted and doubled up by the force of their retraction. They are much more liable to have foreign bodies in them than incised wounds. Such wounds seldom unite by the first intention, but in their treatment this object should always be kept in view, as frequently portions of the wound may be induced to unite. During suppuration and granulation, the same plan of treatment should be pursued as when these processes occur in incised wounds. The constitutional symptoms arising from these wounds are generally more severe than from any others, and require attention. Symptomatic fever must be treated according to the same general principles laid down for the treatment of fevers. [FEVERS.] Another consequence of these wounds is that dreadful state of the nervous system called tetanus [TETANUS], which often resists all kinds of treatment.

Poisoned Wounds.—The principal forms of this class of wounds seen in this country arise from the bites of rabid animals, pricks and cuts received in dissection, and the bites of vipers and the stings of insects. The bites of rabid animals are unfortunately too common, and often in this country require the attention of the surgeon. When the poison is introduced into the system it produces the fearful disease known by the name of hydrophobia, for which medical science has not hitherto found a remedy. [HYDROPHOBIA.] Where persons have been bitten by cats, dogs, or wolves in a rabid state, the wound should be immediately excised and the nitrate of silver (lunar caustic) applied to the wound.

Dissecting Wounds.—Under this head may be included not only the punctures and cuts to which medical men are exposed in the examination of the dead human body, but all those wounds after which ill consequences ensue, in which there is reason to suppose some poison generated in an animal organisation has been introduced into the system. It is still sometimes discussed in books on surgery, as to whether the effects following these wounds are produced by a peculiar poison or are only the result of a slight wound in a constitution predisposed to disease. The frequency of the ill effects of these wounds amongst medical men, as compared with other classes of persons, equally liable to pricking and cutting their fingers, must decide this question in favour of the existence of a poison. It is not however, as is generally supposed, that putrescent bodies and those advanced in decomposition are most injurious, for it is generally found that the worst consequences follow wounds from recent bodies, especially of persons who die of puerperal peritonitis. The consequences following these cuts are uneasiness and festering of the wounded part, the absorbent glands up the arm become inflamed, there is pain felt in the arm, and in the glands of the axilla; these symptoms are attended with more or less fever, and generally great anxiety. These symptoms sometimes increase, the cellular tissue of the arm and side becomes inflamed, abscesses form, and the patient sometimes dies from the fever or subsequent exhaustion. This disease is principally confined to medical men, and much difference of opinion has existed as to its treatment. Formerly tonics, wine, and brandy were administered, and active means taken to destroy the poison by caustic potash, liquor ammoniæ, nitric acid, &c.; but at the present day there is a general opinion in favour of mild antiphlogistic treatment, and having recourse only to tonics and wine when the symptoms seem to require it. Leeches, bleeding, purgatives, antimonials, and opium constitute the chief features of the treatment in the early and inflammatory stage. The application of lunar caustic, a solution of alum, and other things have been recommended immediately after the receipt of the wound, but, after some considerable experience, it may be doubted if these things prevent the absorption of the poison. At any rate if any good is to be done the application must be immediate.

Bites of Venomous Snakes.—These are frequently fatal in tropical climates. The only snake that is to be feared in Great Britain is the viper. Its bite however is seldom fatal except where some peculiar state of the constitution is favourable. Immediately on the receipt of the bite a pain and a burning sensation are felt in the part, which are followed by rapid swelling and a livid discoloration of the part. The constitution becomes affected also rapidly, and there is giddiness, extreme prostration of strength, depression of spirits, faintness, syncope, a small quick irregular pulse, difficulty of respiration, profuse cold clammy sweats, confusion of vision, headache, vomiting of bilious matter, a general yellow tinge of the skin, and a great pain about the navel. These symptoms are observed in greater or less degree to follow the bites of most venomous snakes. The bite of some of the snakes of Africa and America is certainly fatal, and persons die in a few hours after receiving the wound.

In the treatment of cases of bites from snakes, the first object should be to endeavour to prevent the passage of the poison into the system. Various modes are adopted for fulfilling this intention. The most effective is the immediate excision of the part. This will hardly be required after the bite of the British viper, as it seldom proves fatal, but it is frequently the only remedy with regard to tropical snakes. The application of the tourniquet or a ligature above the wounded part has been recommended, also the application of cupping-glasses. These remedies however do not extract the poison, and only arrest its effect. The application of caustic may in some instances have the effect of destroying the poison. Various local applications have had a great reputation for their prevention of the effects of the poison of snakes, but none of these seem entitled to any consideration. The treatment of the constitutional symptoms consists in the administration of stimulants: of these ammonia is preferred. It is the basis of the *Eau de luce*, a remedy once very popular in the bites of snakes. Mr. Ireland, whilst in the West Indies as a surgeon to a regiment, employed arsenic in doses of one grain as a remedy against the effects of the bite of the *Coluber carinatus*. In South America, the plant they call Guaco is said to have a very beneficial effect. Pöppig in his 'Reise,' has collected all the evidence which he could procure of the value of Guaco in these cases, but this is far from being satisfactory as to the value of the remedy. Cases from the bites of rattlesnakes and other poisonous serpents have occurred in this country, as these reptiles are often brought over here for the purpose of exhibition. A man died a few years since from this cause in St. George's Hospital.

Wounds of particular parts of the Body.—When any of the viscera of the body are wounded, questions frequently arise as to the treatment, which can hardly be answered by general principles; hence the wounds of particular parts of the body require consideration. Wounds of the head are frequently accompanied with concussion and compression requiring a modification of the treatment. Wounds of the scalp are also frequently attended with severe inflammatory symptoms, and no injuries of the body require more attention and close watching than these. Of all wounds which the surgeon is called on to treat, those of the throat are perhaps the most common, and require the most prompt attention. These wounds are generally the result of attempted suicide, and vary in extent according to the greater or less determination of the individual, as well as the edge of the instrument used for effecting the wound. The first thing to be attended to in these cases is to arrest the hæmorrhage, which must be done by placing ligatures on the wounded arteries.

When the trachea is opened, the entrance of blood into the lungs should be avoided as much as possible, as its existence there as a foreign body may bring on inflammation of the lungs. When a wound occurs in the larynx above the rima glottidis, every attention should be paid to removing anything that may irritate the glottis or prevent the free passage of air to the lungs. When the œsophagus is wounded, all the food of the patient should be administered by means of a tube passed through the mouth, nostrils, or the wound. It is sometimes the case that a surgeon sent for to a cut-throat will attempt immediately to bring the edges of the wound together by sutures. If this be done, the chances are that the patient will die of suffocation as soon as this is effected. When the bleeding has ceased, an attempt should be made gradually to bring together again the disunited parts. This is frequently done with the most perfect success, and sometimes the very worst cases of cut-throat will recover. It will however generally require great skill and attention on the part of the surgeon to meet all the difficulties that will arise in the treatment of cases where so many important organs are involved.

Wounds of the chest become dangerous when they involve the viscera of the thorax, and several important questions arise out of the nature and extent of these wounds. The most important complications of these are, 1. The entrance of foreign bodies into the cavity of the thorax; 2. The injury of one or more of the intercostal arteries; 3. The protrusion of a portion of lung from the wound; 4. The occurrence of emphysema from the wounding the lungs; and, 5. Extravasation of blood in the cavity of the thorax. Wounds of the *abdomen*, when superficial, require the same treatment as wounds generally. In penetrating wounds of the abdomen, there is always great danger of the occurrence of peritonitis, which requires watching on the part of the surgeon. In cases where there is protrusion, the same general treatment will be required as for hernia. [HERNIA.]

(Cooper's *Dictionary of Surgery*; Cooper's *First Lines of Surgery*; Cooper's, Sir Astley, *Lectures on Surgery*; Liston's *Elements of Surgery*.)

WOUVVERMAN, PHILIP, one of the most popular of the Dutch painters, was born at Haarlem in 1620, and received his first instructions in his art from his father, Paul Wouvverman, an obscure historical painter. He was instructed also by John Wynants of Haarlem, but his style was quite original, and was indebted little if at all to the works of his instructors. Wouvverman lived always at Haarlem, and he is generally considered and reported to have been one of those unfortunate painters who depended entirely upon the liberality of picture-dealers, and to have made his patrons rich while he lived in poverty. This does not however agree with the account of Houbraken, who states that Wouvverman's pictures rose immensely in value after his death, but that he was nevertheless a fortunate painter; and, in corroboration of the latter part of his assertion, he states that he gave his daughter 20,000 florins (1660*l.*) upon her marriage with the painter of flowers and still life, Hendrik de Fromantjou; but he gives this upon no better authority than private information. D'Argenville states, on the contrary, that Wouvverman was occasionally in great want, that he had much difficulty in supporting a large family, and that there can be no truth in Houbraken's report that he gave his daughter 20,000 florins dowry.

Wouvverman died in 1668, aged 48, and he was so disgusted with his want of success as a painter, that he burned, shortly before his death, all the studies he had made during his life, for fear that a son who had a disposition for painting should be induced by the facilities they might offer to follow the same profession. This son afterwards entered the order of the Carthusians. Another and a less charitable reason assigned for this destruction is, that he feared they might fall into the hands of his brother Pieter Wouvverman, who painted similar subjects with himself; a third account is, that the designs and studies which he burned were not his own, but principally Pieter Laer's, and that he destroyed them that it might not be known how much he had made use of the labours of others. None of these stories may be true, but they at least show that Wouvverman, like many other men of genius, had his foes as well as his friends. Wouvverman must unquestionably be reckoned among the most masterly of painters that ever lived, unless mastery consists in something besides fully accomplishing the proposed end. His subjects, though always treated in the same style, present considerable variety both of scene and action, yet he seldom if ever chose a subject which did not admit of the introduction of one or more horses, animals which he painted with unrivalled skill in his small size. It is a common notion that he never painted a picture without introducing a white or a grey horse into it. That he very often painted such a horse is certainly true, but that he never painted a picture without introducing one is most probably incorrect.

His subjects are generally travelling, road-side, hunting, fighting, or plundering scenes; and in skies, in foliage, and in the foregrounds, both in composition and colouring, which is always remarkably transparent, he leaves nothing to be wished for, and has had few rivals, and perhaps no superiors, in the same style of works. His figures also, of which he was by no means sparing, are always admirably designed and coloured, and most appropriately introduced; they are also distinguished by the same rich transparency of colouring which characterises the landscape part of his pictures.

Wouvverman's pictures are very valuable, and, notwithstanding his short life, are very numerous: one or more specimens are in almost every good collection in the northern parts of Europe. Many however of his brother Peter's are attributed to him, but though very similar to Philip's, they are less transparent in colouring, and their horses are very inferior. He had another brother, John, who was a good landscape-painter. John died in 1666, and Peter in 1683.

(Houbraken, *Schouburg*, &c.; D'Argenville, *Vies des Peintres*, &c.)

WRAGBY. [LINCOLNSHIRE.]

WRANGEL, CARL GUSTAF, son of the Swedish general Hermann Wrangel, governor of Livonia, who died December 10, 1644, and more eminent than his father as a military commander, was born at Skokloster on Lake Mälarn, December 13, 1613. Sent abroad at an early age to acquire foreign languages, he passed a whole year in Holland, where he gained considerable insight into nautical matters and shipbuilding, which afterwards availed him in his capacity of admiral. Being taken into the service of Gustavus Adolphus, he was at the battle of Lützen (November, 1632) and was foremost among those who helped to secure the victory over the Imperialists, after the fall of that prince. From that period his rise was rapid, and he distinguished himself on many important occasions, first under Banier, then under Torstenson, the latter of whom dispatched him (1644) to the rescue of the Swedish admiral Clas Flemming, who was blockaded by the Danish fleet, after a severe engagement with them. Flemming, being mortally wounded, gave the command of the Swedish fleet to Wrangel, who conducted it in safety to Stockholm. He afterwards joined the Dutch, and obtained a complete naval victory over the Danes at Femern, made himself master of Bornholm, and would have taken possession of all their other islands, had not the treaty of Bræmsebro put a stop to hostilities. It was about this time that he succeeded Torstenson, then disabled by his age and infirmities, in the command of the Swedish army in Germany, where he distinguished himself by a series of successes till they were terminated by the peace of Westphalia. These services obtained for him both honours and rewards; and when Christina's successor, Charles Gustavus, undertook an expedition against Poland, he gave the command of the fleet to Wrangel, who blockaded Danzig. After that he signalised himself against the Danes, made a descent upon Jutland, and took the fortress of Fredriksudde (1657), which action gave the Swedes a decided advantage, and obtained for himself the dignity of high admiral. He next took the castle of Cronenborg, after a siege of three weeks. In the same year (1658) he obtained a victory over the Dutch admiral Opdam, who had come to the assistance of the Danes, and took some of the Danish islands. On the peace of 1660 he was raised to the dignity of grand-marshal of Sweden, and generalissimo, and also appointed by Charles Gustavus one of the guardians to his son Charles XI. In 1675 he undertook the command of the Swedish troops in Pomerania, but was then so disabled by age and infirmities, that he could do very little personally, being the greater part of the time confined to his bed.

and was therefore at some distance from the army during its reverses at Havelberg and Fehrbellin, in the June of that year. He accordingly retired to his estate in the isle of Rügen, where he was residing when an alarm being given of the approach of some enemy's vessels, he could not be prevented from proceeding to the spot to ascertain the danger. His exertion upon that occasion cost him his life, for it proved too much for his bodily strength, and he died in consequence of it, in July, 1676, leaving the reputation of one of the bravest and most skilful commanders, both by sea and land, that Sweden had ever possessed.

(*Biographie Universelle.*)

WRANGLER. In old times the word Wrangle was used in the universities in the sense of 'to dispute publicly,' that is, to defend or oppose a thesis. The verb has gradually acquired a meaning of reproach (being made to imply uncivil and indecorous opposition), which it had as early as the time of Shakspere. In the 'Taming of the Shrew' the teacher of music says to the scholar—

> '*Wrangling* pedant, this is
> The patroness of heavenly *harmony*.'

The substantive *Wrangler* is hardly ever used, except as significative of a person who has passed the examinations for the Bachelor's degree in the university of Cambridge (the word is unknown in Oxford) with such credit as to have had his name inscribed in the highest list, or list of wranglers. Of these the first in merit is the *Senior* Wrangler: but persons not accustomed to the phraseology of the University are apt to confound Wrangler with Senior Wrangler, that is, to imagine that any one of their friends who may have obtained a wranglership must necessarily be the first man of his year. The second list is that of *Senior Optimés*, as they are called, and the last that of *Junior Optimés*. All who are in these three lists (which are collectively called the Tripos) are said to take the Bachelor's degree *with honours*, or to *go out in honours*; the remainder, who are called the οἱ πολλοί, abbreviated into 'the Pol,' though they equally take the Bachelor's degree, are not supposed to be *honoured*. But in point of fact, the last of the Junior Optimés, or the last on the list of honours, has always been considered an unfortunate person, and the name of *the wooden spoon** has long been attached to his place. It is not as if all were examined together, and the honoured were selected out of the whole list: those who wish to go out in honours declare their intention and are examined separately; so that it frequently happens that the last of the honoured graduates is a person of very inferior attainments to many at the head of the unhonoured multitude. With regard to the facetious terms current in the universities, it should be known that all the seniors, the heads of houses, professors, &c. generally adopt, in course of time, the nicknames invented by undergraduates, which become therefore real and serious denominations. From the vice-chancellor to the freshman of yesterday, the last of the honoured is the wooden spoon: and he must be a formal man (a 'regular Don' the undergraduates would call him) who, in speaking of the 'previous examination' as it is styled in the grace of the Senate which established it, should use those words instead of 'the little go,' a term which was borrowed from the Oxonians as soon as the grace was passed.

There is no history extant of the original introduction of the terms wrangler, senior optimé, and junior optimé. Huber, whose history of our universities has just been translated by Mr. Newman, says that every attempt he has made to unravel the skein of university technicalities has made him giddy with headache. A Cambridge man however finds no difficulty in seeing how the word was used, as applied to the manner in which an examination (not a public disputation) is passed. The examination which takes place in January, and at which a young man is said to 'take his degree' (because in fact he then does all that will be asked of him, the rest having degenerated into mere form), is not an examination for the B.A. degree, but for the right of being admitted to perform the disputations necessary for a degree. All degrees were originally gained by disputations: the substitution of an examination, to see whether the candidates were fit to dispute, is a thing of comparatively modern times. The vice-chancellor, when the examination is over, admits the candidates, not to the Bachelor's degree, but 'ad respondendum quæstioni,' and the person thus admitted is called a questionist. The form of asking some trifling question, or keeping a mock act [ACT], is afterwards performed between the questionist and the *Father* of his college, which is the name given to one of the fellows whose duty it is to present the candidates of his college to the vice-chancellor. On the Thursday after Midlent Sunday the vice-chancellor declares all the questionists (who in the interval have borne the name and assumed the dress of Bachelor of Arts) 'actualiter esse in artibus baccalaureos.' The term wrangler then must imply one who is held more than usually qualified to proceed to the disputations which were once the practical test of his fitness for the degree.

The Tripos lists are given in the Cambridge Calendar from 1747 downwards: but the wranglers and senior optimés form one list till 1752 inclusive. It is said that the regular order of previous years cannot be ascertained, as the proctors were in the habit of making honorary Senior Optimés, and placing them in the list at pleasure.

WRASSE, the familiar English name of a number of beautiful fishes inhabiting the rocky parts of the coast, and belonging to the genus *Labrus* of Linnæus, and family *Labridæ*. They are prickly-spined hard-boned fishes, with oblong scaly bodies and a single dorsal fin. The spines of their fins appear bifid from terminating in membranous shreds, which extend beyond their tips: their lips are large, double, and fleshy; and their teeth strong, conical, and sharp.

The British species of Wrasse belong to three subgenera of *Labrus*, viz. *Labrus* properly so called, the species of which have the margin of the preopercle entire, the cheeks and opercle scaly, and the first dorsal fin-spines not elongated; 2, *Julis*, in which the first dorsal spines are lengthened, and the head is entirely smooth and scaleless; 3, *Crenilabrus*, in which the preopercle has a denticulated margin, and the cheeks and opercle are scaly.

The wrasses are extremely variable in colour, many of the species presenting the most vivid hues—vermilion, orange, blue, green, and bright yellow being common colours in the genus. These colours are most beautiful in spring, just before the spawning season. They frequent the crevices of rocky shores, living among the larger seaweeds, and feeding on crabs and other crustacea. As articles of food they are not much valued in Britain, their flesh wanting firmness and flavour. In the Mediterranean however they are constant ornaments of the fish-market. Some species grow to eighteen inches in length. They take a bait freely.

The following are natives of the British Seas:—1, *Labrus maculatus*, Bloch, the Ballan Wrasse, inhabiting chiefly the eastern coast, but also found in the Irish Sea; 2, *Labrus lineatus*, Don, a doubtful native; 3, *Labrus pusillus*, Jenyns, the Corkling, our smallest species, being only four inches in length; 4, *Labrus vetula*, Bloch, a rare species, observed by Yarrell and Jenyns; 5, *Labrus variegatus*, Gmelin, a large and not uncommon kind; 6, *Labrus trimaculatus*, Gmelin, a beautiful red fish, with three black spots on each side of its back; 7, *Labrus comber*, Gmelin, observed by Pennant, and since by Mr. Couch, and somewhat doubtful as a true species; 8, *Julis Mediterraneus*, one of the most beautiful of fishes, extremely rare as British, and probably only a straggler; abundant in the Mediterranean, where it is common on muddy ground in seven fathoms water, living among seaweed; 9, *Crenilabrus tinca*, the Gilthead, a common and handsome fish, especially abundant in the Irish Sea, along with, 10, *Crenilabrus cornubicus*, which is possibly only a variety of it; 11, *Crenilabrus gibbus*, known only from the description of Pennant, who found it in Anglesey; 12, *Crenilabrus luscus*, first observed as British by Mr. Couch; 13, *Crenilabrus rupestris*, found in 1836 by Dr. Johnston at Berwick; and, 14, *Crenilabrus exoletus* of Linnæus, an uncommon species.

(See Yarrell's *British Fishes* for figures of all these names.)

WRAY, ROBERT BATEMAN, an engraver of gems, was a son of the Rev. William Wray, rector of Newtontony in Wiltshire, and afterwards vicar of Broadchalk in the same county, where Robert Bateman Wray was born on the 16th of March, 1715. Both on the father's and the mother's side he was allied to some of the best families in the county. He was fourth in descent from Sir William Wray of Glentworth, in the county of Lincoln, Bart., who was son of Sir Christopher Wray, lord-chief-justice of England. His mother, whose maiden name was Byng, was granddaughter of Dr. Byng, rector of All Cannings, an ancestor of the Lords Torrington, and was connected with the St. Los and the Hydes of Wiltshire, to which latter family belonged the celebrated Lord Clarendon. By this descent he was allied with the late Sir Charles Wilkins. [Wilkins.] On the death of the Rev. William Wray, which happened in 1724, the widow and her young family went to reside at Pottern in Wiltshire, where her brothers, Edward and Thomas Byng, then lived. Edward was a portrait-painter, who had been a pupil and became an assistant of Sir Godfrey Kneller, with whom he continued to reside till the death of that artist in 1723. Sir Godfrey showed his confidence in Byng's abilities by having directed in his will that the portraits which his sitters had contracted for should be finished by Byng.

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* Since the institution of the classical honours, to which mathematical ones are a necessary preliminary at Cambridge, the wooden spoon has frequently been a distinguished classic, who did not need nor wish for anything except the formal place on the mathematical list, which is required previously to competition for a place in the classical one.

During the years occupied in his education Wray learnt, under the tuition of his uncle Edward, to draw the human figure with grace and precision; and acquired such a taste for the fine arts, that when it became necessary for him to make choice of a profession, he selected that of seal-engraving, an art which at that time was scarcely advanced beyond the delineation of heraldic figures, and was open therefore to great improvement, offering some encouragement to his ambition, as well as the promise of an honourable maintenance. To learn the mechanical part of the business he was placed under a seal-engraver, named Gosset, residing in Berwick Street, Soho, where his rapid progress excited a degree of jealousy that led to a speedy dissolution of the connection. Although Mr. Wray began by engraving the types of antient heraldry as sculptured on the tombs and seals of the middle ages, his innate taste, fostered by the society of the painters whom he met at his uncle's house, and stimulated by a contemplation of the works of the antients, soon prompted him to a nobler field of exertion, and to endeavour to imitate, if he could not rival, the productions of the Greek masters. Thus, whilst he continued to prosecute, or at least to give the finishing touches to the common works required by his employers, his choicer hours were devoted to the delineation of nature, and especially of the human figure, until he had succeeded in representing some of the most distinguished personages of English history, or remains of antient sculpture, or the ideal designs of modern contemporary artists.

Before Mr. Wray had completed his twenty-fourth year he had executed the front face and one of the profiles of Milton, and in another the second profile. Mr. Tassie, of Soho Square, who had recently invented a method of copying antient engraved gems, was so much impressed with the merits of Mr. Wray's works of the same kind, that he sold copies of them together with those of his own collection. Mr. Wray's name thus became extensively known, and his original productions were sought after with avidity even in Italy. At a subsequent period, when Henry, eighth Lord Arundel, visited Rome to collect works of art for the purpose of decorating his new mansion of Wardour, he was surprised to hear of the fame of a man who was then residing within a few miles of his own gates in England; for in the year 1759, after a residence of more than thirty years in London, circumstances had induced Mr. Wray to quit the metropolis, and to fix himself at a house in Church Street, Salisbury. To an artist of the celebrity which he had now acquired, locality of abode was of little moment.

It was at Salisbury that he produced some of his best works, and those on which his reputation with posterity will chiefly depend. The difficulty of engraving figures on hard stones in the manner of the antient Greeks is shown by its rarity in modern times; and although it has been cultivated in Italy with great success, in England Wray has scarcely had a rival. If some of the Italians have surpassed him in facility of execution, and in the number of their works, none have been his superiors in expressing the affections, and in female grace and beauty. That Wray never acquired more than a decent competence by his talents will be easily imagined, when it is stated that the head of the dying Cleopatra, which he esteemed the most perfect, as it was the most difficult of his works, was sold to the duke of Northumberland for 20*l*. But in no branch of art were the labours of native artists very liberally rewarded in those times, except in some rare instances.

The following are the most remarkable of Mr. Wray's works, and they are here placed in the order in which their merit is supposed by some competent judges to rank:—1, Dying Cleopatra; 2, Medusa's Head, a copy from the Strozzi Medusa; 3, a Magdalen; 4, Flora; 5, Madonna; 6, ideal female head; 7, ditto; 8, ditto; 9, Milton, front face; 10, Milton, profile; 11, ditto; 12, Cicero; 13, Pope; 14, Shakspere; 15, Zingara; 16, Antinous.

Mr. Wray died at Salisbury, in the year 1770, in the sixty-fifth year of his age.

WRAY. [Ray.]

WRECK. [Shipwreck.]

WREKIN. [Shropshire.]

WREN.—The Wrens form a group of small insessorial birds.

Linnæus placed the true Wrens among his *Motacillæ*.

Meyer arranged them in the third suborder, *Subulatæ*, of his fifth order, *Oscines*.

Cuvier gave them a place under his *Bec-fins* (*Motacilla*, Linn.), with the generic names of *Regulus*, Cuv., and *Troglodytes*, Cuv.

They appear in the method of Vieillot as members of his twentieth family, *Chanteurs*, and in his second tribe, *Anisodactyli*.

M. Temminck places them under his eighteenth genus, *Bec-fin* (*Sylvia*, Lath.).

Their position in the arrangement of Mr. Vigors is noticed in the article Sylviadæ.

M. Latreille makes them members of the second family, *Dentirostres*, of his second order, *Passereaux*.

The position assigned to the subfamily *Troglodytinæ*, or Wrens, by Mr. Swainson, is between the *Sittinæ* (Nuthatches) and the *Buphaginæ* (Oxpecker), in the family *Certhiadæ*.

The following is his character of the *Troglodytinæ*:—Feet with the tarsus longer than the hind toe, which is but slightly developed. Lateral toes nearly equal, and cleft to their base. The tenuirostral division.

The genera which Mr. Swainson arranges under this subfamily are thus characterised:—

Platyurus, Sw.

Generic Character.—Bill moderate, straight, compressed, very high at the base of the culmen, which is there slightly gibbous, and divides the frontal feathers. Upper mandible distinctly notched. Nostrils very large, basal, protected by a scale-like convex membrane. Frontal feathers stiff, setaceous, narrow, and sometimes reflected forwards. Wings remarkably short and rounded, very convex. Tail (typically) lengthened and graduated; the feathers very soft and broad. Feet very large. Middle toe as long as the tarsus; lateral toes equal, and cleft at their base; hind toe shorter than the tarsus. All the claws compressed, and but slightly curved; the three anterior small, the posterior twice as long. (Sw.)

Locality, South America.

Example, *Platyurus corniculatus*.

Thriothurus, Vieill.

Generic Character.—Bill lengthened, much longer than the head, compressed, straight, or very slightly curved: the tip of the upper mandible slightly reflexed, and obsoletely notched; the base rather broad. Wings and tail moderate, rounded. Feet large, strong. Tarsus lengthened, much longer than the hind toe, but equal to the middle one. Lateral toes equal. Hind claw nearly double the size of the anterior ones: all the claws fully curved. (Sw.)

Locality.—America.

Example, *Thriothurus ludovicianus*.

Troglodytes, Linn.

Generic Character.—Bill short, slender, compressed, like that of a *Sylvia*. Both mandibles entire. Wings very short and rounded. Tail short, narrow, rounded. Legs moderate. Toes long; middle toe as long as the tarsus; lateral toes equal; hinder toe shorter than the tarsus. Anterior claws small, equal; hinder toe shorter than the tarsus. Anterior claws small, equal; posterior claw much larger: all the claws broad and fully curved. (Sw.)

Localities.—Europe; America.

Example, *Troglodytes Europæus.*

Lochmia, Sw.

Generic Character.—Bill moderate, nearly straight; the culmen gently inclining towards the tip, which is entire; the gonys straight. Wings short, rounded; the first and second quills graduated. Tail soft, short, slender, rounded; the tips ovate, but, with the shaft, forming a fine soft point beyond the webs. Tarsus lengthened. Middle toe longest; lateral toe much shorter, and very unequal; the outer longest, and slightly connected to the middle; inner toe shortest, and cleft to the base; hinder toe shorter than the tarsus. All the claws slightly curved. (Sw.)

Locality.—Brazil.

Example, *Lochmia squamulata.*

Tichodroma, Ill.

Generic Character.—Bill very long, slightly arched, cylindrical; the base angulated; the tip depressed. Nostrils naked. Feet long and slender. Exterior toe united to the base of the middle; hinder toe with the claw very long. Wings lengthened, broad; the first quill spurious, the second and third graduated, the three next longest. Tail short, round, broad, and soft. (Sw.)

Locality.—Europe.

Example, *Tichodroma muraria.* [CREEPER.]

Mr. Swainson arranges the *Golden-crested Wrens*, or *Gold-crests*, as he terms them, among the SYLVIADÆ.

The Prince of Canino and Musignano, in his 'Birds of Europe and North America,' places the genus *Troglodytes*, of which he records one European and three American species, next to the genus *Certhia*, in his subfamily *Certhinæ*; and he makes *Regulus*, of which he notices three European and three American species, the first genus of his subfamily *Parinæ*. *Regulus*, in the Prince's arrangement, is immediately followed by *Parus*.

The *Troglodytinæ* of Mr. G. R. Gray form the seventh and last subfamily of his family *Certhidæ*, and comprise the following

Genera.

Rhinocrypta, G. R. Gray. *Menura*, Dav. *Pteroptochos*, Kittl. *Scytalopus*, Gould. *Microura*, Gould. *Merulaxis*, Less. *Thriothurus*, Vieill. *Campylorhynchus*, Spix. *Rhamphocænus*, Vieill., and *Troglodytes*, Cuv.

We proceed to illustrate this group by examples of the genera *Troglodytes* and *Regulus*.

Troglodytes.

Example, *Troglodytes europæus, Motacilla troglodytes*, Linn.

Description.—*Male.*—Upper parts brown, marked with very narrow transverse stripes, which are disposed on the top of the back; quills marked externally with alternate black and rusty spots; tail coverts and feathers striped transversely with black; above the eyes a narrow white band; throat and breast greyish buff or white; all the posterior parts brown, marked with white spots and black transverse stripes. Total length within four inches.

Female rather less than the male, with the tints more rusty and the transverse stripes less strongly marked.

This is the *Troglodyte*, *Roytelet*, *Beuf de Dieu*, *Berichot*, and *Roy Bertaud* of the French; *Reillo*, *Regillo*, *Rectino*, *Reatin*, *Fiorracino*, *Sericciolo*, *Re d'uccelli*, and *Sbuccafratte* of the Italians; *Nelle Konge* of Brunnich; *Schneekoning*, *Konickerl*, and *Zaunschlupfrel* of Kramer; *Zaun Sanger* of Meyer; *Haus und Waldzaunkönig* of Brehm; *Wren*, *Vraun* or *Ran*, *Cutty*, *Katy* or *Kitty Wren*, and *Kitty* of the modern British; *Dryw* of the antient British.

Geographical Distribution.—Northern and Central Europe. Iceland, Greenland. The Faroe Islands. Resident in Sweden. England, Wales, Scotland, and Ireland, Orkney and Shetland. Spain, France, and Italy. Smyrna. Trebizond.

Habits.—This familiar little bird, which has become sacred, like the robin, from the confidence which it shows in courting the neighbourhood of man, creeps about the hedges, making small flights, and in its search for insects generally entering the lower part of the hedge and working upwards. Like the robin, it will sing cheerily even in mid winter, but the frost and snow are sometimes too much for it, and the little creature perishes with cold, which however it avoids by roosting in warm cattle-sheds, for the sake of the animal heat of the inmates, and in other sheltered places.

The nest is placed variously, according to circumstances. Linnæus says 'nidificat sub terra,' and it has been sometimes found in a bank or old road. The materials generally vary with the situation. Thus if the nest be built against the side of a hayrick, hay is used; if against the trunk of a moss-grown tree, that moss is employed. It is large in proportion to the bird, and the shape is generally oval, the top being in the form of a dome and the entrance by a small hole at the side or sometimes at one end. Feathers generally form the lining. Seven, ten, and even more eggs, white, with a few pale red spots, but sometimes spotless, are here deposited, and about ten days suffice for hatching the brood, sixteen of which, it is asserted, have been seen in one nest, a large family for the diminutive parents to rear. But they are most assiduous in collecting food for their young, and though the incubation is short, the female sits very close, depending for her subsistence upon the male, who is in constant attendance on her. Insects and worms are their food.

The feathers in a wren's tail make a killing trout-fly in the early part of the season.

In the 'Portraits d'Oyseaux' (1557) the following quatrain appears under the cut of this species:—

> 'Cet oyselet, qu'on nomme Roytelet,
> Encontre l'Aigle à debat et querelle.
> Tousiours est gay, tant masle, que femelle:
> Et tousiours chante, aymant estre seulet.'

The first lines allude to the old fable of the enmity which was supposed to exist between the wren and the eagle.

The Wren.

Regulus.

Example, *Regulus cristatus, Motacilla Regulus*, Linn.

Description.—*Old Male.*—Upper parts of the body of an olive hue, slightly tinged with yellowish; two whitish transverse bands on the wings; feathers on the top of the head long, rather loose, of a bright orange yellow, approaching to a golden colour; on each side of the head a single black band extending to the occiput; feathers at the base of the bill, region of the eyes, sides of the neck, and lower parts ash-coloured, slightly shaded with rusty olive; quills and tail-feathers grey-brown, bordered externally with a colour inclining to olive and internally with whitish; iris deep brown; bill black; feet blackish. Total length about three inches and a half.

In the *Female* the crest, instead of being orange, like that of the male, is of a lemon colour; the black band which borders it laterally is less wide, and all the colours of the plumage are less vivid.

In the *Young* the loose plumes of the crest are green, approaching to olive: it is only after the first moult that the sexes are distinguishable.

Varieties.—Top of the head azure-blue: a less rare

ty has the head and part of the plumage whitish:
ıer has the crest of a livid yellow. (Temm.)
ographical Distribution.—M. Temminck states that
species is sufficiently common in all the countries of
pe up to the Arctic circle. It is an inhabitant of
ia, Siberia, Sweden, Norway, and Denmark, but from
more northern localities there appears to be a kind
tumnal migration to the more temperate parts down
ıe Mediterranean. It is fairly spread over England,
s, Scotland, and Ireland, and is found in Orkney and
land. It has been received from Trebizond. Edwards
ed on it as inhabiting many parts of Asia, and it has
seen in Japan.
is species is the *Roitelet* and *Roitilet huppé* of the
ch, and Pennant thinks, with reason in our opinion,
it is the *Soulcie* or *Soucie* of Belon; it is the *Regolo,*
ucelli col ciuffo, Reattino, and *Fior-rancio* of the
ans; *Kongsfogel* of the Swedes; *Fugle-Konge* of
nich; *Feuglegongen* of Walter; *Gekrönter Sänger,*
ner Zaunkoenig, Nordisches saffranköpfiges und
kopfiges Goldhanchen of the Germans; *Goldhannel*
Kramer; *Gold-crested Wren, Golden-crested Wren,*
len-crowned Wren, and *Kinglet* of the modern British;
igw and *Sywigw* of the antient British.
abits, Food, &c.—This beautiful and active little bird,
h is a constant resident in these islands, may be fre-
ntly seen busy among the branches, especially of some
or fir, running actively along and clearing away the
cts. It is far from uncommon round London; and if
observer approach cautiously and stand still, he may
h its motions within a very few feet without disturb-
t.
nnant says that he saw this bird suspended in the air
considerable time over a bush in flower, singing very
diously, but with a very weak note, not differing much
that of the Common Wren. Colonel Montagu states
a Golden-crested Wren, which had lost its mate and
r found another, continued to sing from May to the
of August. On the contrary, another of the same
ies, that took possession of a fir-tree in his garden,
ed its notes as soon as the young were hatched. This
family gave Montagu the opportunity of writing one
s most interesting descriptions of the habits of birds:—
When first I discovered the nest, I thought it a favour-
opportunity,' says Montagu, 'to become acquainted
some of the manners of this minute species, and to
avour to discover whether the male ever sung by way
nstructing the young ones. Accordingly I took the
when the young were about six days old, placed it in
all basket, and by degrees enticed the old ones to my
y window; and after they became familiar with that
tion, the basket was placed within the window, then
he opposite side of the room. It is remarkable that,
ough the female seemed regardless of danger from her
tion to her young, yet the male never once ventured
in the room, and yet would constantly feed them while
remained at the outside of the window: on the con-
, the female would feed them at the table at which I
and even while I held the nest in my hand, provided
nained motionless. But on moving my head one day,
e she was on the edge of the nest, which I held in my
, she made a precipitate retreat, mistook the open
of the window, knocked herself against the glass, and
breathless on the floor for some time. However, re-
ring a little, she made her escape, and in about an
after I was agreeably surprised by her return, and
would afterwards frequently feed the young while I
the nest in my hand. The male bird constantly
nded the female in her flight to and fro, but never
ured beyond the window-frame; nor did he latterly
appear with food in his bill. He never uttered any
but when the female was out of sight, and then only a
l chirp. At first there were ten young in the nest,
probably for want of the male's assistance in providing
, two died. The visits of the female were generally
ated in the space of a minute and a half or two
utes, or, upon an average, thirty-six times in an hour;
this continued full sixteen hours in a day, which, if
ally divided between the eight young ones, each would
ive seventy-two feeds in the day; the whole amounting
ive hundred and seventy-six. From examination of
food, which, by accident, now and then dropped into
nest, I judged from those weighed that each feed was
a quarter of a grain upon a medium; so that each young one was supplied with eighteen grains' weight in a day; and as the young birds weighed about seventy-seven grains at the time they began to perch, they consumed nearly their weight of food in four days at that time. I could always perceive, by the animation of the young brood, when the old one was coming—probably some low note indicated her approach; and, in an instant, every mouth was open to receive the insect morsel. But there appeared no regularity in the supply given by the parent bird; sometimes the same was fed two or three times successively; and I generally observed that the strongest got most, being able to reach farthest, the old one delivering it to the mouth nearest to her; and after each feed she waited a while to see if any *muted.*'

Mr. Yarrell remarks that the nest is placed under a branch of fir, and generally towards the end of the bough, being supported by two or three of the laterally diverging and pendent twigs, which are interwoven with the moss of which the outside of the nest is principally composed. This accords with our own general observations; but we have seen the nest, with young in it, in a tall yew hedge. Its most frequent lining consists of feathers. The eggs are pale reddish white.

The cut of the '*Soucie,*' in the 'Portraits d'Oyseaux,' has the following quatrain beneath it:—

'De tous oyseaux l'oyseau plus plein de ioye
Est la Soucie hantant sur les chemins,
Et sur les choux et herbes des iardins.
Il est petit plus qu'autre que lon voye.'

Golden-crested Wren.

This bird must not be confounded with the rarer *Fire-crested Wren, Regulus ignicapillus, Roitelet triple bandeau* of Temminck, which is also to be seen in Britain.

WREN, MATTHEW, bishop of Ely, was the eldest son of Francis Wren, a mercer in London, where he was born, in the parish of St. Peter's Cheap, on the 3rd December, 1585. He was admitted of Pembroke Hall, Cambridge, on the 23rd June, 1601; was elected fellow on 9th March, 1605; and took his degree of M.A. on 2nd July, 1608. He entered into holy orders in 1610. In 1614 he was presented with the rectory of Teversham in Cambridgeshire. In 1621 he was appointed chaplain to Prince Charles. He attended the prince in his strange journey into Spain in 1623, and having thus had opportunities possessed by scarcely any other churchman of ascertaining the opinions and feelings of him who was afterwards to be king, he acquired an influence with the clergy, which made him one of the main causes of the calamities which soon afterwards overlook it. In 1625 he was made dean of Windsor and Wolverhampton, and in 1629 one of the judges of the Star-Chamber. He attended Charles I. on his visit to Scotland in 1633, but he failed to sound the religious feelings of the people of that country so accurately as he had done those of his royal master. In the following year he was made bishop of Hereford, and translated on 5th December, 1635, to Norwich, and on 5th May, 1638, to Ely. He was employed in the construction of the Scottish Service-Book, or Liturgy, the reading of which in Edinburgh in 1637 occasioned those riots which were followed by the subscription of the Covenant, and finally led to the great civil war. On the 19th December, 1640, Hampden was sent by the Commons on a message to the Lords to acquaint them that there were 'certain informations of a high nature' against Wren, 'concerning the setting up of idolatry and superstition in divers places, and exercising some acts of it in his own person, with divers other matters of great importance; and that they have information likewise that he endeavours an escape.' An answer was returned, that he had been ordered to find bail in 10,000*l*. to attend the judgment of parliament. According to a paper preserved in the 'Parentalia' of his nephew, the articles of impeachment intended to be presented against him related to such charges as the railing in of the altar, kneeling at the sacrament, and other matters of ceremonial, which afterwards became part of the uniform observance of the church of England. There is no doubt however that the real ground of the charge against him was the despotic enforcement of his own views in clerical matters, for Clarendon, who praises his learning, says he was a man 'of severe sour nature,' and charges him with having so vexatiously enforced the discipline of the church of England against the Flemish refugees and other dissenters, as to drive many of them from his diocese. The articles of impeachment were not pursued, but he remained a prisoner in the Tower till the Restoration of 1660, when he was replaced in his see. He framed the form of prayer used on the 29th of May in commemoration of the Restoration. He died on the 24th April, 1667. He built the chapel at Pembroke Hall, Cambridge, of which his nephew Sir Christopher Wren was the architect. Of a few doctrinal and controversial pamphlets which he left behind him, the titles will be found at length in the 'Biographia Britannica.'

WREN, MATTHEW, eldest son of Bishop Wren, was born at Cambridge, in 1629. He was for some time a member of parliament. He was also secretary to the earl of Clarendon, and afterwards to the duke of York. He died in 1672. Matthew Wren was the author of 'Considerations on Mr. Harrington's Commonwealth of Oceana, restrained to the first Part of the Preliminaries,' London, 1657, 8vo., published anonymously; 'Monarchy asserted, or the State of Monarchical and Popular Government; in Vindication of the Considerations upon Mr. Harrington's Oceana,' Oxford, 1659, 8vo.; London, 1660, 8vo.; 'On the Origin and Progress of the Revolutions in England,' in Gutch's 'Collectanea Curiosa,' vol. i., 1781. (Watt's *Bibliotheca Britannica*.)

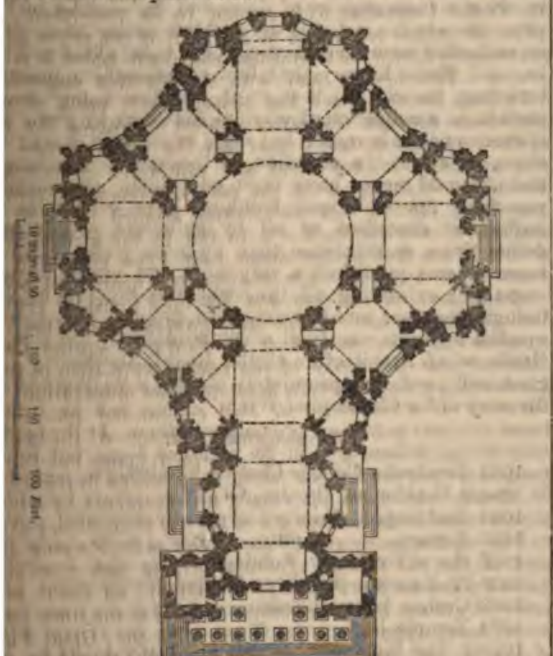
WREN, SIR CHRISTOPHER, born at East Knoyle, Wilts, October 20th, 1632, was of good family, being the son of Dr. Christopher Wren, chaplain in ordinary to Charles I., and dean of Windsor; and nephew to Dr. Matthew Wren, successively bishop of Hereford, Norwich, and Ely; and from the former of these he seems to have inherited a taste for scientific and literary studies, that of architecture included. That he was initiated into architecture by parental example is highly probable, since he was not educated professionally to the practice of it, but applied himself to it only theoretically, and might never have distinguished himself in it if peculiar circumstances had not led to the exercise of his talents.

Though in his childhood of weak bodily constitution, [illegible] was of a most precocious mind, and that too as [illegible] [illegible] the abstruser paths of science and [illegible] a most particular [illegible] At the age of thirteen he invented an as[illegible] a pneumatic engine, and another [illegible] These inventions [illegible] [illegible] was entered as gentleman commoner at Wadham College in his fourteenth year, the notice of Dr. Wilkins [WILKINS], and Seth Wood, Savilian professor of astronomy. A philosopher and mathematician of the age of sixteen was a phenomenon: and even before then he had been distinguished by his proficiency in anatomy, and had been employed by Sir Charles Scarborough as his demonstrating assistant. While at Oxford he associated with Hooke (whom he assisted in his 'Micrographia') and other scientific men, whose meetings laid the foundation of the future Royal Society. In 1653 he was elected a Fellow of All Souls College, Oxford.

By the time he was twenty-four he was known to the learned of Europe by his various theories, inventions, and improvements. In August, 1657, he was appointed to the professor's chair of astronomy at Gresham College, London, and three years after to that of the Savilian professor at Oxford, when he resigned the Gresham chair. On the establishment of the Royal Society soon after the Restoration, Wren contributed not a little to the reputation of that body. Thus far therefore he had attained to high eminence among his contemporaries, but it was such that he might have remained known only to a few, whereas at present his celebrity as an architect has swallowed up all his other titles to distinction. At that time his architectural genius had hardly dawned, and it was probably chiefly owing to his general reputation for scientific skill that he was appointed by Charles II., in 1661, assistant to Sir John Denham, the surveyor-general, and was commissioned in 1663 to survey and report upon St. Paul's Cathedral, with a view to its restoration, or rather the entire rebuilding of the body of the fabric so as to reconcile it with the Corinthian colonnade added to it by Jones. This scheme met with considerable opposition both from the clergy and the citizens, there being strong prejudices amongst the latter against destroying the old edifice; at least earnest wishes that the tower should be still preserved. Dissensions and protracted discussions and delay of course, were the consequence, and nothing was done. But if this undertaking seemed likely to be postponed indefinitely, if not to fall to the ground altogether, Wren had in the mean time been employed on some other buildings—the Sheldonian Theatre at Oxford (1664-9), and the Library and Neville's Court, at Trinity College, Cambridge. In the same interval, and during the squabbles on the subject of St. Paul's, he visited Paris (1665), where the works of the Louvre were then in progress, and he had begun to draw up some observations on the state of architecture in that capital, but he unfortunately never published or completed them. At the beginning of the following year he returned home, but found matters neither settled nor likely to be settled in regard to St. Paul's. At length the events and accidents by which architectural undertakings are so greatly controlled, put an end to all discussion and all perplexity as to retaining any part of the old fabric. Political events had frustrated Jones's plans for the Palace at Whitehall; an event of a different nature, most calamitous in itself at the time, happened most opportunely for Wren, since the 'Great Fire' of London not only decided that St. Paul's should be entirely rebuilt as one consistent whole, entirely of his own idea, but also opened an extensive field for his talents in various other metropolitan buildings. One immediate labour arising from the conflagration was to make a survey of the whole of the ruins, and a plan for laying out the devastated space in a regular and commodious manner, with wide streets and [illegible] at intervals. [LONDON, p. 112.] Yet so far was this plan from being adopted, that it was lost sight of altogether in rebuilding the city: the new streets rose up in that dense and intricate maze of narrow lanes which are now but slowly disappearing before modern improvements; and, worst of all, instead of the line of spacious [illegible] along the Thames, which Wren proposed, the river is entirely shut out from view by wharfs and warehouses in such manner as to render any scheme for improvement to any extent in regard to its [illegible] hardly practicable. It is not indeed to be wondered at that amidst such a scene of confusion, and under the pressure of immediate necessity, the citizens should have paid no regard to schemes of architectural magnificence; still it is to be regretted that they did not adopt some general plan providing for commodiousness in the first instance and for embellishment to grow up erwards by degrees and under more favourable circum- nces.

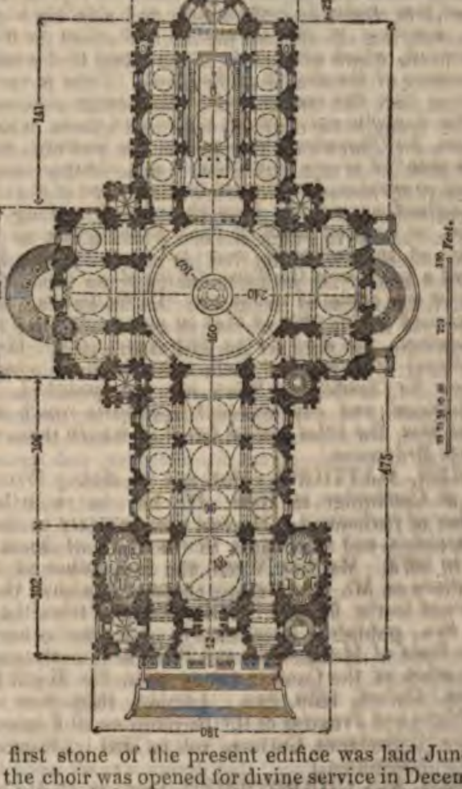
This frustrated in his idea for planning an entire city, l doomed to see his 'New London,' like Jones's White- l, among the things that might have been, Wren was npelled to confine his ambition within narrower limits, l to turn his attention towards individual edifices. iong the earliest of these were the Royal Exchange, stom-house (both since destroyed by fire and rebuilt), nple Bar, the Monument, and some churches, including t of St. Stephen's, Walbrook; all of which were erected 'ore St. Paul's was begun:—and previous to that great nt in his professional life, we may here record two in- ents in his private one: in 1672 he received the honour knighthood; and in 1774 married a daughter of Sir n Coghill, after whose decease he took for his second e a daughter of Viscount Fitzwilliam, an Irish peer; l by both these ladies he had issue.

All this time he had not been idle in regard to the in- ded cathedral, but had prepared various designs and dels. The one however which he himself was most citous to see adopted was set aside for that now exe- ed; and even there he was compelled to make several rations contrary to his judgment. Of this last, plans l other architectural drawings are so common that ost any description of it is superfluous, but it is not so h his own favourite project, which, though invariably rred to, has seldom been explained by any drawings; which account we here exhibit the plan as the clearest briefest description of it.



he composition is compact and simple, forming a dle general octagonal mass, surmounted by a cupola, extended on its west side by a portico, and a short e or vestibule within; and there is also a great deal of produced by the alternate curved sides of the main y of the edifice. Of this design one great recom- dation insisted upon by Wren was that there would be a single order; yet though this is true as regards ding supercolumniation or order *over* order, there ld in fact have been two *ordinances* (both Corinthian), rger one for the portico or west elevation, and one n a smaller scale (but raised to the same level of en- ature, by being placed on a lofty stylobate) in the elevations, which would have been surmounted only n attic and balustrade. Such a combination of two nances might perhaps have been objected to by some ather licentious, notwithstanding that there is ample iority for it in the works of Palladio and others of the ian school; but it would at all events have produced uresque variety, and the larger order of the portico ld have appeared the more imposing by contrast with other. It is further to be observed that that ordinance is kept distinct from the other by being confined to a separate elevation of the building. As to the interior, the parts are beautifully grouped together, so as to produce at once both regularity and intricacy, yet it does not seem by any means particularly well adapted for the Protestant service, there being no space for a collected congregation, except in the circular area beneath the dome, which could not be fitted up for such purpose without being further inclosed; whereby also in other respects the grandeur of the ensemble, as it shows itself in the plan, would have been greatly impaired.

The comparison of that first idea with the one afterwards adopted makes evident almost opposite modes of treatment both as to arrangement and proportions. While the first exhibits concentration and uniform spaciousness, the other is more extended as to length, but contracted in other respects, and the diagonal vistas that would have been obtained in the other case are altogether lost. It may be observed too that the nave, or western arm of the cross, is rendered apparently shorter than the eastern one, externally, being broken so as to form a second or western transept.



The first stone of the present edifice was laid June 21, 1675; the choir was opened for divine service in December, 1697, and the whole was completed in thirty-five years, the last stone on the summit of the lantern being laid by the architect's son Christopher in 1710. Taken altogether, the present St. Paul's is a truly glorious work—its cupola matchless in beauty; yet all noble as it is, the fabric will not bear to be rigidly scrutinized in the spirit of captious criticism; and of late years no little of such criticism has been brought to bear against it. Among other faults, it is alleged that its real form and construction are masked, the upper order of the side elevations being merely a screen concealing the buttresses and clerestory windows of the nave; also that the same is in a great measure the case with the cupola, the external dome being considerably loftier than the inner one, being so elevated chiefly for effect:—True; and that effect is most admirably accomplished. The last reproach is all the more inconsistent, because it has, if not proceeded from, been repeated by those who, while they censure St. Paul's dome as being larger than the interior actually required, not only tolerate but are in ecstasies with a Gothic spire—a feature built altogether for external effect, and quite useless as regards the interior of the structure, otherwise than as giving stability to the tower. Another charge which has now started up against Wren is that he was either ignorant or grossly negligent of the principles of ecclesiastical design—of 'symbolism,' 'spiritualism,' 'sacramentality,' &c. But Wren simply endeavoured to adapt his churches to Protestant congregations, and so far generally showed considerable skill, but it must be confessed very rarely any taste, or aught amounting to architectural character and style. Of his numerous churches in the city, very few indeed have any claims to notice for beauty of design. They are, almost without exception, in a heavy uncouth manner, chiefly marked by a number of large arched and small circular windows, the former of which appear little better than so many dismal gaps glazed in the most ordinary manner. There is nothing in any one of them to remind us of the architect of St. Paul's—nothing in their external design that will bear the slightest comparison with such exquisitely beautiful bits in that structure as the two semicircular porticos of its transepts, worthy models for church façades. Even in his campanili—the far-famed steeples of St. Bride's and Bow Church, there is little to admire except the mere general outline, for they are strange compounds of incongruous parts oddly put together, and not particularly elegant in themselves: the 'absurd steeple' of St. George's, Bloomsbury, has far more classical taste and dignity than those of Wren. The interior of St. Stephen's, Walbrook, has also been greatly overrated, for allowing all the merit claimed for it in regard to the dome and columns, the effect that would else be produced by them is sadly marred by the poverty and tastelessness of all the rest, and the spottiness occasioned by the mean little oval windows and others, which we might say produce a chilling and vulgar sort of light.

Indiscriminate admiration and praise of the works of a great artist, however unworthy they may be of him, are the corruption of criticism and taste; and among Wren's there are many in which no one would affect to discern any beauties, were it not for his name. They might be deducted nearly all without deducting an iota from his proud title to fame as the architect of St. Paul's. Almost all the rest that he did serves rather to encumber than to add anything to the glory derived from that single monument of art. It is the duty however of the biographical chronicler to notice what the mere critic would pass over; but instead of here specifying Wren's other performances one by one, we annex a chronological list of them to this article as more convenient for reference, and resume our biographical notice of the architect himself.

One work which would probably have not a little augmented his fame was a design for a magnificent mausoleum to the memory of Charles I.; yet though parliament voted 70,000*l.* for the purpose in 1678, the design was abandoned, and the money applied more conformably with the personal tastes of Charles II. Wren had been thwarted in his ideas for another monument, namely, the column so-called, which he had conceived very differently and very characteristically, the shaft being adorned with gilt flames issuing from the loop-holes; but no such pattern was to be found in the 'five orders,' therefore as 'the impotence of indecision ever resorts to precedent, and ignorance takes refuge in common-place,' that design was set aside for the very common-place affair which we now see. He had resigned the office of Savilian Professor in 1673; he accepted that of President of the Royal Society in 1680, and he also sat several times in parliament, but his numerous and important professional engagements left him little leisure for other pursuits or duties. Enjoying the favour of successive princes, he was employed by Queen Mary to complete the buildings at Greenwich, to be appropriated as a Royal Naval Hospital; and Wren's additions to that noble pile are well worthy of the architect of St. Paul's, although, by some strange caprice, less quoted as proofs of his genius than several of his inferior performances. In his additions to Hampton Court for William III. he was less fortunate; perhaps unfortunate in being controlled by the taste of the king. If it is not actually a blot upon his fame, as was his work at Windsor Castle, Hampton Court adds nothing to it, whereas he might perhaps have produced a piece of palatial architecture at Windsor had his plan for erecting a distinct pile of building on the south side of the Upper Ward been adopted. [WINDSOR CASTLE, p. 453.] Still palaces do not appear to have been exactly Wren's forte, at least not if we judge by such specimens as he has given us in Marlborough House and some portions of St. James's.

After the death of Anne, the last of his royal patrons, Wren was dispossessed of his office of surveyor-general (which he had held for forty-nine years), very little to the credit of George I., and to the disgrace of 'one Benson,' the man who by succeeding him in that capacity has preserved a name from oblivion by perpetuating it for lasting shame and contempt. To Wren himself however this discharge from office must have been rather a welcome release than otherwise; for, verging towards ninety, he could then have little further worldly ambition, even had he not already amply gratified it. The close of his life was not so much to be pitied as to be envied, for if he passed the last five years of his existence in retirement and in comparative obscurity, he passed them in serenity of mind and placid content. The struggles of dissolution were spared him, for without any previous symptoms of approaching death he was found dead, reposing in his chair after dinner (February 25th, 1723, in the ninety-first year of his age).

He received the tardy honour of a splendid funeral in St. Paul's, where his remains were deposited in the crypt, with no other adornment to his tomb than the inscription on it, with the sublimely eloquent legend—'Si Monumentum quæris, circumspice.'

Christopher, the architect's son by his first marriage, and who sat in parliament for Windsor about 1718, was author of a work entitled 'Numismatum Antiquorum Sylloge,' 4to., 1708; and he composed the chief part of the 'Parentalia, or Memoirs of the Family of the Wrens,' but left it unfinished at his death (1747); it was completed by Stephen Wren, Sir Christopher's grandson, and published in 1750. This work must be considered rather as a mere register of dates and facts than a biography; for as to the last, it is dry and tedious, yet valuable as an authentic record, and as such it has always been referred to. All Souls' Library at Oxford contains other more interesting records of the great architect's professional studies, in a collection of original drawings by him; and it excites not only regret, but some astonishment also that these, or at least a selection of the most interesting of them, should never have been published. In fact comparatively few of Wren's buildings have been fully described or described at all by authentic architectural delineations, or otherwise than by mere views. In 182 however was published a very large and highly finished engraving exhibiting all the structures erected by him brought together into one extensive group. This kind of graphic synopsis was from a composition by the present Professor of Architecture at the Royal Academy (C. R. Cockerell), and is appropriately entitled a 'Tribute to the Memory of Sir Christopher Wren.'

Chronological List.

1663 Pembroke College Chapel, Cambridge.
1664-9 Sheldonian Theatre, Oxford.
1664 Buildings at Trinity College, Cambridge.
1666 Library, ditto, ditto.
1667 Royal Exchange, London.
1668-77 Emmanuel College Chapel, Cambridge.
1668 Custom-house, London.
1670 Temple Bar.
1671-7 The Monument, London (202 feet high)
1670-4 St. Sepulchre's, Newgate.
1671-8 Spire and Church of St. Mary-le-Bow.
1671-86 St. Lawrence, Jewry.
1672-9 St. Stephen's, Walbrook.
1672 St. Michael's, Cornhill.
1672 St. Mary-at-Hill.
1673 St. Bennet Fink, Threadneedle Street, dome now taken down.
1674-98 College of Physicians, Warwick Lane (now converted into a market).
1675 ST. PAUL's begun.
1675 Royal Observatory, Greenwich.
1680 St. Bride's, Fleet Street.
1680 St. Swithin's.
1681-2 Gateway Tower, Christ Church, Oxford.
1682-90 Chelsea Hospital.
1682 St. Antholine's, Watling Street.
1683 The Palace at Winchester, which was left unfinished, and is now a barracks. [WINCHESTER.]
1683 Ashmolean Museum, Oxford,
1683 Queen's College Chapel, Oxford.
1683 St. James's, Westminster.
1683-6 St. Clement's, Eastcheap.

St. Martin's, Ludgate.
Made comptroller of works at Windsor Castle.
St. Andrew's, Holborn.
1704 Christ Church, Newgate.
Hampton Court.
Morden College, Blackheath.
Greenwich Hospital.
St. Dunstan's in the East, Tower and Spire.
Buckingham House, London (now taken down).
Marlborough House, London.
Westminster Abbey, Towers of west front.
inningham's *British Painters, Sculptors, and Ar-*
Elmes's *Life of Wren; Pictorial History of*
; MSS. Memoranda.)

STLING affords so obvious a means of trying the
rength and activity of men, that it has probably
one of the athletic exercises of almost every
at least of every warlike nation. It was in use
he Greeks from the earliest times. Perhaps the
scription of a wrestling-match is that given by
n the 'Iliad' (xxiii., 700, &c.). This contest was
e great games which Achilles provided to dignify
ral of his friend Patroclus. The wrestlers were
l Ulysses. The prize for the victor was a tripod,
t twelve oxen; the compensation to the van-
for his toil was a female slave, valued at four
The wrestlers were naked, except a girdle round
. Having walked into the centre of the ring, they
d of one another 'with their arms and strong
and their efforts to throw each other down were
t, as Homer describes it, their backs creaked, the
ion flowed from them, and many lumps, red with
se on their sides and shoulders. These exertions
tinued so long that the spectators became weary,
then proposed to Ulysses that the one should try
e other. Ajax immediately lifted Ulysses, who,
usual skill, struck his bulky opponent with his
behind in the bend of the knee, and then Ajax,
ff his balance, fell on his back, with Ulysses on
t. If it had been the Cumberland game, Ulysses
ve been declared the victor, but the Greek con-
ch was a terrible trial of strength and not at all a
quired a wrestler, unless he gave up the contest,
rown three times before he was vanquished.
hen attempted to lift Ajax from the ground, but
ed him a little, and in the struggle they fell side
They would have risen again to renew the con-
chilles had not put a stop to it, and assigned an
ward to each.

or something like it, continued to be the usual
of wrestling in Greece till long after Homer's time.
le (περίζωμα) seems to have gone out of use about
Olympiad, and thenceforward they wrestled en-
ked, with the body oiled, to make the skin supple
eck perspiration, and sprinkled with fine sand or
enable them to retain their hold. From this time
n generally to have at first stood apart, watching
the most advantageous grasp of each other, and
g in their preparatory movements, as well as in
equent struggle, a series of beautiful attitudes.
e represented on antient monuments in every
f position, sometimes grasping each other by the
metimes round the shoulders, and sometimes the
seized the other round the loins, and has lifted
vith his head downwards. This mode of wrestling
ed πάλη ὀρθὴ, or erect wrestling; but there was
ind, which was indeed occasionally the concluding
he erect wrestle, called ἀνακλινοπάλη, in which
ggled on the ground; this was always a cruel
sometimes accompanied with biting and similar
annoyance, and was continued till one of them
or was quite exhausted, or actually strangled.

άλη (wrestling) was also combined with the πυγμὴ
, and this alternate game was called παγκράτιον
ll' or 'every,' and κράτος, 'force' or 'strength'),
wer of the body being then brought into action.
principal exercises of the Greeks were also com-
to one game, which was called πένταθλον; in this
the exercises were performed by the same per-
the same day: these exercises were, leaping
running (δρόμος), throwing the discus (δίσκος),
the spear (ἀκόντιον), and wrestling (πάλη).

oman wrestling was an imitation of the later forms of Greek wrestling, without any points of difference deserving of notice.

'Merry England' of the olden time abounded in bodily exercises of many kinds, and wrestling was one among them which was practised in all parts of the country. Except in the north, the game seems to have been generally similar to the Cornish game as still in use. In the common game, the hold was taken by the collar and waistband; in the prize game the body was stripped to the waist, and each had a girdle, something like a shawl, over one shoulder and under the other, for his opponent to take hold of. A ram was one of the most common prizes. In the Prologue to Chaucer's 'Canterbury Tales,' we are told of the miller that

> 'At wrastling he would have away the ram.'

But, according to the old poem called 'A Lytel Geste of Robyn Hode,' prizes of greater value and dignity were sometimes given—a white bull, a great courser, with saddle and bridle, a pipe of wine, and a red gold ring.

In old times the Londoners were distinguished for their skill in wrestling. Matthew Paris, in 'Hist. Ang.,' anno 1222, says that they held their anniversary meeting for this game, in the 6th year of Henry III., near the hospital of St. Matilda, at St. Giles's in the Fields, where they were met by the inhabitants of the city of Westminster and suburbs. The prize was a ram, and the Londoners, having been victorious, accepted a challenge to meet their opponents in Westminster; they did meet them, and the result was a quarrel, a fight, and a tumult which lasted some days. Stow mentions another tumult at a wrestling-match near Clerkenwell in 1453. Wrestling had fallen much into disuse in Stow's time. 'In the month of August,' says Stow, 'about the feast of St. Bartholomew the apostle, before the Lord Mayor, aldermen, and sheriffs of London, placed in a large tent near unto Clerkenwell, of old time were divers days spent in the pastime of wrestling, where the officers of the city, namely, the sheriffs, serjeants, and yeomen, the porters of the king's beam or weigh-house (now no such men), and others of the city, were challengers of all men in the suburbs, to wrestle for games appointed; and on other days before the Lord Mayor, aldermen, and sheriffs, in Fensburie Field, to shoot the standard, broad arrow, and flight, for games; but now, of late years, the wrestling is only practised at Bartholomew's day in the afternoon, and the shooting, some three or four days after, in one afternoon, and no more.'

Wrestling is not much practised in England at the present time, except in the north, especially in Cumberland and Westmoreland, and the south-west, in Cornwall and Devonshire. The Cornwall and Cumberland wrestling are distinct games, and are performed in quite a different manner.

In a Cornwall prize-game the wrestlers wear a short strong jacket, which seems to have superseded the old girdle round the shoulders, and is used for the same purpose. They generally take hold, not deliberately but by a catch, mostly aiming to seize the jacket with one hand as far as possible behind the shoulder, while with the other hand they endeavour to grasp the sleeve of the opposite arm about the wrist or elbow. The shoulder-hold is mostly retained, if possible, but the other is shifted when in the course of the struggle an opportunity presents itself of passing the arm round the loins, so as to give what is called a Cornish hug, or in any other way which offers an advantage. A powerful wrestler, when he gets an extra purchase, will sometimes pull his opponent, head foremost and heels up, over his shoulder. The most objectionable part of the Cornish game, as sometimes practised in London, though, we believe, it is not common in Cornwall or Devonshire, is that of wearing heavy shoes, and kicking each other's shins; and though the front of the leg is defended by a strong piece of leather, the blood is made to flow abundantly. Those who wish for a more detailed account of the Cornish wrestling may consult 'Προγυμνασματα: the Inn-Play, or Cornish-hug Wrestler: digested in a method which teacheth to break all Holds, and throw most Falls mathematically; by Sir Thomas Parkyns, of Bunny, Baronet,' Nottingham, 1717, 2nd edit., 4to. Prefixed are 'Institutes for Young Wrestlers, by William Tunstall.'

The Cumberland wrestling is essentially distinguished from that of Cornwall by the manner of taking hold and by the settled rules of the game. In a prize game the

VRIST. [Articulation; Skeleton.]

VRIT, a law term, which, in its proper and more ex-
sive signification, implies a *writing* under the king's
, whereby he confers some right or privilege, or com-
ids some act to be done. Writs are either *patent*
en, commonly called *letters patent, literæ patentes*),
ch are not sealed up but have the great seal attached to
n; or *close* (*literæ clausæ*), which are, or are supposed
e, sealed up. The former are addressed to all subjects in-
riminately, generally in these terms—'To all to whom
e presents shall come;' the latter are directed to some
er or other individual subject. Of the former kind is
creation of a peer by patent, which is a royal grant of
e specified degree of peerage; of the latter, the crea-
of a peer by writ, which is a summons to attend the
se of peers by the style and title of some barony.

rit in its ordinary and more limited sense signifies
Process connected with the origin and progress of a
or *criminal* proceeding. Civil writs are divisible into
inal and *judicial:* the former issue out of the Court of
ncery, and give authority to the courts, in which they
returnable, to proceed with the cause; the latter are
rded by the court in which the action is already
ding. These are again subdivided into *mesne* and
. Original writs (which now, except in the few
actions still preserved, have been superseded by
writ of summons) used to contain a *brief* statement
he plaintiff's alleged cause of action; and such a
was called in law Latin *breve*, in law French *brief:*
this term was afterwards applied to judicial and other
ts. To what has been already stated on this subject
ay be added that original writs issuing from Chancery
always witnessed, or *tested*, in the name of the king;
eas judicial writs issued from that one of the superior
mon law courts in which the original writ was made
nable, and were tested in the name of the chief
of such court. In cases where the plaintiff seeks to
er a sum under 40*s*., he may bring his suit in the
y-court, or court-baron, in which no royal writ is ne-
y; the suits therein commencing, not by original
ut by *plaint*, which is a statement of the party's
of action in the nature of a *declaration*.

beyond the scope of an article like the present to at-
to enumerate, even by name, the various writs
are known to our law; but some of the more im-
may be here mentioned—*e. g.* the writ to the
of a county to elect a member or members of the
ns' House of Parliament, in case of a vacancy or
election; which issues upon the warrant of the
ancellor or in certain cases of the speaker of the
of Commons. The celebrated writ of *Habeas Corpus*
iciendum), which is directed to any person who
another, commanding him to produce the body of
oner at such a time and place, together with the
his caption and detention, to do, submit to, and
(*ad faciendum, subjiciendum, et recipiendum*)
r the court or judge by whom the writ is awarded,
ink fit. [Habeas Corpus.] There are various
rits of *habeas corpus*, for the purpose of bringing up
s to be charged in execution, to give testimony, &c.
rits of *subpœna ad testificandum*, by which a party is
ded to appear at the trial of a cause, to give evi-
nder a *nominal* pecuniary penalty; and of *subpœna*
cum, commanding the party to bring certain speci-
cuments for the purpose of the trial. There is also
it of *subpœna* in equity, whereby the defendant in a
s commanded to appear and answer the plaintiff's
A defendant privileged from the particular suit, or
being sued except before some other tribunal, is en-
to a writ of *Privilege*, by which the court is required
scontinue the suit. In modern times a party is allowed
rivilege without suing out any *writ* of privilege. The
of Prohibition, Mandamus, and Quo Warranto
been already treated of.

RIT OF INQUIRY. In cases where a plaintiff seeks
over a specific chattel (as in the action of *Detinue*), or
ific sum of money (as in *Debt*), if the defendant allows
ent to go against him by default, this is considered as
ission that the plaintiff is entitled to what he claims;
he judgment therefore is final in the first instance,
led the plaintiff is content to take a small nominal
or the damages resulting from the detention of the
l or the debt. But where a plaintiff only seeks to obtain damages for an injury done to his person or his real or personal estate, or for the non-performance of a promise, if the defendant lets judgment go by default, this, though an admission that the plaintiff has a cause of action, does not operate as an admission of the amount of damages to which he is entitled; and such judgment is called interlocutory. In such cases, and also where the plaintiff seeks to recover substantial damages for the detention of a chattel, or of a debt, the intervention of a jury is required in order to ascertain for what damages the plaintiff is entitled to have final judgment. For this purpose a *judicial* process, called a *writ of inquiry*, issues to the sheriff commanding him to summon a jury to inquire what damages the plaintiff has sustained. If the plaintiff offer no evidence before the jury, a verdict must be found for nominal damages, as existence of *some* damage is admitted.

When the *inquisition* (or finding of the jury) is returned, the plaintiff is entitled to judgment for that amount. [Assessment of Damages.] In some cases where the amount of damages is readily ascertainable, as being a mere matter of calculation, *e. g.* in actions upon bills of exchange, upon covenants for the payment of a certain sum, and the like, the court, instead of directing a writ of inquiry, will refer the matter to one of its officers to compute the amount of principal and interest due to the plaintiff, writs of inquiry being merely to inform the consciences of the court, who may assess the damages themselves, if they think proper, after interlocutory judgment has been obtained.

WRIT OF TRIAL. All trials of causes in the superior courts took place formerly either at *bar* before the whole court, or at *nisi prius* before one of the judges of the court, or a judge or serjeant named in the commission of assize; but now, by the 3 and 4 W. IV., c. 42, s. 17, in any action depending in any of the superior courts for any *debt* or *demand* in which the sum sought to be recovered and indorsed on the writ of summons shall not exceed 20*l*., the court, or a judge (if satisfied that the trial will not involve any difficult question of fact or law), may order the trial to take place before the sheriff of the county where the action is brought, or some judge of an inferior court, and for that purpose a writ shall issue (called the Writ of Trial) directed to the sheriff or such judge, commanding him to try the cause before a jury, and to return such writ with the finding of the jury thereon indorsed. The statute applies only to actions for a *debt* or *demand* indorsed on the writ of summons; it does not therefore extend to cases where the action is brought for a wrong, or where the demand, being for unliquidated damages, the amount claimed cannot properly be indorsed on the writ of summons. (3 Mann. and Gra. 850.) The proceedings under the writ of trial, when directed to the sheriff, usually take place before his under sheriff or other his deputy; and they are conducted in the same manner as at a trial at *nisi prius:* and the court will grant a new trial for the same causes as if the trial had been before one of the superior judges; but a new trial will not be granted upon the ground that the verdict is against the evidence, where the amount of such verdict is less than 5*l*., unless such verdict be manifestly *perverse*.

WRITER, in Scotland, is a term of nearly the same meaning as attorney in England, and is generally applied to all legal practitioners who do not belong to the bar, although it has of late become customary to substitute for it the term solicitor. As special exceptions, the body who in Edinburgh enjoy, concurrently with writers to the signet, the privilege of conducting cases before the Court of Session, the Court of Justiciary, &c., are called solicitors of supreme courts (abbreviated S. S. C.), and the practitioners before the sheriff court of Aberdeen are by local custom called advocates. In each county there is generally a society of writers privileged to practise in the sheriff court and in the other local judicatories, who frame their own bye-laws, and regulate the terms of admission to their body. Individually, they are responsible for their conduct to the local judges before whom they practise; and as bodies they are, on the one hand, protected from the infringement of their privileges by unlicensed persons, and, on the other, liable to judicial control if they attempt unduly to restrict the means of admission to their privileges.

WRITER TO THE SIGNET, abbreviated W. S., is the designation of the members of the most numerous and olonel Montagu says, 'We were enabled to examine the ıners of this bird minutely, by taking a female from her. , and confining her in a cage for some days. A ntity of mould with emmets and their eggs was given and it was curious to observe the tongue darted ford and retracted with such velocity, and with such unng aim, that it never returned without an ant or an adhering to it, not transfixed by the horny point, as e have imagined, but retained by a peculiar tenacious sture, by nature provided for that purpose. While it eding, the body is motionless, the head only is turned very side, and the motion of the tongue is so rapid that ınt's egg, which is of a light colour and more conspiıs than the tongue, has somewhat the appearance of ing towards the mouth by attraction, as a needle flies magnet. The bill is rarely used except to remove the ld in order to get more readily at these insects; where earth is hollow, the tongue is thrust into all the ties to rouse the ants: for this purpose the horny aplage is extremely serviceable as a guide to the tongue. have seen the Green Woodpecker take its food in a lar manner.'

he nest is little or null, the smooth, shining, white —from six to ten in number—being generally deted in the hole of a tree on the decayed wood. The s are remarkable for local attachment, as the following dote, related by Mr. Salmon, will prove:—'I wished,' es that gentleman, 'last spring to obtain the eggs of a neck to place in my cabinet, and accordingly watched y closely a pair that had resorted to a garden for the pose of incubation; I soon ascertained that they had cted a hole in an old decayed apple-tree for that pur, the entrance to which was so small as not to admit hand. The tree being hollow and decayed at the m near the ground, I was enabled to reach the by putting my arm upwards, and I found, on withing the nest, that the underneath part of it was osed of moss, hair, &c., having every appearance of d nest of the redstart's of the preceding summer, I suspect was the case: the upper part was of dried roots. The nest did not contain any and I returned it by thrusting it up in the inside of ee. On passing by the same tree about a week ards, my attention was arrested by observing one of ds leaving the hole, upon which I gently withdrew t, and was much gratified at finding it contained st beautiful glossy eggs, the shells of which were ly white, and so transparent that the yolks shone , giving them a delicate pink colour, but which is the blowing. I replaced the nest and visited it the ensuing week, and was induced, out of curiosity, ine it again, when, to my astonishment, I found ds had not deserted the hole, she having laid six ggs since. I took these away, and was obliged to em, as I was only able to replace the nest by again g it up in the inside of the tree as before, which I again visited the spot in the following week, and that they had still pertinaciously adhered to their le, having further laid four more eggs. I repeated periment, but not having an opportunity of visiting e until ten days afterwards, I thought at the time e nest was abandoned, and was not undeceived until again withdrawn the nest, having taken the precauf endeavouring to frighten the old bird off should e on the nest, which I found was the case, she sufg me to pull the nest to the bottom of the tree before attempted to escape: there were seven eggs, which slightly sat upon. What appears to me extraordinary hat the bird should suffer her nest to be disturbed five es, and the eggs (amounting altogether to twenty-two) be taken away at four different periods within the nth, before she finally abandoned the spot she had cted.'

olonel Montagu says that the wryneck makes a noise like the smaller species of hawks, frequently repeating spring: Mr. Yarrell describes the note as a sharp d, repeated several times, and not unlike the whistle kestrel.

captivity the wryneck is a favourite, and the bird becomes reconciled to the half-reclaimed state in h English and French boys are fond of keeping it, g it out to the woods with a long string tied to its leg, suffering it to ascend trees and forage for food generally, within the length of its tether, and letting it climb at intervals about their dress.

In the 'Portraits d'Oyseaux' the following quatrain is printed under the cut of this species:—

> '*Le Tercot* est au pic verd ressemblant,
> De naturel et non de corpulence,
> Sa langue longue hors de trois doigts il lance,
> Ayant eu ce du serpent le semblant.'

The two last lines are very nearly a translation from Aristotle.

The Wryneck.

WULSTAN, otherwise WULFSTAN, or sometimes WOLSTAN. Of these names, which appear to be only variations the one of the other, there are three Anglo-Saxon ecclesiastics and writers of more or less celebrity.

1. **Wolstan**, a monk of Winchester, of the tenth century, to whom all the three forms of the name are given, is the author of a Latin prose Life of Bishop Ethelwold, whose disciple he had been, and also of a work in Latin hexameter verse (with a prologue in elegiacs) on the miracles of St. Swithin. The former, which is a very poor composition, is printed in the 5th sæculum of Mabillon's 'Acta Sanctorum Ordinis S. Benedicti,' fol., Paris, 1685, pp. 608-624. Of the latter only the introduction has been printed (in the same volume, pp. 628-635); but the whole is preserved in several manuscript copies. The verse, though not of much merit, has the reputation of being the best Latin poetry known to have been produced in England in that age. William of Malmesbury, who calls Wolstan a *cantor* of the church of Winchester, says that he also composed an exceedingly useful work on the Harmony of Tones; but that is no longer extant. Bale says he wrote a Life of King Ethelwulf, which is probably a mistake.

2. **Wulfstan**, who was not a monk, became archbishop of York in 1003, holding along with that dignity the bishopric of Worcester, as had also been done by his two immediate predecessors, and died in 1023. There is extant in MS. a letter addressed by him in Anglo-Saxon to the people of his province; and he is supposed by Wanley, on probable grounds, to be the *Lupus Episcopus* to whom are attributed certain sermons or homilies of this age written in the same language. The most remarkable of these is printed, with a Latin translation and notes by William Elstob, in the 'Dissertatio Epistolaris' contained

in the third volume of Hickes's 'Thesaurus,' fol., 1705, pp. 99-106; and there is also a separate edition of the same matter, published, in folio, at Oxford, in 1701. There are two pastoral letters in Anglo-Saxon written in the name of Wulfstan, by one (which one is matter of dispute) of the two Alfrics, with both of whom he appears to have been well acquainted: they are stated to have been first composed in Latin, and then, at Wulfstan's desire, to have been translated into Saxon, that they might be more generally useful.

3. WULSTAN, bishop of Worcester, is stated by his biographer, William of Malmesbury, to have been born at Icentun in Warwickshire, to a fair estate; the name of his father was Ethelstan, that of his mother Wulfgiva. From the age he is stated to have attained at his death, his birth must have happened in 1007 or 1008. He began his education in the monastic school of Evesham, but was afterwards removed to the more distinguished seminary of Peterborough. Having at the usual age been ordained a presbyter, he soon after became a monk at Worcester, and gradually rose to be at last prior of the monastery there. In 1062 he became bishop of Worcester on the nomination of Aldred, who, having been two years before removed from that see to the archbishopric of York, had attempted at first, as had for some time been customary, to retain both appointments, but was at last obliged to relinquish Worcester in consideration of only being permitted to name his successor. He chose Wulstan, it is said, conceiving that his mild temper and simple character would prevent him from offering any resistance to his patron's appropriation of the estates and aggressions upon the rights of the see. But this turned out to be a great mistake. Wulstan proved a very dragon of a bishop, and, especially after the coming over of the Norman conqueror, to whom he very politically paid court, and who took a great fancy to him, he not only set Aldred at complete defiance, but even compelled his successor, Archbishop Thomas, to make restitution to the see of Worcester of sundry lands or pecuniary dues of which it had been despoiled by his predecessors the prelates of York. He also successfully resisted the claim of the archbishop of York to a jurisdiction over the diocese of Worcester, and got that bishopric declared by the king to be in the province of Canterbury. Wulstan continued in the same favour with Rufus which he had enjoyed with his father; and in the beginning of the new king's reign, old as he was, he proved very serviceable in putting down an insurrection of the adherents of Duke Robert of Normandy, defending his city of Worcester against an army of the rebels led by Roger de Montgomery. Wulstan almost rebuilt the cathedral of Worcester from the foundation; and he died in that city, at the age of eighty-seven, on the 19th of January, 1095. Wulstan is not known to have written anything either in Saxon or Latin, though William of Malmesbury states that he was a ready and effective speaker in the former language; but in the work entitled 'Antient History, English and French, exemplified in a regular dissection of the Saxon Chronicle,' 12mo., Lon., 1830, an attempt is made to show that he was the author of the portion of that venerable record extending from A.D. 1034 to the end of the reign of William the Conqueror. There are two accounts of Wulstan by William of Malmesbury: one in his work 'De Gestis Pontificum;' the other a separate Life, in three books, which is published in the second volume of Wharton's 'Anglia Sacra.'

(Wright's *Biographia Britannica Literaria*, vol. i.)

WURMSER, DAGOBERT-SIGISMUND, COUNT OF, a distinguished Austrian general, was born on the 22nd of September, 1724, in Alsace—the territory which now constitutes the French departments of the Upper and Lower Rhine. He commenced his military career in the French service, and having distinguished himself by his courage in the campaigns of 1745-6-7, was raised to the rank of captain in the cavalry. His father having resolved to settle in the Austrian states, and become an Austrian subject in 1750, Dagobert resigned his commission and accompanied him. Such emigrations from the French Rhine provinces were at that time far from uncommon: the Alsatians, though French subjects, were then unmixed Germans; indeed the century which has since almost elapsed has only stripped their character of its German nationality, without giving them a French one.

Dagobert-Sigismund Wurmser was well received at Vienna. Maria Theresa conferred upon him the office of gentleman of the bedchamber (Kammer-herr), and, what he valued more, a troop of hussars, which he continued to command throughout the whole of the Thirty Years' War. After the battle of Prague he was made Major; after that of Lissa, Colonel; after that of Hochkirken, Major-general; and after that of Leignitz he obtained the cross of the order of Maria Theresa. His kind disposition and generosity rendered him the idol of both the officers and men under his command. There is a story told of him illustrative of these features of his character. Hearing, after the battle of Gorlitz, that a brave but poor lieutenant of cavalry had lost his horse in the action, Wurmser sent him one of the best in his stables, with a message to the effect that, having sworn this horse should belong to one of the bravest men in the army, he begged his acceptance of it.

In 1773 Wurmser became proprietary colonel of the regiment of hussars which subsequently bore his name; and, when the war broke out again in 1778, he was raised to the rank of Lieutenant-general. At the head of a body of 12,000 men, he broke into the territory of Glatz, and on the 18th of January, 1779, surprised the Prussians at Kubelschwerd and defeated them, taking 1200 prisoners. The peace of Tetschen arrested his victorious career, and the collar of commander of the order of Maria Theresa was the reward of his exploits during that short campaign.

In 1787 he was appointed general-commandant of the province of Galicia, and although the inhabitants were extremely averse to the Austrian yoke, he contrived to make himself a personal favourite. The emperor Joseph bestowed on him the appointment of feld-zeug-meister (master of the ordnance when the army is in the field). Wurmser was not employed in the war against the Turks in 1789.

The period of Wurmser's career which obtained for him a European reputation commenced in 1793. In February of that year he was ordered to draw together an army in the Breisgau. By the end of the month he was in a condition to advance. On the 3rd of March he entered Mannheim and Spire; and attacked the rear-guard of Custine, who retreated to Landau. Wurmser pursued him as far as Landau, which he summoned, but without effect. Falling back upon the Rhine, Wurmser joined the prince of Condé at Spire; and having effected a junction with the Prussian army of observation under the Duke of Brunswick, he took up a position at Germersheim to assist in covering the siege of Mayence. After the capitulation of Mayence, Wurmser again pushed forward his corps to the environs of Landau; attacked the fort of Jocknum, and advanced to the base of the Vosges. On the 13th of October, in concert with the Duke of Brunswick, he attacked and forced the lines of Weissembourg. Wurmser pursued the French into his native province; occupied Hagenau; bombarded Fort Louis, which capitulated on the 14th of November; took up a position on the Sarre; and pushed on his outposts to Wantzenau in the vicinity of Strassburg. The miscarriage of an attack by his right on the bridge hampered him considerably; and the Prussians having failed to take Landau, which they were too long of attacking, he was left entirely to his own resources. Pichegru, who had been placed at the head of the army of the Rhine in October, and who had judiciously adopted a war of outposts, sharpshooters, and sudden surprises well adapted to the brave but raw troops under his command, when opposed to steady old disciplined troops, harassed him incessantly. Wurmser was obliged to retire within the lines which he had established on the Motter during his advance. The fort of Frischweiler, defended by the elector-palatine, was forced on the 22nd of December, and nothing prevented the French from overwhelming Wurmser. His men gave way in utter confusion at all points, and he was only able to collect the wreck of his army on the right bank of the Rhine. Having succeeded in the course of January, 1794, in re-establishing something like organization among them, he hastened to Vienna, where the emperor by numerous marks of his esteem sought to express his conviction that Wurmser's reverses were owing solely to the faults of others.

Six months later Wurmser was again appointed to command the army of the Upper Rhine. An accident revealed to him the secret of the correspondence between the Prince of Condé and Pichegru. That Austria should have made no effort to turn that negotiation to account was not surprising. In the sincerity of the republican general that power could have little confidence, and in the judgment of the Prince of Condé still less. Besides the anxiety of Condé and Pichegru to keep their intercourse a secret from the Austrian government was of itself suspicious. The conspiracy was allowed by Wurmser, the archduke Charles, and the cabinet of Vienna to take its course, and it led to nothing but its very natural termination in the ruin of the general who had intrigued with the enemies of his country to subvert the government from which he held his commission. Wurmser defeated the French on the banks of the Neckar, on the 28th and 29th of October, 1794, and entered Mannheim; the citadel surrendered after a bombardment which lasted a few days.

On the 1st of January, 1796, Wurmser received the grand cross of the order of Maria Theresa. Hostilities did not recommence that year till the month of May. On the 15th of June Wurmser gave way before the attack of Moreau and abandoned Frankenthal. The Austrian cabinet, which had relinquished the idea of assuming the offensive in Alsace and on the Rhine, ordered him to move thirty thousand of the best troops in the army under his command without delay upon the north of Italy. An opponent full of the impetuosity of youth and the resources of genius awaited the sexagenarian here.

On the 29th of July Wurmser advanced towards Mantua. He drove in the French outposts on the Lago di Garda; but Bonaparte, having abruptly broken up the siege of Mantua to precipitate himself on his adversary, met and beat him at Lonato on the 3rd of August, at Castiglione on the 5th, then at Roveredo, and on the 8th at the gorges of the Brenta. The Austrian general, far from despairing, made an attempt upon Verona; but, repulsed by General Kilmaine, he retreated along the Adige with 5000 foot and 15,000 cavalry; and, after evading two French divisions detached to watch his motions, threw himself into Mantua. This place was vigorously and skilfully defended by Wurmser; but the defeat of the troops under Alvinzy, want of provisions, and sickness among the garrison, forced him to surrender on the 2nd of February, 1797. Bonaparte, with that chivalrous spirit which marked his early career, left the veteran entire personal liberty, saying that he respected his years, and did not wish to make him the victim of the intriguers who would doubtless avail themselves of his absence to undermine him at Vienna. Wurmser repaid the generosity of the French general in kind: having detected a plot to poison Bonaparte, he put him upon his guard.

On Wurmser's return to Vienna, the emperor appointed him governor of Hungary, with a salary of 14,000 florins. He did not however survive to take possession of his government, dying at Vienna in the month of June, 1797. He was never married: his estates and honours were inherited by a nephew.

The 'Mémorial de St.-Hélène' erroneously attributes to Wurmser the rank of field-marshal, which he never attained. His military skill is unquestionable, notwithstanding his career during the revolutionary war was an almost unbroken series of reverses. It was his fate to command at a time when the revolutionary fervour for a time broke through all the calculations of tacticians. Time has shown that this preternatural stimulus must wear itself out, and organised discipline re-assert its ascendency. Wurmser was one of the most distinguished scientific soldiers of Europe during the period of the army's reverses. Even defeat did not for a moment obscure his personal merits; and to the hopeful and persevering turn of mind of Wurmser, the archduke Charles, Blucher, and a few others, it was in great measure owing that discipline and tactical skill survived to assert their due influence when the maniacal revolutionary period had passed over. Personally Wurmser was brave, frank, and benevolent, with a strong devotional turn. To his honour let it be remembered that, although a strenuous Roman Catholic, he unceasingly asserted the right of Protestant soldiers in the Austrian army to perfect religious freedom.

(The outline of incidents in this sketch of Wurmser is taken from the lives of Wurmser, Pichegru, Condé, and Bonaparte, in the 'Biographie Universelle' and its supplement, checked by reference to the writings of Napoleon, Jomini, the archduke Charles, &c.)

WÜRTEMBERG. This kingdom is situated in the south-west of Germany, between 47° 35′ and 49° 35′ N. lat. and 8° 15′ and 10° 30′ E. long. It is almost wholly surrounded by the kingdom of Bavaria on the east, and by the grand-duchy of Baden on the west, these two states meeting on the northern frontier; on the south it is bounded by Switzerland and the Lake of Constance. Its greatest length from south to north, from the Lake of Constance to Simmeringen, is about 140 miles; and its greatest breadth from east to west, from Neresheim and Bopfingen to Herrenwald, nearly 100 miles. The area is variously stated at 7460 and 7540 square miles. The principalities of Hohenlohe Hechingen and Hohenlohe Sigmaringen are almost wholly surrounded by the kingdom of Würtemberg.

Face of the Country; Soil; Climate.—Würtemberg is, for the most part, mountainous; on the east the Swabian Alb or Alp enters the country, and the western border is covered by the Schwarzwald (the Black Forest), both of which send out branches in all directions. The Schwarzwald runs from south to north, parallel to the Rhine, and to the Vosges mountains on the other side of that river. It begins between Eglisau and Basle, and extends to Durlach and Pforzheim; its length is about 83 miles, and its mean breadth 14 miles. On the west side its declivity is steep and precipitous towards the valley of the Rhine; on the east it slopes gradually towards the central part of Würtemberg. It consists chiefly of granite and sandstone, and is intersected by many well-watered valleys. It is divided into the Upper or Southern and the Lower or Northern Schwarzwald. The former, which is the most considerable, with its vast masses of rock, its fearful precipices and abysses, is in the grand-duchy of Baden; the highest points are the Feldberg, 4600 feet, and the Belchen, 4370 feet, above the level of the sea. The summits of these two mountains are hardly three months in the year free from snow. The northern part, belonging to Würtemberg, is not so elevated; the highest points are the Hornisgrinde, 3640 feet high, and the Rossbühl, 2940 feet high. The Dobel is the highest cultivated part of the Schwarzwald. The Alb, or Alp, is entirely in the kingdom of Würtemberg (excepting a small part of it which is in Hohenzollern), and runs from south-west to north-east. Its length is between 80 and 90 miles, and its breadth varies from 9 to 18 miles, between the Neckar and the Danube. On the north-west side it is steep, but on the south-east side gradually declines into undulating hills. Though not so elevated as the Schwarzwald, it is more bleak and inclement. There are several large caverns in the limestone of the Alp. The Nebelhöhle near Pfüllingen is 600 feet long, so far as it has been explored, and divided into several chambers, some of them 50 feet high. Both the roof and the sides are covered with beautiful stalactites, which have a magnificent effect by torch-light. The Carlshöhle near Erpfingen was discovered on the 30th May, 1834. It is 568 feet long, divided into seven chambers, from 3 to 22 feet high, the walls of which are covered with white shining stalactites. A quantity of bones, vessels, and utensils, doubtless of Roman origin, were found in the cavern, whence it seems that it must have been known at a former period, and probably served as a place of refuge.

There are wide and fertile valleys, the principal of which are that of the Neckar (the Neckarthal) and that of the Danube (the Donauthal) from Tüttlingen to Ulm. The diversity of mountain and valley, the fertility of the soil, and the luxuriance of the vegetation combine to produce an infinite variety of beautiful scenery, and render Würtemberg one of the finest parts of Central Europe, and worthy to be called the garden of Germany.

The chief rivers are the Neckar and the Danube, into which almost all the other rivers discharge themselves. The Neckar rises at the foot of the Alp, in the south-west corner of the country, which it traverses from one end to the other, and enters the grand-duchy of Baden at Gundelsheim, which it crosses till it falls into the Rhine. From its source to its junction with the Rhine the distance in a straight line is 100 miles; but it has so many windings that the length of its course is 250 miles, of which 190 are in Würtemberg. At its sources it is 2150 feet, at Gundelsheim 432 feet, and at its junction with the Rhine 284 feet above the level of the sea. The affluents, both on the right and left banks, are numerous; the principal are: on the right side—the Kocher, a considerable river, which has a course of 160 miles; the Rems; the

Eyach; and the Jagst; on the left side—the Enz, which has a course of 98 miles, and at its junction with the Neckar at Berigheim has a volume of water nearly equal to that river. The Danube, which rises in Baden, enters Würtemberg at Tuttlingen, and crossing the kingdom in a generally north-easterly direction to Ulm, enters Bavaria. The chief affluent is the Iller, which joins it on the right side near Ulm. There are numerous other rivers, some of which are tributaries of the Rhine or the Main, and two small streams flow into the Lake of Constance. This is the only considerable lake in the kingdom, which however only touches a small portion of Würtemberg on the southern frontier. The small lakes are numerous. The Fidersee is about 5 miles long and as many broad.

The soil is extremely fertile, except in the higher regions of the Alp and the Schwarzwald, where the substratum is unfavourable to vegetation.

The climate is, on the whole, temperate and mild, with great difference however arising from the elevation of some parts above the level of the sea. The north-west parts, especially about the Neckar, have a climate as warm as almost any part of Germany, where the vine flourishes and fine fruit is grown; whereas the summits of the Alp and the Schwarzwald are too cold to produce corn, and are covered with forests and pastures. The climate of the southern parts of the kingdom is mild.

Natural Productions.—Of domestic animals, according to Fischer's work, 'Würtemberg and its Inhabitants,' published in 1837, there were oxen 132,988, cows 381,000, young cattle 281,500; sheep 580,000, of which about 100,000 are Spanish Merino, and 140,000 of the improved breed (the total number is doubtless greater at this time, 1843); swine 170,700, goats 21,440, asses 750, horses 93,000. The breed of horses has been greatly improved by the care of the government since the peace, particularly by the encouragement given by the king. The very rigorous laws for the protection of the game had caused the wild-boars, deer, and hares in particular, to multiply to such a degree as to be most injurious to the farmers. But the judicious and equitable measures of the reigning prince have completely put an end to this nuisance; an ordinance, issued in 1817, commands the wild boars to be extirpated in the forests, and to be confined to the enclosed parks; the deer to be diminished so as to be in proportion to the extent of the forests; and especially the numbers of hares to be reduced. There are still a few stags and deer in the forests, as well as foxes, badgers, some wild cats, squirrels, martens, and weasels. Poultry of all kinds is abundant, and also game and wild-fowl, as pheasants, partridges, wild geese and ducks, quails, bustards, woodcocks, snipes, and fieldfares. Birds of prey, such as the eagle, the vulture, and the falcon, are very rare. There are several species of owls, which are very numerous. Singing birds abound in all the forests. The many small lakes or meres, and all the rivers, yield a great variety of fish, which are a source of considerable profit. In some parts of the kingdom bees are kept; there are in all about 70,000 hives. Within these few years silk-worms have been introduced, with every prospect of success. Leeches are bred in ponds appropriated to that purpose, and edible snails in separate reservoirs.

Agriculture.—The whole of the public and private property contains—

	Würtemberg Acres.
1. Cultivated land:—	
Arable, about . .	2,440,000
Meadows . . .	738,000
Gardens . . .	148,000
Vineyards . . .	84,777
2. Forests . . .	1,798,314
3. Uncultivated land, pasture, &c.	350,000
4. Quarries, mines, peat-moors, lakes, and meres . .	8,000

Würtemberg is one of the most fruitful countries of Germany, and agriculture is on the whole carried on upon a good system; the want of sufficient manure is however a great drawback. Great improvements have been made during the present reign by enclosing commons, and the institution of prizes for inventions or discoveries useful to agriculture. On the 26th of September there is an annual fête at Cannstadt, like our cattle-shows, at which prizes are given. A manifest improvement in the breed of cattle and horses is remarked at every new cattle-show.

The kinds of grain cultivated are chiefly spelt, maize, oats and barley, besides rye, and some wheat. There is usually a surplus of 400,000 bushels for exportation. The other agricultural productions are peas, beans, vetches, potatoes (introduced by the Waldenses in 1710), flax, hemp, rape-seed, poppies, hops, and tobacco. Fodder of many kinds is abundant. Of the vineyards more than three-fifths are in the circle of the Neckar, and formerly all the wines of the kingdom were called Neckar wines; but since the acquisition of new territories there are the Tauber and Lake (*i.e.* of Constance) wines, which are very different from the Neckar wines, rather resembling Rhenish. Memminger says (1822) that the Neckar wines seemed to have degenerated. He ascribes this to the attempt made by the government, in 1748-1750, to improve the quality by the introduction of foreign vines, which were obtained from France, Spain, Italy, and even from Greece and Persia; but the soil not being suited to them, the experiment has not only failed, but the mixture has even deteriorated the quality of the wine. Since Memminger wrote much has been done to recover the antient reputation of the Neckar wines. Würtemberg having been enlarged by countries that produce little wine, there is not sufficient for the home consumption, and more is now imported than exported. 'Horticulture and agriculture,' says Fischer, 'are so blended, that it is difficult to make a distinction; horticulture, properly so called, has made great progress within a few years. Though the cultivation of fruit is general in the whole kingdom, even on the Schwarzwald and the Alp, and almost all the high roads are bordered with fruit-trees, there is much room for improvement in the quality of the finer sorts, to which the newly instituted Pomological Society is expected materially to contribute.

The metals and minerals are copper, lead, zinc, and iron (at least 5000 tons annually), marble, alabaster, millstones, freestone, gypsum, quartz, garnets, tourmalins, amethysts, chrysolites, rock-crystal, agate, chalcedony, carnelian, opal, jasper, porcelain earth, potters'-clay, basalt, fullers'-earth, chalk, marl, coals, but not in considerable quantity, and salt. The salt-works are the property of government, which has the monopoly of the salt-trade; the annual produce is 24,000 tons. Most of the Swiss receive their supply of salt from Würtemberg, according to specific conventions.

Manufactures.—There are manufactures of almost every description, and though not on so extensive a scale as in some other parts of Germany, they are of considerable importance, and extraordinary progress has been made since the conclusion of the general peace in 1815. The principal are linen, woollen cloths, calicoes, silks, lace, hosiery, muslin, carpets, leather, porcelain, earthenware, all kinds of articles of iron and steel, and also of gold and silver, tobacco, tobacco-pipes, and gunpowder; there are likewise numerous distilleries and breweries, and manufactories of chemicals. In works of art, as painting, sculpture, engraving, lithography, Würtemberg ranks among those states which by the judicious encouragement of their governments have made a great advance within a few years.

Commerce.—Though Würtemberg cannot be properly called a commercial country, it has a very considerable and profitable trade. The exports consist both of the natural productions and manufactures, horned cattle, horses, sheep, salt, corn, timber, raw hides, wool, garden-seeds, millstones, and saltpetre; gold and silver articles, leather, hats, paper, white-lead, tobacco, oil, chemicals, vinegar, and printed books.

Since the establishment of a free trade within the states composing the German Customs' Union (*Der Zollverein*), to which Würtemberg belongs, it is impossible to state precisely the total amount of the export trade. It was formerly eighteen millions of florins (nearly two millions sterling). The imports consist of raw materials which the kingdom does not produce in sufficient quantity, cotton and cotton manufactures, silks, glass wares, wine, fruit, cheese, china, earthenware, and all kinds of colonial produce. There is likewise a very great transit trade. The inland navigation is important, especially on the Neckar, which becomes navigable at Cannstadt: above 2000 ships are employed in it.

Population; Religion.—With the exception of about 12,000 Jews and a few families of Waldenses, and some foreigners, the population is entirely German, partly

Suabian, partly Franconian, according as they originally belonged to those two circles, the dialect of which they retain. 'They are,' says Fischer, 'a robust good-looking race of men, but of late years the health of the women in the middle and higher classes has been less vigorous than formerly, and especially in the Roththal and Kocherthal, where swollen necks and goîtres are extremely common. The main feature of the character of the people is good-nature, rather phlegmatic than lively; they are honest, faithful, and loyal; but the long wars, the heavy taxes, the injudicious police measures, and the licentious spirit of the times have had a pernicious influence on their character and morals. To these circumstances we may ascribe the very extraordinary number of robberies and other great crimes; and the cause of a dissolute and lawless course of life may be found perhaps in the too great leniency which is shown towards the guilty.' With respect to religion the majority are Protestants: the proportion in 1834 was as follows:—

Protestants . . .	1,124,921
Roman Catholics . .	498,290
Jews . . .	22,266
Not specified . .	177
	1,634,654

The annual increase by the excess of births is above 9000; but as the loss by emigration much exceeds what is added by immigration, the annual increase is not above 7500.

Education.—Würtemberg has always been one of the most enlightened countries in Germany; it has given birth to the most profound thinkers, to some of the greatest poets, and there are few states in Germany which have furnished so many eminent men to the pulpit and to practical life as Würtemberg. For this it is chiefly indebted to its good institutions for education, of which it probably has more than any other country of equal extent in the world.

There is not a parish without its school, and the number of children attending the schools is one in six of the entire population, a much larger proportion than in England and France. There is a university at Tübingen, with about 800 students, seven gymnasia, four lyceums, seventy-eight Latin schools, one superior evangelical seminary at Tübingen, fifty-four inferior evangelical theological seminaries, four seminaries for Roman Catholic priests, one seminary for evangelical and one for Roman Catholic schoolmasters, twenty-four schools of philology and sciences, 1470 evangelical and 787 Roman Catholic parish or district schools, and others for particular objects, *e. g.* for the deaf and dumb, for the blind, for drawing, &c. According to law, every child is to attend school from the age of six years to that of fourteen, and afterwards to receive instruction in the Sunday-school to the age of eighteen. The private literary societies are numerous.

Revenue.—The finances are in a prosperous condition; the budget is voted for three years; the estimated annual expenditure is something more than nine millions of florins, and the ways and means were calculated in 1835 to afford a small surplus of only 6000 or 7000 florins; at the end of the three years, in 1838, it was found however that the revenue had exceeded the expenditure by 4,731,000 florins, so that the government was able to take off some taxes and pay off a portion of the public debt. The debt amounted on the 30th of June, 1838, to 24,354,202 florins, almost the whole (23,378,000 florins) at 4 per cent.

The Army.—Every subject of Würtemberg is liable to serve as soon as he has completed his twentieth year, and he has to serve six years. The army consists of eight regiments of infantry, four of cavalry, two battalions of artillery, two garrison companies, and a squadron of yagers; in all 18,988 men, including 387 officers: this is the war establishment; but in time of peace only between 5000 and 6000 men are embodied.

Constitution.—Würtemberg is an hereditary monarchy. The king governs according to the existing constitution, which was happily completed in 1819 by the present king. His father had drawn up a constitution in 1815, and convoked an assembly of the estates of the kingdom, to which he presented it, fully expecting that it would be joyfully accepted; but the assembly rejected it, and, all negotiations having failed, he was obliged to leave the work unfinished at his death, in 1816, to his son and successor, who, for above two years, was equally unsuccessful, but in 1819 he was so fortunate as to agree with the estates on a constitution which has given general satisfaction. According to this constitution Würtemberg is a constitutional representative kingdom, with a diet or parliament, consisting of two chambers. The chambers have a share in the legislature, have the right of presenting addresses and petitions to the king, and of granting taxes. No law can be altered or abrogated without their consent. The king's person is inviolable, and he is not responsible for the acts of the government; but all his ordinances must be countersigned by the minister to whose department they relate, and who is responsible for them. The crown is hereditary in the direct male line, according to the order of primogeniture; and if the male line becomes extinct, in the female line. The constitution secures to the subject every reasonable degree of civil and religious liberty, Christians of the Lutheran, Calvinistic, and Roman Catholic faith being placed on a footing of perfect equality. The liberty of the press was indeed much restricted, if not abolished, by a decision of the German diet of the 10th of October, 1819, to which Würtemberg, as a member of the German Confederation, was bound to conform. Würtemberg has the sixth place in the German diet, and has four votes in the full council. Its contingent to the army of the Confederation is 13,995 men, viz. infantry, 11,856; cavalry, 1750; artillery, 724; with 24 pieces of cannon and 115 pontoneers. Its annual contribution to the chancery of the Confederation is 2000 florins.

History.—At the beginning of the fourth century the Alemanni appeared in the country, afterwards called Suabia, as successful and dreaded enemies of the Romans; but in 496 the Alemanni were overcome by the Franks under Clovis. This country, as a part of Austrasia, subsequently belonged to the kingdom of the Franks, under whose kings it was governed by dukes. About this time Christianity was introduced into Germany (Alemannia). When Germany was governed by kings of its own nation, we find Suabia under dukes, who were often changed; and, according to the policy of those times, the emperor's own sons were often put in their place. When the princes of the house of Hohenstaufen, who had become dukes of Suabia, had acquired the Imperial crown, they caused Suabia to be governed by members of their family. Philip laid the foundation for the decline of his house, since, in order to gain adherents as emperor, he sold and gave away a great part of the hereditary estates, and thus created a great number of petty principalities in this part of Germany. With the death of Conradin, in 1268, the duchy of Suabia was entirely ruined, and the subsequent attempt of Rudolph I. to restore it was fruitless, for most of the petty lords maintained their independence. Ulrich, count of Würtemberg, who reigned from 1246 to 1265, is the acknowledged founder of the family now on the throne. The accounts up to his time are little more than mere names, and so vague and uncertain, that it is not even positively known who was Ulrich's father. He died in 1260, and left his dominions, considerably enlarged, to his two sons, of whom Ulrich II. died in 1279, and was succeeded by his brother Eberhard, who was a minor only fourteen years of age. Eberhard, who acquired the surname of 'The Illustrious,' was one of the most distinguished princes of his line, and his long reign was marked by great vicissitudes of fortune. The time at which these two brothers commenced their reign was that in which no law had any force but the right of the strongest (*das Faustrecht*). This state of things was exactly suited to the restless and daring spirit of Eberhard, whose motto was, 'God's friend; everybody's enemy.' Above all he made the Imperial cities, which were rising in importance, feel the weight of his arm; for, like the petty lords, they were taking advantage of the unsettled state of the duchy to make themselves independent; but their increasing wealth laid the foundation for that jealousy which, under the name of the 'War of the Cities,' continued with little interruption for nearly two hundred years. At first he headed a confederacy against Rudolph I., in which, after partial successes, he was on the point of ruin, when peace was brought about, in 1287, by the mediation of the archbishop of Mainz. Eberhard submitted to the emperor; but fresh disputes arose between him and the emperors Rudolph and Albrecht, which however were terminated by an amicable arrangement in 1304. The country suffered dreadfully by this continued warfare. On the death of Albrecht, in 1308, Eberhard was a candidate for the German crown; but the princes, dreading his ambition and rapacity, elected Henry, count of Luxemburg. The new emperor held his first diet at Speyer (Spires), and Eberhard was summoned to appear and answer the complaints of the Imperial cities. He appeared indeed, but with a suite of 200 horse, and withdrew, declaring that he was nobody's vassal. He was then put under the ban of the empire, and an army was sent to enforce the decree. Eberhard defended himself bravely, but his enemies were too powerful: in two years they got possession of the whole country, and he had scarcely time to escape and seek refuge with his brother-in-law, the margrave Rudolph of Baden, who concealed him in a tower. The enemy committed unbounded excesses, even violating the sepulchres of the dead. But Henry dying in 1313, Eberhard's enemies were discouraged, and with the aid of his brother-in-law he speedily recovered the whole of his territory. He was now as powerful as ever, and in the last years of his reign acquired considerable additions to his dominions. At the close of his life he got into a dispute with his brother-in-law, and a defeat experienced by his son in attacking the castle of Reichenberg hastened his death in 1325, after a most eventful reign of sixty years (*i.e.* from his father's death).

Eberhard's son, Ulrich III., was of a pacific temper, who however could not avoid some disputes with his neighbours. During his reign the country was afflicted with severe drought, swarms of locusts (1339), a terrible earthquake, a most dreadful famine, and the plague (1342). All these misfortunes were ascribed to the Jews, who were cruelly persecuted. Ulrich made some important acquisitions of territory. He died in 1344, leaving two sons, Eberhard II. and Ulrich III. After reigning together eighteen years, Ulrich wished to have the country divided between them, which Eberhard wisely prevented; and Ulrich dying without children in 1366, Eberhard reigned alone. He was of the same warlike and enterprising spirit as his grandfather, and was engaged till the end of his life (1392) in perpetual feuds, on which account he was surnamed 'The Quarrelsome.'

Eberhard II. left a grandson, Eberhard III., who was called 'The Peaceable,' for he never had recourse to arms unless compelled to do so: this was a great blessing to the country; but the extravagant splendour of his court occasioned the most ruinous expenditure, and compelled him to sell or mortgage many of the acquisitions of his predecessors. He died in 1417. His son Eberhard IV. reigned only two years, and left two sons, who were under the guardianship of their mother till one of them attained his majority, which was fixed at fourteen years of age. He governed in his own name and that of his brother till the two were of age, in 1433; but family differences, fomented by their mother, led in that year to the division of the country between them, thus founding two lines, the Urach and the Stuttgard lines. This division continued till 1482, when Eberhard V., of the Urach line, called also the Elder, to distinguish him from his cousin of the Stuttgard line, who, sensible that his dissolute and prodigal way of life rendered him unfit for government, made a convention with the latter, to whom he resigned his territory for an annuity, and thus the whole country was again happily re-united. This Eberhard, who had led a very irregular course of life when a youth, devoted himself, after attaining the sovereignty of the whole country, to promote the happiness and welfare of his people. To him Würtemberg is indebted for laying the first foundation of a representative constitution. He was very highly esteemed by the emperor Maximilian, who, at the diet at Worms, on the 21st July, 1495, conferred on him the title of duke of Würtemberg and Teck. He died however on the 24th February, 1496, and Maximilian soon afterwards declared at his grave, 'Here lies a prince who has left no equal in the German empire in princely virtues, whose advice I have frequently followed with advantage.' His cousin (who had before resigned the government to him) now succeeded him; but proving no better qualified for government than he was in his youth, he was deposed in 1498, and succeeded by his nephew Ulrich, who was only eleven years old. Ulrich was declared of age in 1503, and reigned till 1550; but though the commencement was brilliant, and much good was effected in this long period, yet the duke's conduct was so extraordinary, with so many outbreaks of tyranny, cruelty, and caprice, that he was involved in constant troubles, drew on himself the ban of the empire, caused his subjects to rebel, and gave reason to believe that he was afflicted with a portion of the insanity for which his father was confined.

His son Christopher, born in 1515, who succeeded him, had suffered from his youth many hardships and misfortunes. Assuming the government at the age of 35, he proved to be a prince endowed with the noblest qualities of the mind and heart, and possessed of great talents, so that his reign of eighteen years was an inestimable blessing to his people. His activity was indefatigable. Among the benefits due to him are the complete establishment of the Protestant religion, and the founding of a constitution in church and state, all the main features of which remain to this day, He was succeeded by his son Lewis, who reigned only two years, and, leaving no children, was followed by his cousin Frederick I., whose reign from 1593 to 1608 was not distinguished by any very remarkable event. He was succeeded by John Frederick, the eldest of his four sons. His first step was to endeavour to make some fixed arrangements with respect to the rank and station to be held by his brothers, with whom he at length, in 1617, concluded a compact, which has become a fundamental law. He was a well-meaning but weak and irresolute prince, by no means equal to the emergencies of the times—such as the dissensions between the Protestants and the Roman Catholics, the plans of Austria to make all Germany an hereditary monarchy, and the Thirty Years War, which began in 1618, but of which he saw only the first ten years, during which his dominions were ravaged by Tilly and Wallenstein. His eldest son Duke Eberhard II. reigned from 1628 to 1674. Though he was not equal to the difficult circumstances of the war, which continued to afflict Würtemberg, yet after the peace, supported by faithful and able counsellors, he found means greatly to heal the wounds which the country had received. His son William Lewis reigned only three years, and was succeeded by his son Eberhard Lewis, who was only nine months old, and a regency governed till he was of age. The reign was not a happy one; the desolation of the palatinate by the French and the war of the Spanish succession caused Würtemberg to be repeatedly plundered by the French. The duke himself behaved with great bravery at the battle of Blenheim, but this did not save his dominions from further ravages; and after the conclusion of the peace, Austria, to whose interests he had devoted himself, treated him with ingratitude, and refused him the electoral dignity, which was given to Hanover. On his death in 1733, he was succeeded by Charles Alexander, who had distinguished himself as field-marshal in the Austrian service. This was a favourable circumstance, because the dispute about the crown of Poland threatened a new invasion of Germany by the French, who in fact sent an army over the Rhine under Marshal Berwick. The danger was happily averted. Charles Alexander had embraced the Roman Catholic religion, but he satisfied his subjects by the most solemn assurances that no change should be made in the religious establishment. He reigned only till 1737, leaving three sons, all of whom in turn reigned after him. His eldest son Charles was only nine years old, and was brought up from 1741 with his brothers at the court of Frederic II. of Prussia, where he gave promise of possessing all the qualities requisite in a good prince. He entered on the government in 1744, but he turned out a most extravagant and ostentatious prince, wholly negligent of his duties, engaged in disputes with the Estates of the kingdom, and did himself no credit by the part he took with France against Frederic II. in the Seven Years' war. However, as he grew older he became sensible of his faults; on the fifty-fourth anniversary of his birth-day (Feb. 11, 1778) he acknowledged, in a manifesto drawn up by himself and ordered to be read in the churches, all his former errors; and from that time to the end of his reign, in 1793, gained the love of his people by economy and respect for the constitution—a change which was partly ascribed to his second wife. His brother Lewis Eugene, who succeeded him, was a highly honourable and kind-hearted man, but did not fulfil the expectations that had been formed of his talents. He died after a reign of little more than a year and a half, and was succeeded by his next brother, Frederic Eugene, who had gained great reputation in the Prussian army during the Seven Years' war. He was a man of talent, and well disposed to do everything for the good of his country, but the French revolution, which had commenced three years before his accession, was doubly fatal by causing Würtemberg to be repeatedly traversed by hostile armies, and by the propagation of a revolutionary spirit, especially among the youth. The French crossed the Rhine on the 24th of June, 1796, and on the 18th of July entered Stuttgard; and the Austrians being obliged to retreat, the duke was compelled to purchase peace with eight millions of francs and the cession of Mömpelgard. The duke convened an assembly of the Estates, in March, 1797, to deliberate on the means of repairing the disasters of the country, but he could not come to any agreement with them, and died of apoplexy, on the 23rd of December, 1797. He was succeeded by his son, Frederic William Charles, to whose life, in vol. x. of the 'Penny Cyclopædia,' we refer for the subsequent events.

(J. D. G. Memminger, *Beschreibung von Würtemberg*, Stuttgard, 1822; A. Fischer, *Würtemberg und seine Bewohner*, Stuttgard, 1837; *Der Weimarsche Almanach*; Brockhaus, *Conversations-Lexicon;* Hassel; Cannabich; Stein; Hörschelmann.)

WÜRZBURG, the capital of the Bavarian circle of the Lower Main, is situated in 49° 45′ N. lat. and 9° 56′ E. long., in a beautiful valley on the two banks of the river Main, over which there is a bridge 200 yards long, adorned with twelve colossal statues of saints. A bishop's see was erected here so long ago as the year 741, and the bishops, having gradually obtained large grants from the dukes of Franconia, acquired a territory of nearly 2000 square miles in extent, with 250,000 inhabitants, which formed the principality of Würzburg. The revenues of the prince bishop were 500,000 florins. As Würzburg has been for 1100 years the see of a bishop, and for a great portion of that long period the capital of a considerable principality, governed by a succession of above 80 bishops, who were princes of the empire, and by their power and wealth exercised great influence in Germany, we cannot be surprised at the number of handsome buildings, especially churches, which we find in this city. Of the churches which remain, some are either incomplete or have been injured by modern additions. The principal are, 1, The Cathedral, said to have been originally founded in the eighth century, but which was wholly rebuilt subsequently to 1042. It contains many fine paintings, and a long series of monuments of the bishops, each bearing the sword in one hand and the crozier in the other. The chapel of Bishop Schönborn is very richly or rather gorgeously adorned with a profusion of marble and gilding. 2, The church of St. John im Haug, built on the model of St. Peter's at Rome. 3, The New Minster, containing the relics of St. Kilian, one of the earliest preachers of the gospel in Germany. He was an Irish missionary, and is considered as the apostle of Franconia. 4, St. Mary's, an elegant edifice, built in the years 1377 to 1479, in the true German pointed style, with lofty lancet windows: and, 5, The University church (now closed), with the observatory on its lofty tower. The most remarkable of the secular buildings are, 1, The splendid episcopal palace, called also the royal residence, though rarely inhabited by the royal family. It was built by two bishops of the name of Schönborn, 1720-1744. It is an imitation of the palace of Versailles, is 270 feet long, 60 feet high, and forms a parallelogram with two projecting wings. It consists of six quadrangles, and contains 254 rooms, and cellaring for 2200 tuns of wine. The grand staircase is celebrated for its magnificence and the elegance of its design. The suite of apartments formerly occupied by the emperors on their way to Frankfort have fallen into decay through neglect and the lapse of time. 2, The Julian Hospital, a very large, wealthy, and admirably arranged institution. 3, The town-hall. 4, The University, with all the necessary appendages; a clinical establishment, an anatomical museum, a collection of instruments, a neat library of 100,000 volumes, a cabinet of works of art, &c.

The charitable and useful institutions are very numerous; among them are a gymnasium, a seminary for priests and schoolmasters, a veterinary school, a polytechnic institution, a school of industry, a Sunday school of design for mechanics and journeymen, schools for the blind, for midwifery, for swimming, and four hospitals, besides the Julian hospital already mentioned. There are manufactures of all kinds, but none on a very large scale.

In the smaller division of the city, on the left bank of the Main, there is a steep hill or rock, called the Frauenberg, or Marienberg, about 400 feet high, on which the citadel stands. It is pretty strong, and, together with the portion of the city called the Main quarter, is capable of standing a siege. The view from the citadel is very fine; the city itself, with its numerous towers and steeples, has a most striking appearance; and the bright Main, here a considerable river, with numerous boats and barges, flowing with many windings through the richly cultivated valley, gives a charming variety and animation to the scene. On the steep southern declivity of the Marienberg, called the Leiste, containing about 60 acres, grows the celebrated Leisten wine, one of the very best sorts of Franconian wine; and on the Steinberg, which is at no great distance, grows the Stein wine (Stone wine). On the whole there are, in the immediate vicinity of the city, 7000 acres of vineyards and many large gardens. Near the city is a hill called St. Nicholas Hill, or the Chapel Hill (*Kappellenberg*), from a very handsome church or chapel, which is a much-visited place of pilgrimage. On the ascent there are many small chapels with the stations of the Passion of our Saviour. The view from the summit is nearly equal to that from the citadel.

The population of Würzburg is 25,000, besides the garrison. The inhabitants derive some advantage from the city being the seat of the tribunals and other public offices of the circle, and the residence of the bishop and chapter; but their subsistence is chiefly derived from their gardens and vineyards. They have a considerable export trade, by means of the Main, of the productions of the country, especially their highly esteemed wines.

(Brockhaus, *Conversations-Lexicon;* Hassel, *Erdbeschreibung*, vol. iv.; Stein, *Geogr. Lexicon; Der Weimarsche Almanach;* Murray's *Handbook of Southern Germany;* Cannabich, *Lehrbuch der Geographie.*)

WURZEN, a town in the kingdom of Saxony, is the see of a suffragan bishop, founded by Bishop Henry, in 1114, in the circle of Leipzig, near the river Mulde, on the road from Dresden to Leipzig, 12 miles from the latter city. The principal buildings are—the cathedral, which contains numerous monuments of the bishops; the church of St. Wenzel; the palace, built in the years 1491-1497; the town-hall and the chapter-house, in which the Protestant canons meet every other year. Wurzen was unquestionably a much more important place in former times than it now is. It has suffered dreadfully in the many wars which have desolated Germany in the last four or five centuries, but especially in the Thirty Years' War, when it was taken and burnt, in the Christmas week, by the Swedes, who committed the most horrible barbarities and excesses. There are now nearly 4000 inhabitants, who gain their living by bleaching, weaving, knitting, and basket-making.

(Brockhaus, *Conversations-Lexicon;* Engelhardt, *Vaterlandskunde.*)

WYATT, SIR THOMAS, called 'the Elder,' to distinguish him from his son, the subject of the next article, was born at Allington Castle in Kent, in the year 1503. His father, Sir Henry Wyatt, the representative of a family of some consequence, originally from Yorkshire, appears to have bettered his worldly fortune by attaching himself to the rising fortunes of Richmond, afterwards Henry VII. He was imprisoned in the Tower, in the last years of Richard III., and treated with great severity. Immediately after the battle of Bosworth, he was liberated, and must have been early placed by Henry in situations of emolument, for in 1493 he was able to purchase the castle of Allington. He was one of the executors of Henry's will, and appears to have enjoyed as much favour from the son as from the father. He obtained a grant of part of the estates of Empson, the first that were forfeited to the crown in the reign of Henry VIII. He survived till 1538.

Nothing is known of the tenor of Thomas Wyatt's life previous to his being entered of St. John's College, Cambridge, in 1515, when he was twelve years old. He took his bachelor's degree in 1518, and proceeded to his Master's degree in 1520. The next incident in his life, the knowledge of which has been preserved, is his participation in a magnificent feat of arms performed before the king at

Greenwich, at Christmas, 1525. He was then one of the gentlemen of the king's bedchamber. He was married by this time to Elizabeth, daughter of Brook, Lord Cobham. The year of his marriage is not known, but his eldest son Thomas was born either in 1521 or 1523. A long interval of seven years, entirely barren of events, succeeds. In 1532 he was one of Anne Boleyn's train when she went from Dover to Calais a short time before her marriage; and in July, 1533, we find him officiating for his father as ewerer at her coronation.

This meagre array of incidents merely indicates that Wyatt was a young gentleman who had been well educated; early 'settled in life' by marriage; and introduced at court under the auspices of a father who had influence enough to obtain for him appointments suited to his age. He had already obtained some reputation as a poet, for Leland, in some Latin verses addressed to him from Paris, compliments him on his compositions. In person he was strong, but elegant; with fine features, a penetrating eye, and a mouth of singular sweetness. He was dexterous in the use of arms; he sung, played well on the lute, and he spoke French, Italian, and Spanish with fluency. His readiness at repartee is a constant theme of his contemporary eulogists.

There is much perplexity in the accounts of the danger in which he was involved on account of Anne Boleyn. So contradictory are the statements, that it is impossible to decide at what time he was placed in peril, and whether as friend or foe of that lady. Fuller's 'Sir Thomas Wyatt fell, as I have heard, into King Henry's disfavour about the business of Anne Boleyn, till by his industry, innocence, and discretion he extricated himself'—admits of either interpretation. Judging by Henry's character, it seems more probable that Wyatt fell into temporary disgrace from having shown his aversion to the match, than from his having been suspected of too much intimacy with the lady. Anne Boleyn, it may be observed, was executed in May, 1536; on the 18th of March of that year Wyatt was dubbed a knight by the king; and in 1537 he was with the king's sanction nominated high sheriff for Kent at a period of considerable danger.

The remaining part of Wyatt's life was passed in the toils of diplomacy and anxieties of court intrigue. In April, 1537, he was appointed to succeed Pate as Henry's minister at the Spanish court. He remained at Madrid till the beginning of 1538. In May he was sent back to Spain (Bonner being joined in commission with him); in June he followed the emperor Charles V. to Nice on his expedition to meet the Pope and Francis I.; in July he was with Charles at Barcelona. In April, 1539, he was recalled, but was detained in Spain till June. The principal service he performed for his king during his Spanish mission was keeping him informed of the intrigues of the court. The indifferent reception that Cardinal Pole experienced at the hands of Charles V. at this time was attributed to the dexterous management of Wyatt. He had urgently solicited to be recalled for nearly a year before he could obtain his wish. His desire to return to England was excited in part by the necessity of looking after his family concerns, his father having died about this time; and in part by the necessity of being at hand to meet the charges brought against him by Bonner. The distaste he entertained for Spain was probably occasioned in a great measure by the anxious state of his mind. All his verses written at this time are in a desponding tone. When not engaged in business he employed himself in corresponding with his son, or in superintending the education of a young person of the name of Baker, recommended to his care by Wriothesly, or in composing verses. He mixed little in society; his principal associates were the ambassadors of Venice and Ferrara.

He was not allowed to remain long unemployed. Towards the close of 1539 the emperor began his journey through France into the Netherlands, and in November Wyatt was appointed ambassador-extraordinary to the imperial court, with instructions to join Charles on his road through France, Wyatt joined the emperor at Blois, on the 11th of December, accompanied him to Paris, and left that city on the same day with him (7th January), proceeding direct to Brussels, there to await his arrival. He continued in attendance on the court at Brussels and Ghent till about the middle of May, when he returned to England. Wyatt had zealously seconded Cromwell in promoting the match between Henry and Anne of Cleves. During his residence in the Netherlands he consistently advocated the policy of supporting the duke of Cleves and the Protestant princes of the empire. By this course he ran counter to the inclinations of the king, and, in common with Cromwell, lost favour with him.

Wyatt had grown averse to business, having been disgusted with the falsehood of the statesmen with whom he had to deal; but prudence had also a share in his resolution to retire from his diplomatic career. He was aware that Cromwell's enemies were gaining the ascendency, and knew that the fall of the minister would involve his own. He was not mistaken. Although Henry received him on his return in a manner that seemed to imply satisfaction with his conduct, he was arrested, towards the close of 1540 or the beginning of 1541, on the old charges of Bonner, which had been understood to be departed from. Although neither allowed to cross-examine Bonner's witnesses nor produce any of his own, he was acquitted, about the month of June, 1541. On the 10th of July following he obtained a grant of lands in Lambeth from the king; in 1542 he was created High Steward of the king's manor of Maidstone; and in the same year he received additional valuable grants. These favours would seem to imply that Henry was convinced of his loyalty and satisfied with his services.

The brief remainder of his life was spent in retirement at Allington. He has himself informed us that when the season permitted he was used to hunt and hawk; that in the depth of winter he was fond of shooting with his bow; and that when the weather confined him to the house, he devoted himself to study or the composition of verses. In October, 1542, he was unexpectedly summoned to attend the king, and, eager to show his zeal, overheated himself in his hasty journey. He was seized in consequence with a fever at Sherborne, and died there on the 11th of the month.

Wyatt was one of the most elegant and accomplished courtiers of his age; and a statesman of great sagacity, dexterity, and integrity. There were four reasons, it is remarked by Lloyd, why men went to dine with him:—'First, his generous entertainment; secondly, his free and knowing discourse of Spain and Germany, an insight into whose interests was his masterpiece, they having been studied by him for his own satisfaction as well as from the exigency of the times; thirdly, his quickness in observing, his civility in entertaining, and his readiness in encouraging every man's peculiar parts and inclinations; and lastly, the favour and notice with which he was honoured by the king.' Wyatt has left writings both in verse and prose. His amatory verses are, in regard to matter, much like other amatory verses. Their language, though less fluent than that of modern ballad-mongers, who have a language made rhythmical to their hand, is sufficiently polished to entitle him to be regarded as one of those whose works mark the progress of the language. His satires have more of matter in them, and more of nerve in the versification. The first is remarkable as containing the earliest English version of the Town and Country Mouse. Of Wyatt's prose writings, his letters on state business show much shrewdness; his letters to his son exhibit a pure, elevated, and well disciplined mind. Taking into account the time at which he wrote, his prose has always struck us as more to be admired than his verse.

(Nott's edition of the *Works of the Earl of Surrey and Sir Thomas Wyatt the elder.*)

WYATT, SIR THOMAS (the Younger), only son of the preceding, was born in 1520, or at the latest in January, 1521. He was married to Jane, daughter of Sir William Hawke, of Bourne in Kent, in 1536 or 1537, when he could not have been more than fifteen or sixteen years old. It has been conjectured that his father was induced to settle him thus early in life with a view to give greater stability to a character which threatened to be unsteady. The supposition is rendered plausible by the tone of two letters addressed by the father to the son a year or two after the marriage, which have been published by Mr. Nott.

In October, 1542, Wyatt succeeded to his father's estates: and before little more than a year had elapsed, executed a deed (discovered by Mr. Caley in the Augmentation Office), which further corroborates the suspicion of the wildness of his youth; an alienation of his estate of Tarrant in Dorsetshire in favour of Francis Wyatt, his natural son by the daughter of Sir Edward Dorrel, of Liddlecote. In April, 1543, he had been imprisoned for assisting the earl of Surrey in breaking the windows of the citizens of London at night with stones shot from a crossbow. Surrey gravely stated in after-life that his intention was, by frightening the citizens through the sudden and mysterious breaking of their windows, to turn them to repentance; but this ingenious defence, if alleged before the privy council, availed neither himself nor his accomplices Wyatt and Pickering.

After his release from the Tower, Wyatt raised a body of men at his own expense, and did good service with them at the siege of Landrecy. It appears from the statements of Churchyard that the military talents of Wyatt were soon acknowledged. Early in 1545 he was placed in command at Boulogne, and constantly employed against the French in that quarter. When Surrey was appointed governor of Boulogne, in September, 1545, Wyatt was made one of his council. 'I assure your majesty,' Surrey wrote to Henry VIII. respecting Wyatt, 'you have framed him to such towardness of knowledge in the war, that, none other dispraised, your majesty hath not many like him in your realm for hardiness, painfulness, and circumspection, and natural disposition to the war.' Wyatt continued to hold his situation at Boulogne after Surrey's recall, and even, it has been assumed, till the place was finally given up to the French in 1550.

During the latter part of the reign of Edward VI. Wyatt appears to have lived chiefly at Allington. The part he took immediately after the king's death is ambiguous. Sir John Bridges subsequently reproached him in words which seem to imply that he had appeared in arms in favour of Lady Jane Grey; but Wyatt in his defence before the privy council asserted that 'he had served the queen against the duke of Northumberland, as my lord of Arundel can witness.'

In the year 1554, when the Spanish match was in agitation, Wyatt was persuaded to take the command of the Kentish men in the rising concerted with the duke of Suffolk. The other conspirators were surprised before they could proceed to action, but Wyatt with his forces having gained some considerable advantages over the royalists, pushed on to Southwark. An attempt to surprise Ludgate on the 7th of February failed, and he with one or two of his followers were separated from the body of his troops and taken in Fleet Street. His conduct at the moment of his capture, as narrated by Stow, gives him the appearance of one who had completely lost his self-possession. He was not tried till the 15th of March, and he is accused during the interval of having implicated Elizabeth and others by his confessions, in a way neither creditable to his courage nor his fidelity. When however the attorney-general charged him on his trial with having brought the Lady Elizabeth in question, he replied, 'I beseech you, being in this wretched state, overcharge me not, nor make me seem to be that I am not. I am loth to accuse any person by name, but that I have written I have written.' He was executed on the 11th of April.

Sir Thomas Wyatt appears to have been a zealous Protestant in theory, although religion does not seem to have exercised much practical influence on his conduct. In his youth he appears to have been wild rather than licentious. He was possessed of strength and address, and that kind of courage which carries a man with éclat through a battle-field, but breaks down under adversity and imprisonment. His tone when taken prisoner at Ludgate, and on his trial, was that of a man bewildered and borne down by his reverses. He does not appear to have possessed any of his father's literary talent. It is probable however that he had some taste for letters, or was at least capable of taking pride in his father's distinction. The Harrington MS. (quoted by Mr. Nott) contains Sir Thomas Wyatt's (the Elder) poems in his own hand-writing, arranged into two classes, and numbered by his son, who had also copied into the volume two letters of advice which his father sent him from Spain.

(Nott's *Works of Henry Howard, Earl of Surrey, and of Sir Thomas Wyatt the Elder*, vol. ii., pp. 89-98; Holinshed and Stow.)

WYATT, JAMES, a very eminent architect, if not one of pre-eminent talent, notwithstanding that there is no memoir of him in Cunningham's 'Lives of British Architects,' and that his name has been omitted in a list of architects by a professional writer; for, deservedly or not, he certainly was celebrated among his contemporaries, and occupies a very conspicuous place in the history of the art in this country during the latter part of the eighteenth and the beginning of the nineteenth century. He was born in 1746, at Burton Constable in Staffordshire, where his father was both a farmer and a dealer in timber; and at an early age was introduced to Lord Bagot, who, being then about to set out for Italy as ambassador to the pope, took him with him, from which it is to be supposed that his lordship must have been struck by some symptoms of extraordinary talent, to take charge of a boy of fourteen in order to afford him the opportunity of pursuing studies which he could then hardly have commenced. Arrived at Rome, young Wyatt spent three or four years in that city, examining and measuring the principal monuments of antient architecture, but, it would seem, without imbibing any taste for its modern ones, since no traces of it are discoverable in his own works. On quitting Rome he proceeded to Venice, where he studied for about two years more under Vicentini, an architect and painter, and then returned to England, after being absent altogether about six years, that is, till about 1766 or 1767. Whether his early patron continued to notice, or helped to push him in his profession, we are unable to say; neither do we know with whom the scheme of the Oxford Street Pantheon originated, or whether Wyatt had actually executed anything previously to being employed upon that building, which was finished and opened in 1772; but it at once stamped his celebrity, and he thenceforth became the 'fashionable' architect of the day. 'The Winter Ranelagh of the metropolis,' as Walpole calls it, established under the auspices of high fashion, and itself the fashion and the rage as a place of amusement, was admired of course by all who pretended to taste or good breeding. It was fitted up in a style of splendour till then unprecedented in this country, and was eminently attractive as the resort and rendezvous of the gay world; yet how far it merited all the encomiums passed upon it as a work of architecture, it is now hardly possible to decide. Of the original structure nothing now remains except the front towards Oxford Street, rebuilt after the fire, and subsequently altered; nor, though it was esteemed a masterpiece, has any publication of the original designs preserved to us an authentic memorial of Wyatt's Pantheon. There exist indeed views of the great room, or 'rotunda,' but they are such that very little reliance is to be placed upon them; and even were they satisfactory in themselves, they furnish very imperfect information; nor is more to be obtained from description, nothing deserving to be so called having been written at the time.

Greatly as it was admired, the Pantheon did not procure for Wyatt a second opportunity of distinguishing himself in the metropolis by any other building of note, either public or private. Commissions poured in upon him, but all from different parts of the country, and chiefly for private residences, the majority of which hardly aspired to the character of mansions. Taken collectively, that class of his works afford stronger evidence of extensive practice than of superior talent. Considered individually, their architectural merit is of rather a negative kind. As houses they are commodious and handsome; but when looked at, they show themselves to be the works of an able builder rather than an architect, and exhibit far more of clever mannerism and of uniformly respectable mediocrity than of style or artist-like treatment, they being nearly all variations of the same design. James Wyatt was a degree or two less frivolous than Adam, yet hardly more dignified: nevertheless it must be acknowledged that we are greatly indebted to both of them, if not for the taste, for the superior accommodation and the refinement of comfort which they introduced into our domestic architecture. Wyatt's Grecian style, admired in his own day for its then almost proverbial 'simplicity' and chasteness, now strikes us as being very jejune and bare, and not so marked by as deficient in that artistical simplicity which results from uniform finish throughout, perfect harmony of character, and unity of expression. There is more of the pretty than of the beautiful, of the neat than of the elegant, of the plain than of the simple, in his so-called Grecian or Greco-Italian style; nor could it perhaps be better described than as a sort of genteel commonplace. Probably he would have done more in his art had he been employed on fewer works, for the multiplicity of his professional engagements prevented him from bestowing much study on the respective designs. It has been recorded of him as matter for admiration that he was in the habit of improvising his designs while travelling in his carriage to the places he was about to be employed at; no wonder therefore that so many of them present such sameness and poverty of ideas, and so very little study, being apparently little more than first hasty sketches, with hardly any revising.

Accustomed to this specious commonplace and indolent fertility, he could scarcely rise above it on occasions which either demanded or afforded opportunity for achieving something really noble. His design for Downing College, Cambridge, where however he was not eventually employed, was animadverted upon in a letter from Mr. T. Hope to the architect himself, as being altogether unworthy of the occasion. Neither did Chiswick inspire Wyatt with any kindred feeling, for though the wings which he added to the house rendered it more commodious as a residence, they sadly marred its original grace as a finished gem of Palladian architecture.

About the time of James Essex's death (1784), the only architect of the period who had shown any knowledge of Gothic architecture in regard to its details, if not its principles, Wyatt began to turn his attention to that style, which he studied in the original examples. There was indeed then hardly any other course to be pursued, for there were no publications, as at present, to initiate the student into it, and facilitate his progress by exhibiting specimens of it in all its manifold varieties. What architects of the present day find delineated and measured for them on paper, and always ready for reference, Wyatt had to draw and measure for himself; it is therefore highly to his credit that under such circumstances, and amidst so many other avocations, he gained the insight into it which he did; and that he attained to correctness in his details and individual features, though not to a clear perception of the spirit and true character of the style. Very great allowance is therefore to be made for him, and it is most ungenerous to call him, as one who is himself distinguished by his knowledge of that style has done, 'James Wyatt of execrable memory.'

His first essay in that style was Mr. Barrett's at Lee near Canterbury (1783), and it was for the architect as happy a hit in its way as the Pantheon had been. Extolled by Horace Walpole, it served to bring thenceforward into vogue for modern residences a style of Gothic comparatively pure for the time, yet what would now be termed 'mongrel,' correct in particular features and details—even those however too ecclesiastical, ill applied, and put together without regard to propriety of character. From that time Wyatt became 'the restorer of our antient architecture,' and he certainly was pre-eminent, standing as he did singly without rival or equal. However little merit criticism may now award to the generality of his productions of that class, we are certainly in no small degree indebted to him for the practical revival of Gothic, although we now perceive that he did not adopt the best course. In the way of making alterations and 'improvements' in the older edifices in that style, he was extensively employed at some of the colleges at Oxford and at the cathedrals of Salisbury and Lichfield; but what he did at these last have since been considered rather 'destructions' than 'restorations,' and even at the time occasioned very strong remonstrances. In that splendid caprice Fonthill Abbey, erected for Mr. Beckford, and now dismantled, there was more of magnificence than propriety of character: instead of being palatial, the edifice was modelled externally after a church, and even as such by no means very happily in its general form and proportions. While employed upon it he succeeded Sir W. Chambers, in 1796, as surveyor-general, which led to his being employed at Woolwich and the House of Lords, and by George III. at Windsor Castle and at Kew, where he began to erect for the king a castellated palace, never completed, and since entirely demolished. In 1802, on West's retiring from the office of President of the Royal Academy, Wyatt became his successor, to the no small dissatisfaction of that body, who viewed with jealousy an architect in the chair. He was however not very long seated there, for the following year West was re-elected.

After this, scarcely any particulars have been recorded of his life, although materials for a full professional biography of him may possibly be in existence. He himself has left none by publishing any of his numerous designs, whereby authentic memorials would have been preserved to us of the Pantheon and some other works of his. Of Fonthill we have illustrations in two works, the one by Britton, the other and more complete one by Rutter; yet both together do not afford that satisfactory architectural information which could be desired.

Wyatt died September 5th, 1813, in consequence of being overturned in a carriage while travelling from Bath to London. He left a widow, who survived him till January 27th, 1817, and four sons, one of whom, Benjamin, was the architect of Drury Lane Theatre. Notwithstanding his very extensive and lucrative practice, James Wyatt was so far from accumulating a considerable fortune, as others in the profession have done, that he was often involved in pecuniary difficulties, which may have been one reason why he did not care to incur the expense of engraving any of his designs or buildings. Of these last we subjoin a list, which, though scanty and imperfect, may be found convenient as far as it goes, notwithstanding that several dates require to be supplied.

1770-2 Pantheon, Oxford Street, London (burnt down January 14th, 1792).

1778 Doric Gateway, Canterbury Court, Christ Church, Oxford.

1783 Lee, in Kent.

1786 Observatory, Oxford.

1788 Library, Oriel College, Oxford: Ionic.

1789 Salisbury Cathedral: alterations.

1789 Balliol College, Oxford: alterations.

1795 Fonthill Abbey, begun.

1796 Military Academy, Woolwich: castellated.

1797 Designs for alterations at Magdalen College, Oxford.

1800 Windsor Castle: alterations.

1800 House of Lords.

1801 Designs for Downing College, Cambridge.

Castle Coote, Ireland: Grecian.

Cashiobury.

Ashridge.

Gothic Palace at Kew, now demolished.

Mausoleum at Cobham, Kent.

Mausoleum at Brocklesby, Lincolnshire.

(*Gentleman's Magazine*, 1813; Cresy's *Translation of* Milizia; *Pictorial History of England; MS. Memoranda.*)

WYATVILLE, SIR JEFFRY, nephew to James Wyatt [WYATT], and son of Joseph Wyatt, was born at Burton-upon-Trent in Staffordshire, August 3, 1766, at the free-school of which place he received his education. At school he appears to have been of truant disposition, and was so far from displaying any predilection for studies connected with his future profession, that he was bent upon going to sea, and made two attempts to do so, the first at the age of only twelve, the second about two years afterwards, but on both occasions he was pursued and brought back. At the age of seventeen he was to have gone out with Admiral Kempenfeldt, in the Royal George, but being prevented from joining the vessel in time, he escaped the fate which awaited it at Spithead. Thus thwarted, he betook himself to the metropolis in the hope of finding some opportunity of entering into the naval service, but as the American war had terminated, no such opportunity offered.

These disappointments however were all so many turns of good-fortune, which reserved him for higher distinction than he might else have obtained, even had he risen to some high post in the navy. He was not left a friendless adventurer in the metropolis: his uncle Samuel, an architect and builder of some note and considerable practice (who erected the Trinity House, London; Heaton House, Lancashire; Tatton Hall, &c.), although almost obscure in the profession, in comparison with James, took him into his office for seven years. At the end of that period, in the course of which he had become fully acquainted with the routine and business of his profession, he served a sort of second apprenticeship with his other uncle James, and it was no doubt from him that he imbibed a preference for the Gothic and Old English styles. While with his uncle James, he was brought into contact with several persons of high rank and influence, and among others his future royal patron, then prince of Wales.

No great encouragement however, at least no oppor tunities seem to have been held out to him at that time from that quarter; for in 1799 he accepted the proposal made him by an eminent builder (Mr. John Armstrong) who had extensive government contracts to join in business with him.

The line of business he now engaged in was highly respectable, nor the less so because eminently lucrative; still it proved for about twenty years a bar to his admission into the Royal Academy as a member of that body, nor perhaps altogether improperly. It did not however prevent his being employed very extensively as an architect by many noblemen and gentlemen in various parts of the country, either in improving and making additions to their mansions or erecting new ones. Nearly all his works are of this class, however varied in themselves, with the exception of the new front of Sidney Sussex College, Cambridge (1833). He was not therefore so much known by repute to the public generally, as he might have been, had he been employed on buildings more open to notice.

It seems to have been unexpected by himself when he was summoned to Windsor by George IV. in 1824: and perhaps it occasioned some surprise in others, when it was first announced that Mr. Jeffry Wyatt was to be the architect employed in remodelling the Castle—such an opportunity for the display of talent as had not till then been offered to any one in the profession for full a century. Important as was that work, and great as was the celebrity derived from it to the architect, we need not enter into any account of it, that having been already given under WINDSOR CASTLE (p. 453, &c.), where also is mentioned how the architect lost the name he endeavoured to signalize, by its being transformed into that of Wyatville. That work nearly occupied him exclusively for the remainder of his life, during which he resided chiefly at Windsor, within the precincts of the Castle, in what is called the Wykeham Tower, at the western extremity of the north terrace; and where, after suffering for the last five years under an asthmatic complaint, he died, February 18, 1840, in his seventy-fourth year, and was buried in St. George's Chapel. Sir Jeffry had been a widower thirty years, having lost his wife (Miss Sophia Powell) in 1810; and of their three children, Augusta, the youngest and favourite daughter, died at Windsor, in 1825; and George Geoffry in 1833; Emma (Mrs. Hambly Knapp) alone surviving him.

It was the architect's good fortune to behold his great work brought to completion by himself, and it was his intention to publish the designs, which he directed to be done by his executors, under the superintendence of Mr. H. Ashton. The work was accordingly brought out on a magnificent scale in two volumes, large folio, 1841, and forms, as regards the exterior of the Castle, one of the most complete and elaborate series of illustrations ever published of any single edifice, but is nevertheless defective, inasmuch as, with the exception of the plans, there is nothing to afford any information with regard to the interior, which, if not exactly what Sir Jeffry wished to make it, contains much that would have been interesting both to professional men and the public. At present such omission is somewhat like a satire upon the taste of his royal patrons, if not upon himself, for in the interior of such a palace there ought to be a great deal worth exhibiting and worth studying.

It is further to be regretted that of his other works no authentic illustrations have been published in any shape, not even of the princely seat of Chatsworth, to which he made very extensive additions during the last twenty years of his life. He was also employed at Longleat Castle, Wilts, Wollaton Hall, Notts, and completed Ashridge, the seat of the earl of Bridgewater, which had been begun by James Wyatt; lodges and other buildings in Windsor Park; a temple at Kew; and alterations at Bushy for the queen dowager. There is a well-engraved portrait of Sir Jeffry, after one by Sir Thomas Lawrence, in Fisher's 'National Portrait Gallery,' from which work, and the memoir accompanying the 'Illustrations of Windsor Castle,' our chief materials have been derived.

WYCH-HAZEL, the common name of the species of the genus Hamamelis, the type of the natural order of plants Hamamelaceæ. The genus Hamamelis has a 4-lobed calyx furnished with three or four scales on the outside; an ovarium ending in two or three styles at the apex, a 2-celled, 1-seeded coriaceous capsule opening by two elastic valves; the seed oblong, shining, with a superior hilum; the albumen fleshy, the embryo with a superior radicle and flat cotyledons. There are four species belonging to this genus: two of them are inhabitants of North America, one of Persia, and one of China. They are small trees, having alternate leaves on short petioles, and yellow nearly sessile flowers, which are disposed in clusters in the axils of the leaves and surrounded by a 3-leaved involucrum.

H. virginica, Virginian Wych-Hazel, has obovate leaves acutely toothed with a small cordate recess at the base. This plant is a native of North America from Canada to Florida. It is found in dry and stony situations, and also near the side of waters. In its native districts it attains a height of about twenty or thirty feet, and has a trunk six or more inches in diameter. This plant is very remarkable from the fact that its flowers appear after its leaves have dropped off. In autumn and winter, when most other plants have lost their flowers and foliage, the Wych-hazel is covered with a profusion of yellow blossoms, which do not disappear till the leaves are beginning to be put forth in the following spring. The flowers of this plant present a great variety; sometimes they are all pistiliferous, sometimes all staminiferous, and sometimes they are all supplied with both stamens and pistils, and these again may be all mixed on the same tree. It is from this circumstance that several species have been made out in some works, and called *H. monoica*, *H. dioica*, *H. androgyna*, &c. Amongst the American Indians this tree is esteemed for its medical properties. The bark is supposed to act as a sedative, and is applied as a cataplasm to painful swellings. A poultice of the inner bark is also used as an application in inflammation of the eyes. This plant was introduced into Great Britain in 1736, but does not seem to have attracted the attention which it deserves. In the nurseries about London it seldom attains a height of more than 5 or 6 feet. Loudon however figures a plant in his 'Arboretum' which is growing at Ham House, and has attained a height of 15 feet. It does not require much attention in its cultivation, as it will grow in any light free soil kept rather moist. It may be propagated by layers and seeds; these latter however are not brought to perfection in Great Britain, and those brought from America should alone be used. They ought to be sown immediately on their arrival in this country. Nuttall has described a small variety of this plant which he calls *H. v. parvifolia*, on account of the smallness of the leaves. It is a native of the mountains of Pennsylvania.

H. macrophylla has nearly orbicular leaves, cordate, coarsely and bluntly toothed, and scabrous from dots beneath. This species was first described by Pursh, and is a native of North America, in the western parts of Georgia, and of North Carolina on the Catabaw Mountains. Some writers consider this only a variety of the Virginian species, but, independent of the difference in the character of its leaves, it blossoms from May to November, indicating a difference in habit which entitles it to be considered a distinct species.

H. chinensis has ovate leaves, quite entire, unequal at the base, and grey on both surfaces owing to stellate down. This plant was first described by Robert Brown. It is a native of China near Nankin, and has also been found in the island of Chusan. It has linear, 3-nerved, very elongated petals, and deciduous valves of the anthers. As it differs from the other species, Brown proposes for it a distinct section, under the name *Loropetalum*. It is a shrub, attaining a height of from 6 to 10 feet. Little is known of the *H. persica*. It was collected by Hansen in Persia, in the province of Lenkeran.

(Loudon, *Arb. et Frut. Brit.*; Don, Miller's *Dict.*)

WYCHERLY, WILLIAM, son of Daniel Wycherly, Esq., of Cleve in Shropshire, was born about 1640. In his fifteenth year he was sent to travel in France, probably because his father's loyalist opinions rendered him doubtful of the universities at that time. He does not appear to have returned to England till a short time before the Restoration. He resided, during the greater part of his stay in France, on the banks of the Charente. The duke of Montausier was at that time governor of Angoulême, and Wycherly was favourably received at the court of his duchess, Julie d'Angennes Rambouillet, celebrated in Voiture's letters. 'This little court, learned and strict (savante et prude), must,' says a French biographer, 'have given lessons of propriety to the young Englishman, of which he made only an indifferent use.' At the time, the tone of that court certainly did exercise considerable influence on the mind of Wycherly, for during his residence in France he solemnly abjured the Protestant faith, and was received into the bosom of the Roman Catholic church.

On his return to England, Wycherly was entered as a student of law in the Middle Temple. It would appear however, from a passage in Wood's 'Athenæ Oxonienses,' that he was previously sent for a short time to Oxford to be reconciled to the Anglican church. At that university he 'wore not a gown,' only lived in the lodgings of the provost of his college, was entered in the public library under the title of Philosophiæ Studiosus, in July, 1660, being then about 20 years of age. He departed without being matriculated, or a degree conferred on him, having been by Dr. Barlow reconciled to the Protestant religion.

It is not easy to trace with certainty Wycherly's career from 1660 till 1669 or 1670, when he produced his first play. The accounts of his favour with Charles II., intrigue with the Duchess of Cleveland, his introduction to Buckingham, and his intimacy with Rochester, are all derived from conversational gossip. It is sufficiently apparent however that he possessed means which enabled him to mingle with the gay world on a footing of equality, and that, forgetful of the lessons of the 'petite cour savante et prude,' he conformed to the manners of the time. Major Pack states that the family estate was worth 600*l*. a year in the time of Wycherly's father.

Wycherly's first play, 'Love in a Wood, or St. James's Park,' was produced after May, 1669, and before November, 1671, with a success which enabled him to take rank as one of the leading wits of the day. His other three plays were all equally fortunate. 'The Gentleman Dancing-master' appeared about the close of 1671; the 'Plain Dealer' in 1674; and the 'Country Wife' in 1678. The plays however appear to have been composed some time before they were acted—in 1659, 1661, 1665, 1671. There is much wit in these productions, but more manly common-sense expressed in racy English. Their licentiousness will prevent their ever again becoming popular. The impression produced upon Wycherly by the severe decorum of the Duchess of Montausier's court had been completely obliterated by the licentious society in which he had subsequently mingled. But his intellect, though familiarized with impurity, had not been enervated. He had a strong and just perception of character, and expressed it with vigour and felicity.

Several years after the appearance of 'The Plain Dealer,' Wycherly encountered the Countess of Drogheda, a young, rich, and beautiful widow, at Tunbridge. They met in a bookseller's shop. The lady came to inquire for 'The Plain Dealer,' and the master of the shop presented Wycherly to her as the real plain dealer. This must have been subsequent to June, 1679, when the earl died. They were soon after privately married. The lady was (probably not without good reason) distractedly jealous. Dennis relates that their lodgings were in Bow Street, Covent Garden, opposite the Cock Tavern, and that if at any time he entered that place of refreshment with his friends, he was obliged to leave the windows open that she might see there was no woman in the company. Of course a person of this disposition would feel considerable reluctance to trust her husband at the court. The unfrequency of Wycherly's appearance there gave umbrage, and lost him the favour of Charles.

The Countess did not long survive her marriage. She settled her whole estate upon Wycherly, but the settlement was disputed after her death, and, ruined in his circumstances by legal and other expenses, he was thrown into prison. There he lay several years. It is said he was at last relieved by James II., who, having gone to see 'The Plain Dealer' acted, was so delighted, that he was induced to give orders for the payment of the author's debts and settling a pension of 200*l*. a year on him. The story has an apocryphal air. It is certain that Wycherly in after-life returned to the Romish church, and this, with some remains of court influence, is more likely to have attracted to him the munificence of James.

Wycherly did not profit by the king's liberality to the full extent, for, ashamed to confess the amount of his debts, he understated them. His pension dropped at the Revolution. His father's estate, to which he succeeded some years later, was strictly entailed, and the income was attached by his creditors. A more decorous, if not a more virtuous generation had risen up, and Wycherly's strained wit was no longer the fashion. He continued to struggle with his difficulties till 1715, the year of his death. Eleven days before that event, in the 80th year of his age, he was married to a young woman with a fortune of 1500*l*. What attractions such a match could possess for the lady it is difficult to imagine. He contrived to spend a good deal of her money; but repaid her on his death-bed by the judicious advice, 'not to take an old man for her second husband.'

In 1704 Wycherly published a volume of poems, to which he prefixed an engraving from his picture painted by Sir Peter Lely in the prime of life. Below this portrait he inserted the motto 'Heu quantum mutatus ab illo!' A volume of poems, and 'moral reflections,' which he had in part prepared for the press, was published posthumously in 1728, by Major Pack, who prefixed a very slovenly and meagre memoir of the author. Wycherly's poems are defective in rhythm, and have not much of what is properly called feeling in them; but they are not unfrequently characterized by his vigorous common-sense. Some of his 'moral reflections' are terse and pointed.

(Major Pack's *Memoirs of William Wycherly, Esq.*; Dennis's *Letters*; *Biographia Britannica*; Leigh Hunt's biographical notice of Wycherly in Moxon's edition, and the review of the notice in the 'Athenæum.')

WYCLIFFE or WICLIF (two of the most common among about twenty variations of the spelling), **JOHN DE**, appears to have been born about the year 1324, and, according to the most probable account, was a native of the parish of the same name, situated about six miles from the town of Richmond in Yorkshire. The tradition of the place makes him to have been a relation of a family of the name of Wycliffe, or De Wycliffe, who were lords of the manor and patrons of the rectory from the Conquest down to the year 1606, when the property passed by the marriage of the heiress into a family of another name. The earliest fact that is known respecting Wycliffe is, that he was one of the students first admitted at Queen's College, Oxford, which was founded in 1340. He soon however removed to Merton College. He is said to have applied himself with diligence and success to the study of the civil, the canon, and even the common law; but the departments of learning in which he acquired the greatest distinction were scholastic philosophy and divinity. The chronicler Knighton, who on every occasion evinces and openly expresses the keenest aversion to Wycliffe's doctrines and proceedings, admits that he was esteemed the most eminent theological and philosophical doctor of his time, and that in the employment of the scholastic dialectic he had no equal.

Wycliffe's first publication, as commonly stated, is a tract entitled 'The Last Age of the Church,' which is inferred from internal evidence to have appeared in 1356. It has been lately printed for the first time with a preface and notes by the Rev. James Henthorn Todd, D.D., 16mo., Dublin, 1840, from the only known MS. in the University library, Dublin, in which shape it fills thirteen or fourteen short pages, making altogether not much above two hundred lines. For anything that this performance can add to the reputation of Wycliffe, it might have been left in oblivion; it is an attempt to prove that the world would come to an end with the then current century, grounded principally on the prophecies attributed to the Calabrian monk Joachim (who lived in the twelfth century, and whose own calculation was that the end of the present system would happen in 1260), and on a cabbalistic computation from the letters of the Roman alphabet, which appears to be the writer's own. These dreams of Wycliffe seem to have arisen out of the impression left by the great pestilence which desolated Europe in 1348. Dr. Todd however has ventured to suggest a doubt whether the tract can with perfect certainty be assigned to Wycliffe, and also whether the passage from which the date of its publication or composition has been inferred is conclusive as to that matter. (See his Preface, pp. xii.-xv., and notes, p. lxxxi.*)

It is affirmed by all Wycliffe's biographers that he began to distinguish himself by his writings against the Men-

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[*] In the note here referred to, pp lxxix. and lxxx., Dr. Todd, whose edition is a very careful and learned one, makes the difficulty of a point which he is discussing greater than it is, by inadvertently assuming that the tract professes to have been written in 1350. He repeatedly elsewhere speaks of 1356 as the date. (See pp. xi., liv., &c.)

dicant Orders about the year 1360. The fact may be so, but the earliest testimony to it, we believe, is that of Anthony Wood, who may have derived his knowledge from the records of the university of Oxford. There is nothing upon this subject among the extant writings attributed to Wycliffe which can be assigned to nearly so early a date. The statement however is in itself very probable: the contest between the Mendicants and the University was at its height about 1360; and about the same time Wycliffe appears to have been in high favour at the University; for in 1360 or 1361 he was made warden or master of Baliol Hall (as Baliol College was then called), and in the beginning of 1361 he was presented by that society to the rectory of Fylingham or Fillingham, a living of considerable value, in the diocese of Lincoln.

In 1365 Wycliffe appears to have resigned the mastership of Baliol for that of Canterbury Hall, then recently founded by Archbishop Islep. He was put into this place by the archbishop in December of that year, in the room of a monk named Henry de Wodehall, who had been originally appointed, but whose turbulent conduct had compelled the founder to remove him. In 1366 however Islep was succeeded in the primacy by Simon Langham, who had been himself a monk; and then a process was commenced with the object of ejecting the secular warden from Canterbury Hall, on the pretence that his nomination had taken place when Islep was incapacitated by weakness both of body and mind for the transaction of business. It appears that Wycliffe's appointment was pronounced void by the archbishop; that a person named John de Radyngate was in the first instance substituted in his place; but that, within a month after, Wodehall was restored. Wycliffe appealed against the sentence to the pope, but it was confirmed by his holiness in 1370; and in 1372 it was further ratified by the king, Edward III.

It is singular that Mr. Webb Le Bas (in his 'Life of Wiclif,' 8vo., Lon., 1832) should in an elaborate argument entirely constructed upon a comparison of dates (pp. 121-123) have assumed that Wycliffe's appeal to Rome in this cause was made in 1365. It is correctly stated, only a few pages before (p. 117), that Archbishop Islep died in 1366, and that the proceedings in the case were commenced under his successor Archbishop Langham. Wycliffe's appeal was certainly not made till 1367, in the month of May of which year Wodehall was restored. Instead therefore of his suit having been then two years pending, as Mr. Le Bas argues, it had probably not commenced when Wycliffe was, in 1367, publicly challenged by a monk to defend the decision of parliament that the king should not do homage to the pope; a challenge which, as is stated by Mr. Le Bas, he promptly answered. His reply to the monk is printed, from a MS. in the Lambeth library, by Lewis, 'Life of Dr. John Wiclif,' Papers and Records, No. 30. It is in Latin, being entitled 'Determinatio quædam Magistri Johannis Wyclyff de Dominio contra unum Monachum;' and in it the author calls himself the king's own chaplain (*peculiaris regis clericus*). He protests that, as an humble and obedient son of the Roman church, he desires to assert nothing injurious to the said church, or that could reasonably offend pious ears.

In 1368, while his suit at Rome was certainly depending, he exchanged his living of Fillingham for that of Lutgershall, in the same diocese, but in the archdeaconry of Bucks, which was of less value, but was recommended to him by being nearer Oxford. In 1372, having taken his degree of D.D., he was, according to Dr. Vaughan (*Life and Opinions of John de Wycliffe*, 2 vols. 8vo., Lon., 1828, vol. i., p. 303), and his avowed copyist Mr. Le Bas, elevated to the theological chair of Oxford. The matter is more correctly stated by Lewis, who says that 'he now publicly professed divinity and read lectures in it.' This 'he did,' Lewis continues, 'with very great applause, having such an authority in the schools that whatever he said was received as an oracle. In these lectures he frequently took notice of the corruptions of the begging friars, which at first he did in a soft and gentle manner, until, finding that his detecting their abuses was what was acceptable to his hearers, he proceeded to deal more plainly and openly with them.' Some of his treatises that survive were probably written about this time, but there is no positive evidence to that effect.

The next fact in his history that is ascertained is his appointment, in July, 1374, as one of the members of a legation sent by Edward III. to Pope Gregory XI., then residing at Avignon, to treat with his holiness about the practice of papal provision and other abuses against which the English parliament had recently passed several laws and resolutions, more especially the Statutes of Provisors and Præmunire in 1350. The circumstance that Wycliffe's name stands second in the royal commission (the first name being that of John, bishop of Bangor) may be taken as attesting the high public reputation to which he had by this time risen. The seat of the conferences was fixed at Bruges; the negotiation resulted in a very partial mitigation of the evils complained of; but Wycliffe is supposed to have had his aversion to the then prevalent ecclesiastical system considerably sharpened by his experience of the papal court. In the mean time however he did not deem it necessary to decline what of its advantages might fall to his share. Either while he was still abroad, or immediately after his return home, he was presented by the king to the prebend of Aust in the Collegiate church of Westbury, in the diocese of Worcester: the letters-patent of ratification are dated 6th November, 1375. And about the same time he appears to have been also presented to the rectory of Lutterworth in Leicestershire, the right of nominating to which had fallen for this turn to the crown, in consequence of the minority of Lord Henry de Ferrars of Groby, the patron. Lewis thinks it probable that Wycliffe now left Oxford, or at least was always at Lutterworth during the vacations. 'Here,' he says, 'as it appears by his sermons yet remaining in MS., he performed the office of a very diligent and edifying preacher, since he preached not only on Sundays, but on the several festivals of the church, and of a most exemplary and unwearied pastor.' There are about 300 of his parish sermons still extant.

He now however began to speak his sentiments very openly on the subject of the pope and the church. Lewis quotes him as in one of his writings or lectures soon after his return to England styling the pope 'Antichrist, the proud worldly priest of Rome, and the most cursed of clippers and purse-kervers' (cut-purses). The consequence was, that in a convocation of the clergy, held on the 3rd of February, 1377, a citation was directed to be issued for his appearance at St. Paul's on the 19th of the same month, to answer the charge of holding and publishing certain heretical or erroneous doctrines. Lewis appears clearly to be mistaken in supposing this to have happened in 1378. Wycliffe presented himself on the appointed day, accompanied by John of Gaunt, duke of Lancaster, and the Lord Henry Percy, earl marshal; a violent altercation immediately arose between these noblemen and Courtney, bishop of London; the crowd, which was very great, broke out into a tumult; and the result was, that the court rose without having done anything. The mob seems on this occasion to have sided with their bishop against Gaunt and Wycliffe.

A story told by Dr. Vaughan about a reference made to Wycliffe by the first parliament of Richard II., which met in October, 1377, on the subject of the right of the kingdom to retain its treasure, when required for its own defence, although demanded by the pope, and about a vindication of that right which he thereupon drew up, appears to be indifferently supported. It rests, we believe, on no better authority than that of Fox's 'Acts and Monuments.' Wycliffe may have drawn up some such paper; but probably not in answer to an application from the parliament. Be this however as it may, the prosecution against him for his errors of doctrine was speedily renewed in a more formidable shape. On the 22nd of May 1377 (not the 11th of June, as Mr. Le Bas translates 'XI. Kalendas Junii'), a bull was addressed by Pope Gregory to the archbishop of Canterbury and the bishop of London directing them to summon Wycliffe before them, and others dated the same day to the king, requesting his favour and assistance in the matter, and to the university of Oxford, desiring them to withdraw their protection from the accused theologian. Before the [illegible] England, which they do not appear to have done till November, King Edward was dead; the Archbishop [illegible] issued his mandate about the end of December [illegible] to present himself in the church of St. Paul's [illegible] the 30th court-day from that date. The [illegible] have come down to us are very [illegible] appears that Wycliffe did [illegible] the following year, 1378, before a synod assembled, not in St. Paul's, but in the archbishop's chapel at Lambeth. This new attempt to put down the reformer however was not more successful than the former; the Londoners now, if we are to believe the chronicler Walsingham, upon whom we are principally dependent for our information as to what took place, showed themselves disposed to take part with Wycliffe, and, breaking into the chapel, threw the synod into consternation: and the safety of the prisoner was secured by the arrival of Sir Lewis Clifford with a message from the king's mother positively prohibiting them from proceeding with the cause. He was let off with a simple admonition to abstain from repeating the objectionable propositions, that the laity might not be made to stumble by his perversions; an injunction which, says Walsingham, he treated with contempt, persisting in scattering about conclusions still more pernicious.

The circumstance however that finally and effectually saved Wycliffe was the breaking out of the great schism of the West by the election of the two popes on the death of Gregory XI. in this same year 1378. This division and dissension of the Roman world so enfeebled the papal power in England and everywhere else, as to leave it for the present very little of either strength or disposition to proceed to extremities against its enemies where it was possible to take another course. Wycliffe accordingly appears to have been allowed to go on for some years preaching and writing as he chose without further disturbance. In the beginning of 1379 he was seized while at Oxford with a dangerous illness, from which however he recovered. Soon after he got well he is supposed to have published his tract entitled 'De Papa Romano,' or 'Schisma Papæ,' still preserved in MS., in which he called upon all kings throughout Christendom to seize the opportunity sent them by providence of bringing down the whole fabric of the Romish dominion, seeing that Christ had cloven the head of Antichrist and made the two parts fight against each other. This was followed by other writings, both in Latin and English, of which by far the most important was his translation of the whole Bible from the Latin Vulgate, being, it is commonly believed, the first complete English version of the Scriptures which had appeared. There is reason to believe that this great work was finished, and several transcripts of the whole made and dispersed, some years before the death of Wycliffe; but it is probable that it was not all executed by himself, although it may have all undergone his revisal.

Some odium seems to have been brought upon Wycliffe and his novel opinions by the great outbreak of the Commons, Watt Tyler's insurrection, in 1381, which it was natural enough for the friends of the established religion to affect to refer, in part at least, to the destruction of old convictions and of all reverence for authority, which he and his followers had laboured to produce. For Wycliffe, it is to be noted, while he himself remained stationary at Lutterworth or Oxford, preaching or lecturing there, had numbers of disciples whom, under the name of 'poor priests,' he kept itinerating over the country, in imitation, apparently, of the same effective system for acting upon the great body of the population of which the mendicant orders of monks had already set the example. There can be no doubt that his opinions were thus very generally disseminated and adopted. He now besides took what was considered the boldest step upon which he had yet ventured, by attacking the doctrine of transubstantiation. This he did, according to Anthony Wood, in a course of divinity lectures which he read in the summer of 1381 at Oxford. An assembly of twelve doctors, summoned by the chancellor, unanimously condemned his conclusions, and denounced imprisonment and excommunication as the punishments of whoever should maintain them. Some months after, in May, 1382, a synod of divines and doctors of law, assembled at the priory of the Grey Friars in London, on the summons of his old enemy Courtney, recently translated from the see of London to Canterbury, having declared ten opinions which were stated to have been lately publicly preached among the nobles and commons of the realm heretical, and other fourteen erroneous, instructions were immediately despatched to the bishops of London and Lincoln, enjoining them to take the most rigorous measures for the suppression of the said doctrines; and upon that letters mandatory were forthwith issued by the bishop of Lincoln, charging all ecclesiastical functionaries throughout the archdeaconry of Leicester, within which the rectory of Lutterworth is situated, with the execution of this order. Soon after also a petition to the crown by the lords spiritual in parliament was answered by a royal ordinance, empowering the sheriffs of counties to arrest all preachers of heresy, and detain them in prison till they should make satisfaction to the church. But it is remarkable that, although many of Wycliffe's followers were apprehended and proceeded against under the powers thus granted to or assumed by the ecclesiastical and temporal authorities, he himself remained for a considerable time unmolested. He was only named, among several other persons notoriously suspected of heresy, in an order issued by the synod at the Grey Friars to the chancellor of Oxford. It is supposed that the protection of the duke of Lancaster, which, although not openly avowed, was probably as notoriously suspected as his heresy, deterred his enemies from touching him. But having in November, 1382, instead of appealing to the king from the sentence which had imposed silence upon him, as he declared at the time he would do, addressed a long statement of his case, under the title of a 'Complaint,' to the king and parliament, in which he both reiterated in very vehement terms his general abuse of the church and the clergy, and avowed his continued disbelief of the doctrine of the real presence, which he affirmed had 'been brought up by cursed hypocrites, and heretics, and worldly priests, unkenning in God's law'—he was immediately summoned before the convocation of the clergy assembled at Oxford to answer for these opinions. It is said that his old friend Lancaster, who had stood by him so long as he assailed merely the constitution of the hierarchy and the temporalities of the church, declined to go along with him now, when he had begun openly to attack the commonly received faith on the most sacred points of doctrine; and after advising him to retract, or at least to keep his sentiments to himself, openly withdrew his protection. The contemporary accounts however of this matter are very indistinct and unsatisfactory. All that is certain is, that Wycliffe appeared before the convocation, and gave in two written confessions or defences, the one in English, the other in Latin, in which he explained his opinions on the question of transubstantiation, not apparently without a considerable anxiety to give them as little of the air of a deviation from the common faith as possible. The account given by his enemy Knighton is, that 'he laid aside his audacious bearing, put on the breastplate of dotage, attempted to disclaim his extravagant and fantastic errors, and protested that the follies he was called upon to answer for were basely and falsely ascribed to him by the malicious ingenuity of his enemies.' The two confessions are entirely different. His apologist and admirer, Mr. Le Bas, describes the one in English as 'a concise and tolerably perspicuous document;' the Latin one, which is very much longer, is also, he admits, 'very much more defective in simplicity.' In both Wycliffe acknowledges that the sacramental bread is really and truly the body of Christ; but he does not, he says, affirm it to be the body of Christ essentially, substantially, corporeally, or identically. 'Then' (in the Latin Confession), continues Mr. Le Bas, 'he plunges us into a perfect jungle of argumentation, in which I profess myself unable to see my own way, and through which I therefore will not attempt to conduct the reader.' The result appears to have been that no sentence was pronounced by the convocation, but that soon after letters were obtained from the king by which Wycliffe was debarred from teaching any longer in the University. This at least is the version of the story adopted by his latest biographers Dr. Vaughan and Mr. Le Bas: the succession of events as detailed by Lewis is altogether different; and the true facts, if they are recoverable, are only to be got at by a more laborious and careful examination of original authorities and documents than has yet been instituted.

Wycliffe is supposed to have spent the remainder of his life in his parish of Lutterworth, where however his pen was more active than ever. Indeed the literary performances which he is commonly supposed to have produced after this date make an amount of composition which is entirely incredible in the circumstances. It is related that some time after he was driven from the University he was summoned to Rome to answer the charge of heresy by Pope Urban VI.: this appears to rest on nothing more than a letter of Wycliffe's, without date, addressed to his holiness, published by Lewis from a MS. in the Bodleian, in which he says, 'If I might travel in my own person, I would, with God's will, go to the pope. But Christ has needed me to the contrary, and taught me more obeish to God than to man.' It is supposed that he had had an attack of paralysis before this time. He recovered partially, but found it necessary to hire another priest, John Purneye, to assist him in his parish duties, and also to act as his amanuensis. At last, while he was in his church hearing mass, on Holy Innocents' day, the 29th of December, 1384, just as the host was about to be elevated, he was thrown down by another violent fit of palsy, and he never spoke more, but died on the last day of the year.

In the obscurity in which much of the history of Wycliffe still continues to be involved, it is impossible to arrive at any certain conclusion as to the real character of the man and the motives by which he was actuated. He was probably honest, in so far as honesty consists in sincerity, and he may have been ready to make any sacrifices for what he believed to be the truth. But actually he was scarcely called upon to make any; he continued to the end of his life in the enjoyment of considerable preferments in the church which he professed himself anxious to pull down; and in his attacks, both upon the mendicant friars, with whom he began, and upon the pope and the other heads of the clergy, who next fell under his lash, he evidently gratified his personal resentments, as well as maintained what he believed to be the cause of reason and true religion. Whatever other Christian qualities also there may be in his writings, there is at least very little of Christian meekness or charity. His intolerance and violence, and often his coarseness of invective, are unmeasured. As for the particular opinions which he held, it is not quite easy to say what they really were on various points, for two reasons: first, they were probably different at different times of his life; secondly, we are by no means certain whether many of the writings attributed to him are really his. But generally his views appear to have resembled those of Calvin more nearly than those of any other great leader of the Reformation of the sixteenth century. To some of the more peculiar doctrines of the Roman church he seems to have adhered to the end of his life: it may be doubted, for instance, if he disapproved of either pilgrimages or the worship of images; purgatory he evidently believed in to the last; and, what is not very easily reconciled with his repeated denunciations of the papal power as Antichrist, he addresses Pope Urban in the letter mentioned above as the greatest of Christ's vicars upon earth, and in another of his treatises, supposed to have been written shortly before, that entitled 'On the Truth of Scripture,' he describes it as being nothing less than paganism for a man to refuse obedience to the apostolic see. In his doctrinal theology he was a strong predestinarian and necessitarian. On the subject of church government he was an independent and voluntary of the most extreme description; opposed to episcopacy, opposed to establishments, opposed to endowments, holding that the clergy should be supported only by alms, and that every man should be as far as possible a church to himself.

In the maintenance of those opinions his earnestness and passion and the dexterity of his logic are far more remarkable than any impression he leaves of solidity of judgment, or of a considerate and reflecting mind. Nor has his style any grace, or other attraction, except its occasional energy or vehemence. Of his writings, the fullest catalogue that has been attempted is that given by Dr. Vaughan (vol. ii., pp. 414-431), which is copied by Mr. Le Bas (pp. 435-450). But upon this subject the reader should see what is said by Dr. Todd in the preface to 'The Last Age of the Church,' and also in the preface to his edition of 'An Apology for Lollard Doctrines, attributed to Wicliffe,' printed from a MS. in the library of Trinity College, Dublin, for the Camden Society, 4to., London, 1842. Most of Wycliffe's writings, or supposed writings, still remain in MS. Even of his translation of the Scriptures, only the New Testament has been printed; first, by his biographer, the Rev. John Lewis, minister of Margate, in folio, in 1731; again in 4to., in 1810, under the care of the Rev. Henry Hervey Baber, of the British Museum; and lately, for the third time, in Bagster's 'English Hexapla,' 4to., Lond., 1841. 'The public,' says Mr. Le Bas, in the preface to his 'Life of Wiclif,' 'will be gratified to learn that the University of Oxford is about to publish Wiclif's version of the Old Testament; and that the Rev. J. Forshall, and F. Madden, Esq., both librarians of the British Museum, are preparing the same for the Clarendon Press.' The work thus announced however has not yet appeared. A volume consisting of extracts from some of Wycliffe's unprinted writings was published about ten years ago by the Religious Tract Society.

(There is an account of Wycliffe in Fox's 'Martyrs,' which is worth little or nothing. There are also long articles about him in the first edition of the 'Biographia Britannica,' 1766, vol. vi., part 2, pp. 4257-4266; in 'British Biography,' 12 vols. 8vo., 1773, vol. i., pp. 11-52; and in Chalmers's 'Dictionary,' 1817, vol. xxxii., pp. 27-38. The separate Lives, by the Rev. John Lewis (first published in 1719; for the last time, at the Clarendon Press, in 1820), by Dr. Robert Vaughan (1828, and second edition, 1831), and by the Rev. Webb Le Bas, now principal of Haileybury College (1832), have been mentioned above.

WYCOMBE, CHIPPING, or HIGH WYCOMBE, a parliamentary and municipal borough in the southern part of Buckinghamshire, 29 miles from London. From the discovery of a Roman tessellated pavement and Roman coins, it is probable that there was a Roman settlement here. Wycombe was a market-town in the time of the Saxons. It was incorporated in the reign of Henry VI. (1422-1461). Some authorities state that a charter of incorporation was obtained a century earlier, in the reign of Edward III. The governing charter up to 1835 was granted 15 Charles II. The ruling body was self-elected. The borough has returned two members to Parliament since the reign of Edward I. The town principally consists of one wide long street, forming part of the high road from London to Oxford, with smaller streets branching from the main street. The river Wick passes through the town, and falls into the Thames at Great Marlow, about six miles south of Wycombe. A stream called the Rye rises near the town, and, rather more than two miles from it, within the limits of the parish, joins the Wick. There are paper- and corn-mills on these two streams. The general appearance of Wycombe is that of a well-built market-town. The church is a fine old building of the thirteenth century, with a highly ornamental tower, 108 feet high, of later date. The altar-piece, St. Paul preaching to the Britons, is by Mortimer. The living is a vicarage, valued at 140*l*. per annum. The town-hall, erected in 1757, is supported on thirty-four stone pillars. There are places of worship for Baptists, Independents, and Methodists. The grammar-school is of antient foundation, and is partly supported by an endowment made in the reign of Queen Elizabeth. In 1831 the number of inhabitants in the parts of the town beyond the limits of the parliamentary borough was 950. The limits of the municipal borough included the town. By the Reform Act the parliamentary borough was made co-extensive with the parish, which comprises an agricultural district of about 4000 acres, with a population amounting in 1831 to 973 persons. The right of voting before this period was in the mayor, bailiffs, and burgesses: the greatest number of burgesses in the preceding thirty years had not exceeded 124; and there had not been a contested election during that time. The number of parliamentary electors for the borough was about 400 in 1840. The number of municipal burgesses in 1837 was 235. The governing body of the corporation consists of four aldermen and 12 councillors. The income of the corporation is about 200*l*., and arises from tolls, dues, and rents and fines. The principal item of expenditure is the maintenance of the borough police. The entire parish and parliamentary borough comprises 6380 acres, and in 1841 the population was 6480. The area of the old parliamentary borough was 120 acres, with a population of 3184 in 1841; that of the parish, exclusive of the old borough, was 6260 acres, and the population in 1841 was 3296. The hamlets or villages of Wycombe Marshes and Loudwater are in Wycombe parish: the latter is a perpetual curacy, valued at 132*l*. per annum.

(Lysons' *Buckinghamshire: Municipal Reports*, &c.)

WYDLE'RIA, a genus of plants belonging to the natural order Umbelliferæ. It was named by De Candolle in honour of H. Wydler, who has written a monograph on the genus Scrophularia. Wydleria is distinguished by possessing a calyx with the margin obsolete; the petals ovate-lanceolate, entire, acuminate with the point inflexed; the fruit ovate, rather didymous, crowned by the short stylopodium, and short reflexed styles; the mericarps somewhat semiterete and rather contracted at the margins, furnished with 5 filiform thickish obtuse ribs at equal distances, and the furrows between these ribs furnished with a single vitta; the commissure is narrow and has two vittæ; and the vittæ very narrow. There is but one species of this genus, which is a native of the West Indies at Puerto Rico, where it is cultivated with Musa paradisiaca and Lepidium Virginicum. It is a smooth plant, with a terete branched erect stem about a foot high, with ternate leaves, multifid leaflets, and cuneated lobes. According to Koch, it has an affinity with parsley (*Petroselinum*) and fennel (*Fœniculum*), but differs from them in the petals ending in tapering points. The rays of the umbels are from 12 to 14 in number, and the leaves are stiff. It is called, from the place where it grows, *Wydleria Portoricensis*.

This genus belongs to the tribe *Ammineæ*, or *Orthospermæ, paucijugatæ contractæ* of Koch. To this tribe belong the most important genera of Umbelliferous plants, as Cicuta, Celery (*Apium*), Parsley (*Petroselinum*), Helosciadium, Bishop's-weed (*Ammi*), Caraway (*Carum*), Earth-nut (*Bunium*), Pimpinella, Skirret (*Geum*), and Bupleurum.

WYE. [KENT.]

WYE. [SEVERN.]

WYERMAN. [WEYERMAN.]

WYKEHAM, WILLIAM, or WILLIAM DE or OF, was born at Wykeham or Wickham in Hampshire, in the year 1324, and, as his biographer Bishop Lowth has shown, some time between the 7th of July and the 27th of September. There is reason to believe that he did not take his name from his native village, the same name being borne by several of his relations living in his own day, who do not appear to have been born there. All that is certainly known about his father and mother is that their Christian names were John and Sibyl: if his father bore the name of Wykeham, he appears to have also passed by that of Long or Longe, and to have had an elder brother who was called Henry Aas. His parents are said to have been both, although poor, of creditable descent, as well as of reputable character.

He was put to school at Winchester, not by his father, who had not the means, but by some wealthy patron, who is traditionally said to have been Nicholas Uvedale, lord of the manor of Wykeham and governor of Winchester Castle. The tradition further asserts that, after leaving school, he became secretary to Uvedale; and that he was secretary to the constable of Winchester Castle is stated in a written account compiled in his own time. Afterwards he is said to have been recommended by Uvedale to Edyngton, bishop of Winchester, and then by those two friends to have been made known to King Edward III. There seems to be no reason for supposing that he ever studied at Oxford, as has been affirmed by some of the later writers of his life. It is evident indeed that he had not had a university education, and that he never pretended to any skill in the favourite scholastic learning of his age. His strength lay in his natural genius, in his knowledge of mankind and talent for business; and probably the only art or science he had much cultivated was architecture.

He is said in an antient contemporary account to have been brought to court when he was no more than three or four and twenty, which would be about the year 1348: but the earliest office which there is the evidence of records for his having held is that of clerk of all the king's works in his manors of Henle and Yethampsted, his patent for which is dated 10th of May, 1356. On the 30th of October in the same year he was made surveyor of the king's works at the castle and in the park of Windsor. It is affirmed by a contemporary writer to have been at his instigation that King Edward pulled down and rebuilt great part of Windsor Castle. Wykeham had the sole superintendence of the work. Queenborough Castle, in the Isle of Sheppy, was also built under his direction.

The king now began to reward him bountifully. He had probably taken deacon's orders at an early age; Lowth finds him designated 'clericus,' or clerk, in 1352. It was not however till the 5th of December, 1361, that he was admitted to the order of acolyte: he was ordained subdeacon on the 12th of March, 1362, and priest on the 12th of June following. Meanwhile his first ecclesiastical preferment, the rectory of Pulham in Norfolk, had been conferred upon him by the king's presentation on the 30th of November, 1357. On the 1st of March, 1359, he was presented by the king to the prebend of Flixton, in the church of Lichfield. On the 16th of April following he had a grant of 200*l*. a year from the crown, over and above all his former appointments, till he should get quiet possession of the church of Pulham, his induction into which having had been opposed by the court of Rome. On the 10th of July in the same year he was appointed chief warden and surveyor of the king's castles of Windsor, Leeds, Dover, and Hadlam, and of the manors of Old and New Windsor, Wichemer, and sundry other castles and manors, with the parks belonging to them. On the 5th of May, 1360, he received the king's grant of the deanery of the royal free chapel or collegiate church of St. Martin-le-Grand, London. In October, 1360, he attended upon the king at Calais, probably in quality of public notary, when the treaty of Bretigny was solemnly confirmed by the oath of Edward and King John of France. Numerous additional preferments in the church, for which we must refer the reader to the elaborate detail given by Lowth, were heaped upon him in the course of the next three years. By June, 1363, moreover he had been appointed to the office of warden and justiciary of the king's forests on this side Trent. On the 14th of March, 1364, he had by royal grant an assignment of twenty shillings a day out of the exchequer. On the 11th of May, 1364, he was made keeper of the privy seal, and soon after he is styled secretary to the king, or what we should now call principal secretary of state. In May, 1365, he was commissioned by the king with the chancellor, the treasurer, and the earl of Arundel to treat of the ransom of the king of Scotland (David II., taken at the battle of Neville's Cross in 1346), and the prolonging of the truce with the Scots. And not long after this he is designated, in a paper printed in the 'Fœdera,' chief of the privy council and governor of the great council, which phrases however Lowth supposes do not express titles of office, but only the great influence and authority which he had in those assemblies. 'There are several other preferments, both ecclesiastical and civil,' adds Lowth, 'which he is said to have held; but I do not mention them because the authorities produced for them are such as I cannot entirely depend upon. And, as to his ecclesiastical benefices already mentioned, the practice of exchanging them was then so common that 'tis hard to determine precisely which of them he held altogether at any one time.' There is extant however an account given in by himself on occasion of the bull of Pope Urban V. against pluralities of the entire number and value of his church benefices as the matter stood in the year 1366; and from this statement, in which Wykeham calls himself 'Sir William of Wykeham, clerk, archdeacon of Lincoln, and secretary of our lord the illustrious king of England, and keeper of his privy seal, it appears that the total produce of those which he had held when the account was demanded was 873*l*. 6*s*. 8*d*. and of those of which he remained in possession when it was given in, 842*l*.

All these inferior dignities however it is to be presumed that he resigned when, upon the death of William de Edyngdon, on the 8th of October, 1366, he was immediately, upon the king's earnest recommendation, elected by the prior and convent of Winchester to succeed him as bishop of that see. He was not consecrated till the 10th of October in the year following; but this delay, till an adjustment was effected of the conflicting pretensions of the royal authority and the court of Rome, was evidently occasioned, as Lowth has shown, only by a contention between the king and the pope as to which of them should have the largest share in Wykeham's promotion. Meanwhile he had been appointed by the king lord high chancellor of England; he was confirmed in that office on the 17th of September, 1367.

He continued chancellor till the 14th of March, 1371, when he delivered back to the king both the great and the privy seals, on the change of ministry made in compliance with a petition presented shortly before by the Lords and Commons, complaining of the mischiefs which had resulted from the government of the kingdom having for a long time been in the hands of men of the church, and praying that secular men only might be appointed to the principal offices both in the king's courts and household. There is no appearance however of this complaint being specially directed again any part of the conduct of the bishop of Winchester, who assisted at the ceremony of

tuting his successor in the chancellorship, and seems
e for years after this continued to retain both the
of the king and the good will of the parliament,
en to have remained in habits of intimate and con-
al connection with the Duke of Lancaster, to whose
ice the removal of the clergy from the offices of state
to have been owing.
this time the bishops of Winchester had no fewer
welve different castles or palaces, all furnished and
ined as places of residence. Wykeham's first under-
after he found himself in possession of the see was
about a thorough repair of these episcopal houses.
ost him above 20,000 marks. He also applied him-
ith great zeal and diligence to the reformation of
in the monasteries and religious houses of all sorts
hout his diocese: the antient hospital of St. Cross,
rkeford, near Winchester, founded, in 1132, by the
Bishop Henry de Blois, brother to King Stephen,
ticular engaged much of his attention, and the
of the charity were indebted to his persevering
ns for the restoration of many rights and benefits
they had originally enjoyed, but of which they had
or a long time defrauded. But the object which
he first chiefly occupied him was his own great
tion of two colleges in which students might be
ed 'for the honour of God and increase of his wor-
r the support and exaltation of the Christian faith,
the improvement of the liberal arts and sciences.'
eparatory college or school at Winchester was
in 1373; and he had before this purchased most
ground in the city of Oxford upon which his college
still called New College, to which that at Winches-
designed as a nursery, was afterwards built.
e pious and patriotic exertions however were inter-
for a time by a political storm which rose against
hop in 1376, the last year of the reign of Edward
e had been appointed one of the council established
rintend the conduct of affairs on the petition of
liament which met in April of that year; and in
ence became a principal object of the resentment
Duke of Lancaster and his party, who, after the
of the Black Prince in June, and the rise of the
ent in July, took possession of the superannuated
ing king, and proceeded to overthrow all the
that had been lately made in the government, and
t, as far as they could, the ruin of all concerned in
By the duke's contrivance eight articles were ex-
against the bishop at the beginning of the next
lmas term, charging him with various acts of
ry defalcation, oppression, and other sorts of mis-
ment while he had been in office many years before
er of the privy seal and lord chancellor. He was
n his defence, before a commission of bishops, peers,
vy councillors, about the middle of November, when
nt was given against him upon one of the articles,
ng at the utmost a mere irregularity; and upon this,
he influence that then prevailed at court, an order
mediately issued for the sequestration of the revenues
bishopric, and he was at the same time forbidden,
king's name, to come within 20 miles of the court.
xt parliament, which met on the 27th of January,
vas wholly devoted to Lancaster; and when, soon
on the petition of the Commons, an act of general
was issued by the king, in consideration of its being
r of his jubilee, the bishop of Winchester alone was
ly excepted out of its provisions. All this, in the
stances of the time, may be taken as the best attes-
to Wykeham's patriotism and integrity. His brethren
clergy however assembled in convocation now took
cause with great zeal; and, whether in consequence
bold representations on the subject to the king, or
ne other reason, it was soon deemed expedient to
e proceedings against him, and on the 18th of June
nporalities were restored to him, on condition of
ing out three ships of war for the defence of the
m and maintaining them at sea for a quarter of a
And even from this mulct he was released on the
on of Richard II., a few days after. But the loss
heless to which he had been subjected by his prose-
is said to have amounted to 10,000 marks.
continued to stand high in the favour and confidence
liament during the minority of the new king. In
e was one of a commission appointed on the petition of the Commons to examine into the state of the revenue and the kingdom, with full powers to call before them all persons who had been in office either during the current or the late reign. Again, after the suppression of the insurrection of Wat Tyler and his followers, in the next year, the bishop of Winchester was one of the seventeen persons proposed by the Commons to be appointed to confer with them on the condition of the kingdom: and on various occasions afterwards a similar tribute was paid to his popularity and weight of character. As soon as he was released from his troubles he hastened to apply himself anew to the carrying forward and completion of his two colleges. The business of teaching appears to have commenced both at Winchester and at Oxford in 1373; Pope Urban VI.'s bull of licence for founding Winchester College was granted 1st June, 1378; the building of the College at Oxford, which he called 'St. Mary College of Winchester in Oxford,' was begun in 1380, and was finished in 1386; that of the college at Winchester was begun in 1387, and was finished in 1393. The papal bull confirming the statutes of the college at Oxford is dated 19th July, 1398. And as soon as his two colleges were erected, he entered upon another great work, which still remains a monument of his taste and munificence: he resolved to rebuild his cathedral in the greater part of its extent. This undertaking he commenced in 1395, and he just lived to see it brought to a close in about ten years after. [WINCHESTER.]

The bishop of Winchester was one of the fourteen persons appointed in 1386, on the petition of the parliament instigated by the king's uncle, the duke of Gloucester, to be a council to the king for one year, and in fact for that term to exercise all the powers of government. As soon as the parliament was dismissed, Richard made an attempt to break from the yoke thus imposed upon him; the commission and statute appointing the council were declared by the judges, on the royal command, to be illegal and null, and to have involved all who had been concerned in procuring them in the guilt of treason. Upon this the Duke of Gloucester and his friends raised an army of 40,000 men. Having encamped before London, they sent a deputation, of which the bishop of Winchester was a member, to the king; the deputies were graciously received, and returned with proposals for an accommodation; but in the mean time a body of forces which had been raised for the king in Wales and Cheshire, under the command of his minion, the Duke of Ireland, was encountered by the Earl of Derby and a part of the army of the confederated lords at Radcott Bridge in Oxfordshire, and entirely defeated. This blow compelled Richard to yield tor the present. But in May, 1389, another revolution in the government was effected by the king suddenly declaring himself to be of age, and removing the Duke of Gloucester and his friends from the council-board. He did not however dispense with the services of the bishop of Winchester, but, on the contrary, forced him again to accept the great seal. Wykeham remained chancellor till the 27th of September, 1391, when he retired from office, Gloucester having by this time been restored to his place in the council, and all parties having been for the present again reconciled, in a great measure, it is probable, through the bishop's mediation. From this date Wykeham appears to have taken little or no share in public affairs. In 1397, when the Duke of Gloucester was put to death, and several of those who had joined him in taking arms in 1386 were attainted for that treason, the bishop of Winchester and others were, at the intercession of the Commons, declared by the king from the throne in parliament not to have been implicated in what their fellow-commissioners had done. Wykeham was present in the parliament held 30th September, 1399, when Richard was deposed, and also in the first parliament of Henry IV., summoned a few days after; but this was the last which he attended. He continued however in the active discharge of his episcopal duties for two or three years longer, and was able to transact business till within four days of his death, which took place at South Waltham, about eight o'clock on the morning of Saturday the 27th of September, 1404.

(*Life*, by Robert Lowth, D.D., 2nd edition, 8vo., London, 1754.)

WYMONDHAM. [NORFOLK.]

WYNANTS, JOHAN, one of the best of the Dutch landscape-painters, was born at Haarlem about the year

1600. Little is known about him; he is not mentioned by Houbraken; and Van Gool, who notices this omission of Houbraken, lived at too late a period to be enabled to learn any facts of his life. Wynants is supposed to have been the master of Wouvverman, to whom some of his pictures have been attributed. He was fond of amusement, and idled much of his time in parties of pleasure, and his pictures are accordingly few in number. He generally painted small pictures, coloured with great transparency: the figures and cattle in them are not painted by himself; a fact, says D'Argenville, which Wynants endeavoured to keep a secret. These parts of his pictures were painted by several masters,—by Van Thulden, Ostade, Wouvverman, Lingelbach, and A. Vandevelde, which gives an additional value to his works. In Pilkington's Dictionary, and some other books, 1670 is given as the date of Wynants' death, but there is a picture in the gallery of Schleissheim by him, dated 1673: his name also is written in the painters'-company's book of Haarlem for the year 1677. (D'Argenville, *Vies des Peintres;* Dillis, *Gemälde zu Schleissheim.*)

WYNDHAM, SIR WILLIAM, the third baronet of that name, distinguished in the parliaments of Queen Anne and the first two Georges, was born in 1687. He was of an antient family in Somersetshire, and succeeded at an early age to his title and estate. He was educated at Eton and at Christ Church, Oxford, and afterwards travelled for some time abroad. On his return he was chosen to represent his native county in parliament, and married a daughter of the duke of Somerset. He thus entered upon public life with great advantages, which his abilities well supported. He associated himself with the Tory party, and, fascinated by the talents of Lord Bolingbroke, he joined in the pleasures as well as the politics of that nobleman. When the Tory ministry was formed under Oxford and Bolingbroke in 1710, Wyndham was made master of the buckhounds, and on the 18th June, 1711, was appointed secretary-at-war. In August, 1713, he was promoted to the office of chancellor of the exchequer, and in November was sworn a privy councillor. In the dissensions between Oxford and Bolingbroke he sided with the latter, and was entirely in his confidence. When the lord high treasurer was disgraced, Lord Bolingbroke wished to have the treasury put in commission, and proposed Wyndham as one of the five commissioners; but this arrangement was defeated by the sudden appointment of the duke of Shrewsbury to the vacant office. This appointment, followed by the death of the queen, put an end to the hopes of the Tory party. The suspicion of a treasonable correspondence with the Pretender had attached to many of the Tory ministers, and to none more than to Lord Bolingbroke. Wyndham himself was not free from suspicion: his intimacy with Lord Bolingbroke and his close friendship with other reputed Jacobites having pointed him out as one requiring to be watched. He was returned to the new parliament summoned by George I., and protested in such strong language against the proclamation by which the late parliament had been dissolved, that he was only saved from imprisonment in the Tower by Sir Robert Walpole, who persuaded the House of Commons to spare him with a reprimand from the Speaker. When the rebellion in favour of the Pretender broke out in 1715, intelligence was brought to the privy council that Sir W. Wyndham was concerned in a projected rising in Somersetshire: his father-in-law the duke of Somerset offered to be responsible for him, and desired that he might not be taken into custody; but the council refused to leave him at large, and sent Colonel Haske to arrest him. Sir William, on being taken at his own house, contrived to escape under pretence of making preparations for his journey to London: and a proclamation was immediately issued offering 1000*l*. for his apprehension. For some time he eluded the vigilance of his pursuers, disguised as a clergyman, but finding that he had little chance of escape, he surrendered himself, and was committed to the Tower. He denied all knowledge of any plot whatever in favour of the Pretender; and, whether on account of his innocence, the failure of evidence, or the influence of his connections, he was never brought to trial.

He was henceforth distinguished as one of the most active and able members of the opposition. He opposed Sir Robert Walpole on almost every occasion. The most vehement and perhaps the best speech against Walpole's Excise scheme was delivered by him in 1733. Of all his reported speeches, that in favour of the repeal of the Septennial Act in 1734 may be pronounced the most able and argumentative. In 1739, having been in the minority who voted against the address on the Spanish convention, he determined, with many others, to secede from parliament. In expressing this resolution he applied insulting terms to the majority of the House, and was indebted, for the second time, to Sir Robert Walpole's judicious forbearance for his escape from commitment to the Tower. Nothing could have been more absurdly impolitic than the retirement of the opposition from all further contest in the House of Commons: it had been suggested by Lord Bolingbroke, whose counsels were often more mischievous than wise: and the mistake was so evident, that the seceders all returned on the first day of the next session.

The influence of Wyndham in the House of Commons was proved by the immediate consequences of his death in 1740. He had united the Tories and a considerable party of Whigs in their opposition to Sir Robert Walpole. At his death this union was dissolved—the opposition was disarmed of half its power—and for some time the minister had little to dread either from the eloquence or the numbers of his opponents. He died at Wells in Somersetshire, July 17, 1740, and was succeeded by his son, Sir Charles Wyndham, who afterwards inherited the title of earl of Egremont from his uncle the duke of Somerset. By his second wife, relict of William, marquis of Blandford, he left no issue.

Sir William was one of the most popular men of his day, and in parliament was remarkable for the force and spirit of his eloquence. The character of his oratory has been thus described by a great critic, Mr. Speaker Onslow: 'There was much grace and dignity in his person, and the same in his speaking. He had no acquirements of learning; but his eloquence, improved by use, was strong, full, and without affectation, arising chiefly from his clearness, propriety, and argumentation; in the method of which he, by a sort of induction almost peculiar to himself, he had a force beyond any man I ever heard in public debates. He had not the variety of wit and pleasantry in his speeches so entertaining in Daniel Pulteney; but there was a spirit and power in his speaking that always animated himself and his hearers, and, with the decoration of his manner, which was indeed very ornamental, produced not only the most attentive, respectful, but even a reverend regard to whatever he spoke.'

(Tindal, *Continuation of* Rapin; Coxe, *Memoirs of Sir R. Walpole;* Burnet's *Own Time;* Chandler's *Debates;* Collins, *Peerage*, by Sir Egerton Brydges.)

WYNTOUN, ANDREW, a rhyming annalist, lived during the early part of the fifteenth century, and was prior of the monastery of St. Serf's Inch or Island on Loch Lomond in Scotland. Nothing has been discovered as to his parentage or the periods of his birth and death, and he is only known as the author of 'The Orygynale Cronykil of Scotland,' a work of considerable authority in Scottish history, during the interval between the commencement of the eleventh and that of the fifteenth century. It is valuable also as a specimen of the Scottish language at a time when it closely resembled the English, in all but the Gallicisms which pervade Chaucer and Gower, and before it had taken that distinct provincial form which it exhibits in the Scottish poets of the latter part of the fifteenth, and of the sixteenth century. Wyntoun seems to have strongly felt the difficulty under which all rude chroniclers lie, of drawing a line of demarcation between the domestic and the foreign. The work is divided into nine books,

'In honoure of the ordrys nyne
Of haly angelys, the quhilks dywyne
Scripture lowys, on lyk wys
I wylle departe now this tretis
In Nyne Bukis, and noucht mà;
And the fyrst Buke of thá
Sall trete frà the begynnyng
Of the warlde.'

Accordingly the author is as good as his word, and, beginning at the creation, he passes through the greater part of Scripture history to the mythological period of Greece and Rome, mingling the sacred and profane strangely together, and describing both the deluge of Scripture and Deucalion's flood. The early and completely fabulous part of the Scottish annals is mixed up with these widely dispersed icles. Four books out of the nine are finished before rth of Christ is narrated. In the printed edition of ironicle the editor has very properly given only the nical titles of the chapters which do not refer to Scot- and thus of these four books only a few fragments rinted. Wyntoun is a tedious narrator, but he is d in his descriptions; and the stirring events he has ord, with the curious traditions of national super- mingled with them, give the book considerable tion. Sir Walter Scott has been obliged to Wyntoun any striking incidents in his narrative poems. The natural parentage of the Seer, in the 'Lady of the ' of whom it is said,

> 'Of Brian's birth strange tales were told,
> His mother watched a midnight fold,' &c.

en from the narrative of the birth of Macbeth (book 18). The following is an instance which will give illustration of Wyntoun's style. It is said of Sir Lindsay, of Glenesk, in a battle with the Highlanders 2—

> 'Suá on his hors he sittand than
> Throw the body he strak a man
> Wytht his spere down to the erde:
> That man hald fast his awyn swerd
> Intil his neve, and wp thrawand,
> He pressit hym, noucht agayne standand
> That he wes pressit to the erd.
> And wyth a swake thare of his swerd
> [Throw] the sterap lethir and the bute
> Thre ply or four, above the fute
> He straik the Lyndesay to the láne.
> That man na strake gave bot that áne
> For thare he deit.'

incident is adopted by Scott, in 'The Lord of the canto 6, thus:—

> 'Yet still on Colonsay's fierce lord,
> Who press'd the chase with gory sword,
>   He rode with spear in rest;
> And through his bloody tartans bored,
>   And through his gallant breast.
> Nail'd to the earth the mountaineer,
> Yet writhed him up against the spear,
>   And swung his broadsword round!
> —Stirrup, steel-boot, and cuish gave way
> Beneath that blow's tremendous sway,
>   The blood gushed from the wound;
> And the grim lord of Colonsay
>   Hath turn'd him on the ground,
> And laugh'd in death-pang, that his blade
> The mortal thrust so well repaid.'

re are several MSS. of Wyntoun's Chronicle; one in ottonian collection, another in the Harleian, and a in the Advocates' Library. The best is however n the Royal Library in the British Museum, from Mr. David Macpherson edited the printed edition, ing it with the others. This magnificent specimen tish typography was printed in 1795, in 2 vols. 8vo. e copies of it seem to have been printed on drawing- ; at least the writer of this notice has never met with opy on ordinary paper. It contains an introduction, and a glossary.

WYRE, river. [LANCASHIRE.]

WYTHER, GEORGE. [WITHER.]

WYTTENBACH, DANIEL, was born in 1746, at Bern, where his father, Daniel Wyttenbach, was then pastor. His father distinguished himself by several theological works, and died, in 1779, being then professor of theology in the university of Marburg. Young Wyttenbach studied philology at Marburg, Göttingen, and Leyden, and in the last place he was one of the pupils of Ruhnken, to whom he became particularly attached. In 1771 he was appointed professor of Greek and philosophy in the Athenaeum of Amsterdam, which is now called after him the Wyttenbach Athenaeum. From Amsterdam he was transferred, in 1779, to the chair of eloquence in the university of Leyden, of which he and Ruhnken were now the most illustrious scholars. He remained in this office for a great number of years, until the infirmities of old age and blindness compelled him to withdraw from his functions. In 1816, at the age of 70, he went to Heidelberg, where, for a short time, he abstained from all literary exertions. Two years later he married Johanna Gallien, a woman of great acquirements and talent, who distinguished herself as a writer, and was created, in 1827, doctor of philosophy by the university of Marburg. From 1818 Wyttenbach had withdrawn from all public functions, and, weighed down by old age and the loss of his sight, he died at Oegs, on the 17th of January, 1820. Wyttenbach was one of the greatest scholars of whom the university of Leyden can boast; he possessed extensive and profound learning and great critical skill. He always wrote in Latin. His Latin composition, especially his 'Vita Ruhnkenii,' is among the best modern specimens of that language, both for purity and elegance. We are indebted to Wyttenbach for some excellent editions of antient authors. The most important among them are:—1, The 'Opera Moralia' of Plutarch, Oxford, 1795-1800, 6 vols. 4to., and 12 vols. 8vo. This is the best and most valuable edition of that portion of Plutarch's works. 2, 'Selecta principum historicorum, Herodoti, Thucydidis, Xenophontis, Polybii, Plutarchi vitae Demosthenis et Ciceronis,' with very useful notes, Amsterdam, 1794, 8vo. New editions appeared in 1808, and at Leyden in 1829, 8vo. From 1779 to 1808 Wyttenbach edited the 'Bibliotheca Critica,' Leyden, 12 vols. 8vo. His smaller essays were collected after his death under the title 'Opuscula varii Argumenti, Oratoria, Historica, Critica,' Leyden, 1821, 2 vols. 8vo. His life of Ruhnken is printed in Fr. Lindemann's 'Vitae Duumvirorum doctrina et meritis excellentium,' together with Ruhnken's Life of Hemsterhuis, Leipzig, 1822, 8vo. Wyttenbach's correspondence with the most eminent scholars of the time has been edited by W. F. Mahne (Ghent, 1829-30, 3 parts, 8vo.), who has also written a very good Life of Wyttenbach ('Vita Wyttenbachii'), which forms part 1 of vol. ii. of Fr. Tr. Friedemann's 'Vitae Hominum quocunque Literarum genere eruditissimorum ab eloquentissimis Viris scriptae,' Brunswick, 1825, &c., 8vo.

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X.

X to an Englishman is the representative of what might as well be denoted by the two consonants *ks*. But in the Greek alphabet it was merely a guttural aspirate, equivalent probably to the German *ch*. The cause of this change in the power of the symbol appears to admit of the following explanation:—Before the employment by the Greeks of their character Ξ or ξ, it was their common custom to represent this sound by ΧΣ, as may be seen in Boeckh's inscriptions, rather than by ΚΣ, of which there exist however a few examples, as in the so-called Nanian Inscription. [ALPHABET, p. 383, plates ii. and iii.] Now the Romans copied this Greek practice, and we consequently find in Latin inscriptions such forms as MAXSVMVS, PROXSVMVS, &c. (See the Index of Marini's *Fratelli Arvali.*) So again coins give us the proper name AXSIVS, where the later orthography would have been AXIVS; and even existing manuscripts still bear traces of this orthography. Thus the Medicean MS. of Virgil has EXSESA (*Aen.*, viii. 418), EXSVIT (*Aen.*, viii. 567). But the Romans, being generally averse to the aspirated letters (*h* itself, though written, seems not to have been pronounced by them), had little or no occasion for the character x except in this combination with an s. The very sight therefore of an x, even before the eye came to the s, raised in the mind the idea of a sibilant, and thus rendered the sibilant itself a superfluous letter; which, because it was superfluous, would before long be omitted, and thus the single letter x would perform the office of the two consonants xs. It may be objected to this view, that in one of the oldest inscriptions, the Bacchanalian (See the plate in the seventh volume of Drakenborch's Livy), we have the form EXDEICERENT, where the letter in question already has the power of our modern *x*. This perhaps is an erroneous idea. It would probably be more correct to look upon the character in this word as the simple guttural, thus: *echdeicerent*, from which the later form *edicerent* would easily flow. A sibilant in this word would have given the same offence to a Roman, as εξδιδοναι would have done to a Greek ear. It should be recollected too that the old Latin preposition had the form *ec*, as seen in *ecfari*, *ecferre*, &c. (for thus did Cicero write these words), and that a sibilant was added only before the sounds *p*, *k*, *t*, or before a vowel. An argument against the view we have taken in reference to the change of power in the symbol might be founded upon the fact that the Spaniards employ the very same symbol as a guttural. Thus in the geographical names Xeres, Xalapa, Mexico, the X has little or nothing of a sibilant character.

The letter X was the last in the Roman alphabet, neither Y nor Z belonging to it, although the majority of Latin grammars include them. On reflection however it will be admitted that the words in which those two letters occur are not really part of the Latin language, but borrowed from the Greek, as *zephyrus*, *zona*; or from some Eastern source, as *gaza*. Such forms as *luchryma*, *hyems*, *sylva*, are simply errors of modern editors. The Romans themselves wrote *lacruma* or *lacrima*, *hiems*, or rather *hiemps*, and *silva*. But the fact that *x* was the final letter of the Roman alphabet is established by an anecdote in the Life of Augustus by Suetonius (c. 88), but the reader must be careful to avoid the false reading of Casaubon, who, in defiance of the manuscripts, has substituted a *z* for an *x*.

The interchanges of *x* with other letters are as follows:—

1. *x* with *c*, as in the double form, already mentioned, of the Latin or Greek preposition *ex* or *ec*.

2. *x* with *sc* or *sk*. See S.

3. *x* with *g*, as in the Latin *augeo* compared with the Greek αυξανω, and μιγ-νυμι compared with *mix*, Eng., and *mix-tus*, Latin.

4. *x* with *ps*, as the Latin *exilis* compared with the Greek ψιλος. In the same way we find an illiterate Roman officer writing *ixi* for *ipsi*, and thus too *proximus* is the superlative of *prope*. This change is in fact only another instance of the interchange of *p* and *c*, so common between Greek and Latin. See C.

haps with *h*. Thus ξενος is probably in the first syllable the equivalent of the Latin *hostis* and *hospes*. See O and N. So again *hasta* is probably connected with the Greek ξεστος.

6. *x* with *z*. Thus in Spanish a *z* is found where the Latin has an *x*. For example, the Latin words *crux*, *pax*, have become in Spanish *cruz*, *paz*, whence the names of the American towns *Vera Cruz* and *La Paz*.

XALAPA. [MEXICAN STATES.]

XALLE, the Turkish name of the seeds of the Prickly Christ's Thorn (*Paliurus aculeatus*). The genus *Paliurus* belongs to the natural order Rhamnaceæ, and has a 5-cleft spreading calyx; 5 petals; ovate 2-celled anthers; a flat pentagonal disk; a 3-celled ovary, with 3 styles and a dry indehiscent fruit, which expands into a membrane round the disk, and contains a 3-celled nut. The *P. aculeatus*, Prickly Christ's Thorn, has pubescent branchlets: ovate, serrated, smooth, 3-nerved leaves, with 2 spines at their base, the one erect, the other hooked; the flowers few, and crowded in umbels. This plant is a shrub, and inhabits the coasts of the Mediterranean, and is the common thorn of the hedges, for which it is well adapted, on account of the thick fence it forms by its branches growing close together. It has greenish yellow flowers, and from the peculiar form of its membranous fruit, which looks like a little head with a broad-brimmed hat on it, it is called by the French *Porte-chapeau*. The branches are easily bent into any form; and as it is the commonest plant with thorns which grows in Palestine, it has been supposed to have afforded the materials of which the crown of thorns was made which was placed on the head of Jesus Christ. Hence the common name of this plant. The seeds are used by the native doctors of Constantinople in a variety of diseases, but they do not appear to have very active properties. They are also used as a dye.

XANTHIC ACID was discovered by Zeise in 1822: it is prepared by gradually adding bi-sulphuret of carbon to a solution of potash in alcohol till the alkali is neutralized; by this operation xanthic acid and xanthate of potash are formed. The salt is colourless, and crystallizes in needles of considerable brilliancy; when exposed to the air it becomes slightly yellow, and has a cooling, sharp, sulphurous taste. It is very soluble in water, but does not absorb it from the air; it is dissolved by alcohol, and also, though very slightly, by æther.

When xanthate of potash is treated either with sulphuric or hydrochloric acid diluted with about five times its weight of water, it is decomposed, and xanthic acid possessing the following properties is obtained:—

It resembles an oil, but is heavier than water, and, being insoluble in it, separates from it; it is colourless, and remains liquid even when cooled below the temperature of the air; by exposure to the air it is soon covered with a white opaque crust; its smell is strong and somewhat resembling that of sulphurous acid; its taste is at first sour, and then bitter and astringent; it reddens litmus-paper, and decomposes spontaneously when kept under water.

From the experiments of Zeise it appears that this acid consists of—

Four equivalents of sulphur .	64
Six equivalents of carbon . .	36
Five equivalents of hydrogen .	5
One equivalent of oxygen . .	8
Equivalent . . .	113

This acid precipitates several metallic salts of a yellow colour, and hence its name; this is especially the case with the salts of copper and is characteristic of the acid.

When the xanthates are heated they are decomposed, and when xanthate of potash is subjected to distillation a limpid yellow coloured fluid comes over, which Zeise has called *xantheic oil;* water however dissolves a small quantity of it: its taste is sweet and sharp, but it does not possess the general properties of an acid; it burns with a blue flame, and the evolution of much sulphurous and carbonic acid.

XANTHIC OXIDE. [Calculus.]

XANTHIN. [Madder.]

XANTHIPPE. [Socrates.]

XANTHIPPUS. [Punic Wars.]

XANTHITE consists of a congeries of small rounded grains, easily separable from each other, and not larger than small grains of sand. It occurs also in foliated masses, which are very friable, and readily fall into grains, some of which are prisms about $\frac{1}{25}$th of an inch in length. It yields by cleavage a doubly oblique prism. The grains are translucent or transparent, and of a greyish yellow colour. Hardness about 2. Specific gravity 3·221. Before the blowpipe, with borax, melts into a glass, which is yellow while hot, but becomes colourless on cooling.

According to Dr. Thomson's analysis it consists of—

Silica	35·092
Lime	33·080
Alumina	17·428
Peroxide of iron . . .	6·368
Protoxide of manganese .	2·801
Magnesia	2·001
Water	1·680
	98·450

It is found in a limestone-bed at Amity, Orange County, New York, United States of America.

XA'NTHIUM, a genus of plants mostly referred to the natural order Compositæ, but of which Link forms a small order called Ambrosiaceæ. The genus Xanthium has monœcious flowers; the male flowers have a many-leaved involucrum, tubular petals, and a paleaceous receptacle; the female flowers have an involucrum with a single leaf, which is bilocular, and embraces 2 flowers without petals. The species are herbs.

X. strumarium, the Lesser Burdock of English botanists, is a naked plant, with the lower leaves cordate, 3-lobed, toothed, and 3-nerved. It is found on roadsides and in cultivated places in Great Britain and other parts of Europe. *X. spinosum* is found in the south of Europe. It has entire or 3-lobed leaves, and is covered with 3-forked spines. An infusion of this plant is sometimes used as a yellow dye; hence the generic name, from ξανθος, yellow.

(Koch, *Flora Germanica;* Burnett, *Outlines.*)

XANTHO, Dr. Leach's name for a genus of Brachyurous Crustaceans, placed by M. Milne Edwards among his *Canceriens Arqués* [Platycarcinus], between the genera *Lagostoma* and *Chlorodius.*

Generic Character.—Carapace very wide, but never regularly ovoïd, and with but little convexity; its surface generally entirely horizontal transversely, and not curved in its longitudinal direction, except on the anterior portion. *Front* ordinarily advanced, lamellar, and nearly horizontal; a narrow fissure divides it into two lobes, the border of which is more or less notched in the middle. The *orbits* present nothing remarkable, and resemble those of the crabs and of Zozymus. The latero-anterior borders of the carapace are generally prolonged much less backward than in the preceding genera of *Canceriens Arqués*, and only reach ordinarily to the level of the middle of the genital region, so that the anterior portion of the carapace is scarcely more extended than the posterior portion. The latero-posterior borders are nearly always long, straight, and directed much less obliquely inwards than in the preceding genera. The *antennary fossets* are narrow, transversal, and separated by a delicate partition. The basilary joint of the *external antennæ* is placed as in the *Zozymi*, but is in general shorter. The external *jaw-feet* present nothing particular. The *sternal plastron* is inclined to oval. The anterior *feet* are strong, and in general unequal in the male; the claws are sometimes pointed, sometimes rounded, but never hollowed into a spoon-shape, as in the *Zozymi;* as in all the preceding genera, they are black or deep brown. The succeeding feet are moderate, more or less compressed, and terminated by a very short tarsus, armed with a single horny nail. The *abdomen* presents seven segments in the female, and in general five in the male.

Geographical Distribution.—The species are numerous, and spread in all seas. M. Milne Edwards thus arranges them:—

§ A. Species whose carapace is granulous or tuberculous above.

a. Four last pairs of feet equal, neither spiny nor toothed.

*a**. Carapace covered with rounded and isolated granulations.

Example, *Xantho hirtissimus.*

Description.—Carapace granulous and very strongly embossed throughout its extent. General form nearly ovoïd. Latero-anterior borders of the carapace very much curved and divided into four obtuse lobes. Latero-posterior borders very concave. Pterygostomian regions granulous and hollowed with small furrows, which are continued with the notches of the latero-anterior borders. Feet moderate and compressed. Body entirely covered with small stiff hairs. Length about seven lines.

Locality.—The Red Sea.

*a***. Carapace covered with small tubercles conjoined in double rows and having a worm-eaten aspect.

Example, *Xantho vermiculatus.*

Description.—Carapace hardly convex, strongly embossed, and presenting on each embossment a great number of united tubercles, so as to form lines which are elevated and carved as it were on each side, which unite in their turn and give the carapace a worm-eaten appearance. Latero-anterior borders divided into four lobes with triangular teeth, whose borders are dentilated: latero-posterior borders concave. Front very much inclined; a narrow and deep notch towards the middle of the anterior border of the third joint of the external jaw-feet. Feet with the appearance of being worm-eaten, both above and externally; first pair moderate and rounded above; claws furrowed; four last pairs of feet with the upper border trenchant and hairy. Length about two inches. Colour whitish. (M. E.)

a a. Four last pairs of teeth neither spiny nor toothed. (Carapace tuberculous.)

Example, *Xantho Reynaudii.*

Description.—Carapace with very distinct and embossed regions, tuberculous throughout its whole extent, slightly convex, strongly truncated behind and covered with tubercles which do not project much. Front divided into two sinuous and truncated lobes; latero-anterior borders reaching only a little beyond the level of the stomachal region, and armed with four large triangular and tuberculous teeth; latero-posterior borders slightly concave and very long; anterior feet with a swollen appearance and covered internally and externally with large rounded tubercles; claws pointed; succeeding feet slender, rather long, and carrying on the upper border of their third joint a row of six or seven large teeth. Inferior surface of the body granulous. Length about two inches and a half. Colour red mingled with yellow and white.

Locality.—The Indian Ocean. (M. E.)

§ B. Species whose carapace is not covered either with granulations or tubercles.

b. Hands and four last pairs of feet without a trenchant crest on their upper border.

*b**. Carapace embossed and dotted throughout its extent (its latero-anterior borders strongly toothed).

Example, *Xantho impressus.*

Description.—Carapace hardly convex and covered with embossments whose surface is unequal and dotted. Front slightly inclined and divided into four rounded lobes, the two middle of which are large and projecting, and the two lateral ones very small. Latero-anterior borders taking their origin much below the level of the orbit, not prolonged beyond the level of the middle of the genital region, and divided into four large rounded lobes. Anterior feet short, stout, and dotted; a great bi-lobate tubercle on the inner border of the carpus; hands presenting neither tubercles nor spines; claws pointed and rounded at the end; four last pairs of feet rounded above. Length two or three inches. Colour yellow, washed with red.

Locality.—The Isle of France. (M. E.)

*b***. Carapace embossed anteriorly, but flat on its posterior half (its latero-anterior borders strongly toothed).

Example, *Xantho lividus.*

Description.—Upper surface of the carapace remarkably convex; lower border of the opening of the internal organ of the orbit advancing to the level of the fourth joint [illegible] the external antenna. Latero-anterior borders of the carapace divided into four teeth; anterior feet moderate; hand rounded above; upper border of the four last pairs of feet rounded, furnished with a great number of small tubercles and very hairy. Length about three inches. Colour reddish yellow.

Locality.—The Isle of France. (M. E.)

b***. Carapace without notable embossments, even on its anterior portion.

b***†. Latero-anterior borders delicate and deeply cut.

Example, *Xantho crenatus.*

Description.—Carapace much widened and smooth; front divided into two very wide, truncated, lamellar lobes, with nearly straight edges; latero-anterior borders divided into three delicate and nearly square lobes, followed by a fourth triangular tooth. Anterior feet very unequal and moderate; claws slightly compressed and curved inwards and downwards. Succeeding feet nearly as in the preceding species, but more slender. Length about 10 lines.

Locality.—The coasts of Peru. (M. E.)

b***††. Latero-anterior borders thick and entire, or only presenting two or three tubercles, which hardly project at all.

Example, *Xantho Gaudichaudii.*

Description.—Front slightly advanced, very narrow, and deeply divided into four rounded and very projecting lobes. General form closely resembling *Xantho floridus.* Length about two inches.

Locality.—Chili. (M. E.)

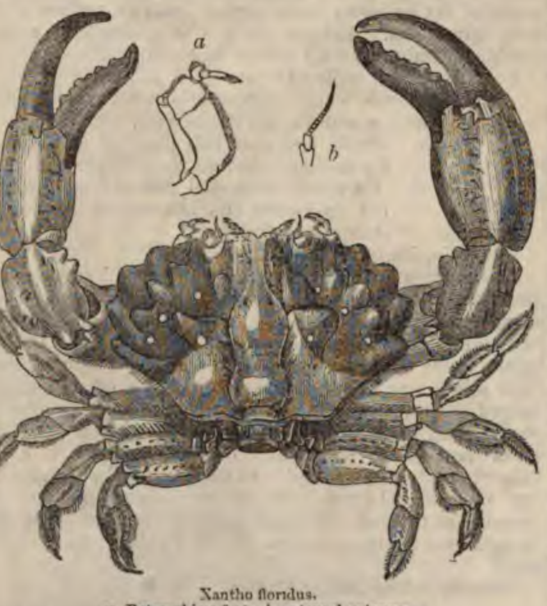
b b. Hands and four last pairs of feet furnished above with a longitudinal crest.

Example, *Xantho incisus.*

Description.—External surface of the hands furnished with many horizontal rows of small tubercles. Carapace very wide, slightly convex, strongly embossed, and presenting on the stomachal and hepatic regions many small transversal crests. Front scarcely inclined, and divided into four rounded lobes, the two external of which are very small. Latero-anterior borders of the carapace divided into four teeth, the two first of which are rounded and compressed, and the two last triangular and carinated above. Anterior feet granulous. Length about an inch. Some hairs on the carapace and on the feet.

Locality.—Australasia. (M. E.)

We illustrate the genus by *Xantho floridus*, which is common on the English and French coasts, about two inches in length, of a reddish brown colour, with black claws.



Xantho floridus.
a, External jaw-foot; *b*, external antenna.

N.B. There are fossil examples of this genus.

XANTHOCHYMUS, a genus of plants belonging to the natural order Guttiferæ. It is by some botanists referred to the genus Stalagmitis [STALAGMITES], from [illegible] it differs in its hermaphrodite flowers, and its [illegible]ng disposed in five bundles. Three species of East Indian plants have been described under Xanthochymus by Dr. Roxburgh. Of these the *X. pictorius* is the most important. This plant is the *X. tinctorius* of Linnæus. It has lanceolate acuminate leaves, wrinkled petioles, and fruit 1-4-seeded. It is a native of the East Indies, in valleys among the Circar Mountains. It is a large tree with white flowers and a yellow fruit resembling the orange. The fruit is eaten by the natives, and is very inviting to the eye, though the flavour is not pleasant to a European taste. When nearly ripe the fruit is filled with a resinous juice, of the consistence of cream, and of a yellow colour, and having acrid properties similar to the gamboge. It is imperfectly soluble in proof spirit and less so in water, but in alkaline solutions more. It makes a pretty good water-colour, either alone for yellow, or with blues to form a green. There is little doubt but that some of the vegetable secretion known in the market as gamboge is the produce of this plant. The gamboge yielded by Garcinia is in the form of rolls; that from Xanthochymus is in small granular brittle pieces, and is less valued both as a colour and as a purgative.

(Don's Miller; Lindley, *Nat. System.*)

XANTHOMIZA. [XANTHOMYZA.]

XANTHOMY'ZA, the correct form of ZANTHOMIZA, which last is used by Mr. Swainson and the catalogues generally.

XANTHOPHYLL. It is well known that in autumn the foliage of many forest-trees becomes of a bright yellow colour, which, according to Berzelius, is owing to the replacement of the green colouring-matter of the leaves, or *Chlorophyll*, by a peculiar yellow colouring-matter which he calls *Xanthophyll.* The properties of this are, that it is a fatty substance of a deep yellow colour, which melts between 100° and 120° Fahr.; it is insoluble in water, but dissolves copiously in alcohol and æther; its solution exposed to air and light is rapidly bleached; alkalis dissolve it sparingly; the solution, which is of a yellow colour, is also destroyed by the action of light.

XANTHOPROTEIC ACID. According to Mulder, this acid is formed when albumen or any other protein compound is digested in nitric acid; these dissolve with the escape of azotic gas, and yield a yellow-coloured solution, while oxalic acid and ammonia are formed.

Two equivalents of protein, 1 of water, and 2 of nitric acid yield 3 of oxalic acid, 2 of ammonia, and 1 of xanthoproteic acid. After being washed with boiling water, the acid exists as a tasteless orange-yellow powder, which combines with acids as perfectly as with bases; its compounds with the latter dissolve in water, and give dark-red coloured solutions. This acid consists of carbon, hydrogen, oxygen, and azote, combined with water.

XANTHORHI'ZA, a genus of plants belonging to the natural order Ranunculaceæ and the tribe Pæonieæ. It has a calyx composed of 5 deciduous sepals; 5 petals; 2 to 3-seeded carpels, but the seeds are usually solitary from abortion. There is but one species of this genus, the *Xanthorhiza apiifolia*, which is a small shrub, with irregularly pinnate leaves, with 5 to 7 leaflets, which are deeply serrated. The flowers are small and dark purple, and arranged in branched racemes, which are pendulous, and arise with the leaves from the scaly buds. The roots are creeping, and of a yellow colour, hence the generic name. It is a native of North America from Virginia to Georgia, where it grows on the shady banks of rivers, and is commonly known by the name of *yellow-root.* The bark of the root is intensely bitter, and is used in America as a tonic, but the plant has also acrid properties.

The yellow-root wlll grow in any common garden soil, and is easily propagated by means of the suckers, which it throws out in great abundance.

XANTHORNUS, the generic name used by Brisson and Cuvier for certain Orioles. The generic character is given in the article STURNIDÆ, p. 174.

The Baltimore Oriole, or *Golden Robin*, will serve as an illustration of the genus.

Description.—Tail nearly even. *Male*, orange; head, neck, back, wings, and tail black; the lateral tail-feathers orange at the summit. Length seven inches.

Female and Young.—Pale orange; the back greyish mottled with yellow, and the tail orange.

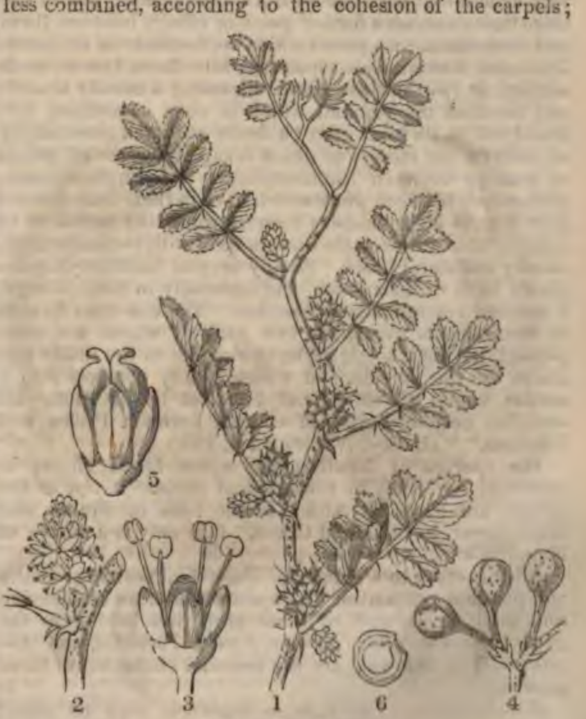
Locality, Habits, &c.—These brilliant birds arrive in the United States from South America very early in May. The males come first. Their natural notes are mellow, and whistle loud and clear; but they are great mimics, atch up the note of any bird that comes nigh them. food consists principally of small caterpillars, beetles, es, and other insects, but neither young peas nor come amiss to them.

here is nothing,' says Nuttall, 'more remarkable in hole instinct of our Golden Robin than the ingenuity yed in the fabrication of its nest, which is, in fact, a llous cylindric pouch of five to seven inches in depth, ly suspended from near the extremities of the high ing branches of trees (such as the elm, the pear, or -tree, wild-cherry, weeping-willow, tulip-tree, or butood). It is begun by firmly fastening natural strings flax of the silk-weed (*Asclepias*), or swamp-holyhock *scus palustris*), or stout artificial threads, round two re forked twigs, corresponding to the intended width epth of the nest. With the same materials, willow-, or any accidental ravellings, strings, thread, sewingtow, or wool, that may be lying near the neighbourouses, or round the grafts of trees, they interweave abricate a sort of coarse cloth into the form intended; ds the bottom of which they place the real nest, made y of lint, wiry grass, horse and cow hair, sometimes, fect of hair, lining the interior with a mixture of er strips of smooth vine-bark, and rarely with a few ers, the whole being of a considerable thickness, and or less attached to the external pouch. Over the he leaves as they grow out form a verdant and agreeanopy, defending the young from the sun and rain. is sometimes a considerable difference in the manue of these nests, as well as in the materials which enter heir composition. Both sexes seem to be equally s at this sort of labour, and I have seen the female perform the whole without any assistance, and the also complete this laborious task nearly without the f his consort, who however in general is the principorker. I have observed a nest made almost wholly , which was laid out for the convenience of a male who with this aid completed his labour in a very time, and frequently sung in a very ludicrous manhile his mouth was loaded with a mass larger than ead. So eager are they to obtain fibrous materials, hey will readily tug at and even untie hard knots made of tow. In Audubon's magnificent plates, a nest is represented as formed outwardly of the long moss (*Tillandsia usneoides*); where this abounds, of course the labour of obtaining materials must be greatly abridged. The author likewise remarks that the whole fabric consists almost entirely of this material, loosely interwoven, without any warm lining, a labour which our ingenious artist seems aware would be superfluous in the warm forests of the lower Mississippi. A female, which I observed attentively, carried off to her nest a piece of lamp-wick 10 or 12 feet long. This long string and many other shorter ones were left hanging out for about a week before both the ends were wattled into the sides of the nest. Some other little birds, making use of similar materials, at times twitched these flowing ends, and generally brought out the busy Baltimore from her nest in great anger.' (*Manual of the Ornithology of the United States and of Canada.*)

Baltimore Bird.

The four or five white eggs are faintly tinged with bluish, and marked, chiefly at the larger end, though sometimes scatteringly, with straggling serpentine dark brown lines and spots, and fainter hair-streaks, looking sometimes almost like real hair, and occasionally lined only and without spots, according to Nuttall, who says that the eggs which he had seen did not resemble Wilson's figure; though they may vary much. Period of incubation fourteen days, according to Audubon, who states that in Louisiana, where they arrive early in the spring, they frequently rear two broods in the season.

XANTHOXYLA'CEÆ, a natural order of plants belonging to Lindley's Gynobasic group of polypetalous Exogens. It possesses the following essential characters:— The flowers are unisexual and regular; the calyx in three, four, or five divisions; the petals usually of the same number as the divisions of the calyx, usually longer than the calyx, and sometimes absent; the æstivation is generally twisted and convolute; the stamens are equal in number to the petals, or twice the number, and arise from around the base of the stalk of the abortive carpels; in the female flowers they are either absent or very imperfect; the ovary is made up of the same number of carpels as there are petals, or of a smaller number; the carpels are either distinct or more or less combined; there are mostly two ovules in each cell, sometimes four; the styles are more or less combined, according to the cohesion of the carpels; the fruit is either membranous or in the form of a berry, sometimes having from two to five cells, and sometimes consisting of several drupes or 2-valved capsules, of which the sarcocarp is fleshy, and is easily separated from the



Xanthoxylum pterota.

1, Branch with leaves, flowers, and fruit; 2, flowers separated; 3, male flower; 4, stalked capsules; 5, female flower; 6, section of seed.

endocarp; the seeds are solitary or twin, pendulous, usually smooth and shining with a testaceous integument; the embryo lies in the midst of a fleshy albumen, the radicle is superior, and the cotyledons ovate or flat. The species of plants belonging to this order are trees or shrubs, with exstipulate, alternate, or opposite leaves furnished with pellucid dots. The flowers are either axillary or terminal, and coloured grey, green, or pink.

The plants in this order were included originally by Jussieu in his Terebintaceæ. They were first separated by Martius and Nees under the order Xanthoxyleæ, which was subsequently adopted by Adrien de Jussieu. On the affinities of this difficult order Adrien de Jussieu has the following remarks:—'The place originally assigned, and for a long time preserved, for most of the genera of Xanthoxylaceæ, proves sufficiently how near the affinity is between them and what used to be called Terebintaceæ. If, with Brown and Kunth, the latter are divided into several orders, Xanthoxylaceæ will be most immediately allied to Burseraceæ and Connaraceæ, agreeing with the former in the genera with a simple fruit, and with the latter in those with a compound one. Notwithstanding the distance which usually intervenes in classifications between Aurantiaceæ and Terebintaceæ, there are nevertheless many points of resemblance between them; Correa de Serra has pointed out a passage from one to the other through Cookia. Kunth, in new-modelling the genus Amyris, and in considering it the type of a distinct order, suspects its near affinity with Aurantiaceæ; we cannot therefore be surprised at the existence also of relations between the latter and Xanthoxylaceæ. A mixture of bitter and aromatic principles, the presence of receptacles of oil, that are scattered over every part, which give a pellucid dotted appearance to the leaves, and which cover the rind of the fruit with opaque spaces,—all these characters give the two families a considerable degree of analogy. This has already been indicated by Jussieu in speaking of Toddalia, and in his remarks upon the families of Aurantiaceæ and Terebintaceæ; and it is confirmed by the continual mixture in all large herbaria of unexamined plants of Terebintaceæ, Xanthoxylaceæ, and Aurantiaceæ. The fruit of the Aurantiaceæ is however extremely different; their seeds resembling, as they do, Terebintaceæ, are on that very account at variance with Xanthoxylaceæ, but at the same time establish a further point of affinity between them and some Rutaceous plants which are destitute of albumen. Unisexual flowers, fruit separating into distinct cocci, seeds solitary, or twin in these cocci, enclosing a usually smooth and blackish integument, which is even sometimes hollowed out on its inner edge; a fleshy albumen surrounding an embryo, the radicle of which is superior,—are all points of analogy between Xanthoxylaceæ and Euphorbiaceæ, particularly between those which have in their male flowers from four to eight stamens inserted round the rudiment of a pistil, and in the female flowers cells with two suspended, usually collateral ovals. Finally several Xanthoxylaceous plants have in their habit, and especially in their foliage, a marked resemblance to the Ash. The diœcious flowers of Fraxinus, its ovary, the two cells of which are compressed, having a single style, two ovules in the inside and scales on the outside, and which finally changes into a samara, which is 1-celled and 1-seeded by abortion,—all establish certain points of contact between Ptelea and Fraxinus.' (Lindley, *Nat. Syst.*, p. 135.)

The species of Xanthoxylaceæ are found chiefly in America, especially in the tropical parts. A few of the species are found in Africa, in the Isles of France and Madagascar, in India and China. One only is a native of New Holland.

All this order to a greater or less extent possess aromatic and pungent properties. The species which are best known and used on account of these properties belong to the genera *Xanthoxylum*, *Brucea*, *Ptelea*, *Toddalia*, and *Ailanthus*. The following are the essential characters of these genera:—

Xanthoxylum. Calyx 3- 4- 5-parted, with an equal number of petals and stamens; the styles equal in number to the carpels, distinct or connected at the apex; the carpels 1-5, sessile or stipitate, 2-valved, 1- 2-seeded; the leaves simple, ternate, and unequally pinnate.

Brucea. The calyx 4-parted; 4 petals, 4 stamens; 4 tinct; 4 drupes, 1-seeded; the leaves unequally

Ptelea. The calyx 4- 5-parted; the petals 4-5, the stamens 4-5, the fruit compressed, 2- 3-celled; the cells 1-seeded, turgid in the centre, each cell expanded into an orbicular reticulated wing; the leaves mostly of three, sometimes of five leaflets.

Toddalia. The calyx 5-toothed; the petals 5, the stamens 5, the stigma almost sessile, peltate; the fruit fleshy, 5-furrowed, 5-celled; the cells 1-seeded; the leaves trifoliate; the male and female flowers on different branches.

Ailanthus. The flowers polygamous, the calyx 5-cleft, the petals 5; the stamens 10, unequal; the styles 3-5, rising from the notches of the ovaries; the carpels 3-5, tongue-shaped, compressed, membranous, tumid in the middle, 1-celled, 1-seeded; the seeds compressed, albumen absent, the leaves unequally pinnate.

The species of *Xanthoxylum* are trees, or shrubs with the petioles, leaves, and branches usually furnished with prickles. Like the whole order to which they belong, they possess aromatic and pungent properties, and are known in the countries where they grow under the name of Peppers.

X. fraxineum has unequally pinnated leaves with four or five pairs of ovate obsoletely serrulated leaflets, terete unarmed petioles, stipular prickles, and axillary corymbs. This plant is a tree attaining a height of fourteen or fifteen feet, and is an inhabitant of North America from Canada to Virginia. The bark of this tree and its capsular fruit have a hot acrid taste, and are much used as a remedy for the toothache: it is on this account called *toothache-tree*, and this name is now applied to all the species of Xanthoxylum. A tincture of the bark is recommended as a remedy in rheumatism.

X. hyemale is a native of Brazil, in the provinces of St. Catherine and Rio Grande do Sul. It has white flowers: unequally pinnate leaves, with 3 or 6 pairs of obovate, blunt, crenate-serrated, nearly sessile leaflets, which are glandular on the margins; the rachis hardly winged: the flowers in racemose panicles. This tree is called *Coentrilho* in Brazil, and the natives make use of a powder of the bark for the ear-ache. The wood is also good and useful for many purposes.

X. Budrunga is a native of the East Indies, in Silhet. It is armed with small incurved prickles, and has unequally or abruptly pinnate leaves, with 5 or 6 pairs of unequal ovato-lanceolate, entire, acuminate, smooth leaflets. It is called in India *Budrung*, and the natives use the seeds, which have a warm spicy flavour, medicinally. The fruit is about the size of a pea, and the outer coat contains an exceedingly fragrant balsam.

X. Rhetsa is a native of the mountainous parts of the coast of the East Indies. It is a large spreading tree, attaining a height of 50 feet. It is armed with prickles, and has abruptly pinnate leaves, with 8 or 16 pairs of lanceolate, falcate, smooth, entire leaflets, all nearly equal in size. The unripe capsules of the fruit resemble berries, and have an aromatic taste similar to the skin of a fresh orange. The seeds are aromatic also and acrid, resembling black pepper. The bark has also the same properties, with a bitter principle added. In the Telinga language this tree is called *Rhetsa-maun*, which means Council-tree, and it is under the branches of this tree that the hill people assemble to discuss all matters of public interest.

X. emarginatum is a native of Cuba and Jamaica. It is unarmed, and has unequally pinnate leaves, with 2 or 3 pairs of ovate, emarginate leaflets. It is a tree about 20 feet in height, with the branches inclining to the ground. On burning the wood of this tree, the smoke is exceedingly odoriferous, and is supposed to have been the origin of the fine scent which Columbus perceived before discovering the island of Cuba.

Most of the other species of Xanthoxylum possess aromatic properties, and are used for condiments or medicines where they grow. The capsules and seeds of *X. hostile*, called *tej-bul* by the natives, are used in India for intoxicating fish, and are supposed to be the *Faghureh* of Avicenna. In Japan the capsules of *X. piperitum* are used as a substitute for pepper. The fruits of many of the species are also held to be antidotes to the action of poisons on the system, and there can be little doubt that the secretions of these plants would be found valuable stimulant remedies in many diseases. The hardy species will grow in the open air in this country, and are well adapted for ornamenting small shrubberies. They may be propagated by cuttings, or by slips of the roots, which should first be planted in pots and placed in a hot-bed till the young plants are strong enough to be removed.

The species of Brucea possessing medicinal properties are the *B. antidysenterica* and *B. Sumatrana*. The former species is a native of Abyssinia, and is known by its quite entire leaflets, which are clothed with rusty villi on the nerves beneath. This plant is known in Abyssinia by the name of *Wood-ginoos*. It is used in that country as a specific in dysentery. It contains in its bark an active principle called Brucia, which resembles Strychnia in its effects, but is from 12 to 16 times less energetic than that alkaloid. The *B. Sumatrana* is a native of Sumatra, the Moluccas, and China, and is said to have properties very similar to those of the first species.

The *Ptelea trifoliata* is a native of North America, and is known in Canada by the name of the three-leaved ash. It has corymbose flowers, with three ovate acute leaflets, the middle one tapering much to the base. Its foliage has an unpleasant smell and bitter taste, and the young green shoots are used in infusion as an anthelmintic. The fruit is membranous and winged, and is aromatic and bitter, and has been recommended as a substitute for hops.

The species of *Toddalia* are dwarf shrubs, with alternate trifoliate leaves, full of pellucid dots. The *T. aculeata* is covered with recurved prickles, and has ovate-oblong leaflets. Several varieties of this species have been recorded, and are found in various parts of the East Indies, in Ceylon, the Mauritius, Malabar, and the Indian Archipelago. The bark of the root of this plant is bitter and aromatic, and is employed in India as a remedy against the remittent fevers which are caught in the jungles of the Indian hills.

The species of *Ailanthus* are large trees, and their timber is used for various purposes in the countries in which they grow. *A. glandulosa* is a native of China and the Moluccas, where it is called *Ailanto*. It attains a height of 60 feet, and has unequally pinnate leaves, with the leaflets coarsely toothed at the base, and furnished with glands beneath the teeth. The leaves of this tree are three feet long; the flowers are of a whitish green colour, and exhale a disagreeable odour. When the bark is wounded it gives out a resinous juice, which hardens in a few days. The wood is hard and heavy, and is susceptible of a very fine polish. This tree grows well in England, and is a handsome addition to ornamental plantations. It is easily propagated by slips of the roots.

A. Malabarica is a large tree, and is a native of Malabar. It has abruptly pinnate leaves, entire leaflets, the fruit a amara blunt at both ends and connected together at the ase. The wood is used for making sheaths for spears, &c. A resinous juice flows from the bark when wounded. The ruit is triturated with maize and mixed with rice in decocion, and used as an application in ophthalmia.

(Don's Miller; Lindley, *Natural System*; Burnett, *Outines of Botany*; Bischoff, *Lehrbuch der Botanik*.)

XANTHO'XYLUM. [Xanthoxylaceæ.]

XANTHUS. [Lycia.]

XANTHUS (Ξάνθος), one of the early Greek historians, was, according to Suidas, a son of Candaules, and born t Sardes. Strabo (xiii., p. 628) admits, with other writers, hat Xanthus was a Lydian, but he says it is not known hether he was really a native of Sardes. As to the me in which he lived, we know, from a fragment of phorus, that he was older than Herodotus, who is even id to have been induced by Xanthus to undertake his reat historical work. But it appears that Xanthus cannot ave been much older than Herodotus, since Dionysius of alicarnassus mentions him among those writers who lived ortly before the Peloponnesian war, and from one of anthus's own fragments it is clear that he wrote his work the reign of Artaxerxes I., who reigned from B.C. 465 to 25. The statement of Suidas, that he was born about the me of the taking of Sardes (by the Ionians, in B.C. 499), so agrees with these facts. Xanthus wrote a work on ydia (Λυδιακά), in four books, in the Ionic dialect, of hich however only a few fragments are extant, which are eserved in Strabo and other writers. The genuineness these fragments has been the subject of much discussion, cause Athenaeus (xii., p. 515) states, on the authority of rtemon of Cassandrea, that Dionysius surnamed Scythobrachion forged a work on Lydia under the name of Xanthus. But in the first place, the existence of Xanthus the historian cannot be doubted, and secondly, most of the fragments which are preserved under his name bear the strong internal evidence of being genuine; and lastly, there are scarcely any that can be declared spurious with certainty. Dionysius of Halicarnassus, who appears to have had the work of Xanthus before him, speaks of it with high praise, and calls the author a man most intimately acquainted with the antient mythical history, and not inferior to any of those who had written on Lydia. So far as we can judge from the extant fragments, which contain valuable information on various points, especially the history and geography of Asia Minor, the work of Xanthus seems to have been one of great merit. One Menippus, of uncertain date, made an abridgment of the work of Xanthus. (Diog. Laert., vi. 101.) The fragments of Xanthus's 'Lydiaca' are collected in Creuzer's 'Historicorum Graecorum antiquissimorum Fragmenta,' p. 191, &c., and in C. and Th. Müller's 'Fragmenta Historicorum Graecorum,' p. 36, &c. Some antient authors attribute to Xanthus a work on the Magi and the religion of Zoroaster, but the two fragments which are quoted from it leave no doubt that this work was the production of some late grammarian.

(*Museum Criticum*, vol. i., p. 80, 216; Creuzer, in the work cited above, p. 135, &c.; C. and Th. Müller, p. xx., &c.; Welcker, in Seebode's *Archiv für Philol.*, for 1830, p. 70, &c.)

XAVIER, ST. FRANCIS. [Jesuits; Missions.]

XEMA. [Laridæ, p. 334.]

XENO'CRATES (Ξενοκράτης), a native of Chalcedon, was born B.C. 396. He was originally a pupil of Æschines, the Socratic philosopher, and then of Plato. The few facts of his life are chiefly known from the loose account of Diogenes Laertius. According to Diogenes he accompanied Plato to Sicily. Xenocrates was naturally of a slow understanding, which led Plato to say that Xenocrates required the spur, but Aristotle the bit. His temperance was proof against all temptation, and there are stories of his successfully resisting all the solicitations of Lais and Phryne. A story is also told of the Athenians allowing him to give his testimony without oath, though it was the universal practice to require a witness to take an oath. It does not seem very consistent with this story that he should have been once sold for a slave by the Athenians, because he could not pay the tax which was imposed on the metoicoi, or resident aliens. Demetrius Phalereus, it is said, paid the money and released him; this laudable act is also attributed to the orator Lycurgus. Other accounts of his having been sent by the Athenians as ambassador to King Philip, and to Antipater after the Lamian war, are hardly more credible. He succeeded Speusippus B.C. 339 in the Academy, of which he was at the head for twenty-five years. A long list of his writings is given by Laertius.

We know little of the doctrines of Xenocrates, but it may be inferred that he exhibited his opinions in a systematic form, and not in dialogues like his master Plato. To him is attributed the division of philosophy into Logic, Ethic, and Physic (Physics). He principally occupied himself with attempting to reduce the ideal doctrines of Plato to mathematical elements. He assumed three forms of Being (οὐσία)—the sensuous, that which is perceived by the intellect, and that which is compounded and consists in opinion. In his doctrines we see the tendency of the Academy towards the Pythagorean doctrines of number. Unity and duality he considers as the gods which rule the world, and the soul as a self-moving number. Other like conceits are attributed to him. Xenocrates considered that the notion of the Deity pervades all things, and is even in the animals which we call irrational. He also admitted an order of daemons, or something intermediate between the divine and the mortal, which he made to consist in the conditions of the soul. In his ethical teaching he made happiness consist not in the possession of a virtuous mind only, but also of all the powers that minister to it and enable it to effect its purposes.

The dialogue 'Axiochus,' On Death, which is usually assigned to Aeschines, has been sometimes attributed to Xenocrates.

It seems almost impossible to form out of the scattered notices of Xenocrates anything like a connected view of his system; and what we can learn of it is not calculated to make us regret the loss of his works. An anecdote in Laertius is pertinent, as showing that he did not expect a person to come to the study of philosophy without the necessary preparation. A man who was unacquainted with music, geometry, and astronomy wished to become his pupil, but Xenocrates told him to be gone, for he had not yet got hold of the handles of philosophy.

(Diogenes Laertius, iv., *Xenocrates*, and the *Notes* of Menage; Ritter, *Geschichte der Philosophie*, vol. ii.)

XENO'CRATES (Ξενοκράτης), of Aphrodisias, a Greek physician, who is commonly supposed to have lived in the reign of the emperor Tiberius (A.D. 14-37), though some critics are inclined to place him about B.C. 40, but the only authority on this point is a passage in Galen (tom. iii., p. 130) which strongly supports the common opinion. Respecting the life and literary activity of Xenocrates we know nothing, except that he wrote a work 'On the Advantages or the Nutriment derived from Animals' (περὶ τῆς ἀπὸ τῶν ζώων ὠφελείας or τροφῆς; Galen, tom. ii., p. 132; Clemens Alexand., *Stromat.*, i., p. 717). This work, which is often referred to, and must have consisted of several books, as the first is quoted by Galen, is now lost, but a considerable fragment of it, which treats of the nutriment which we derive from aquatic animals (περὶ τῆς ἀπὸ τῶν ἐνύδρων τροφῆς), is still extant, and contains many sound observations on this branch of natural history. A Latin version of this fragment is contained in Oribasius, 'Collectanea Medica' (ii. 58); the Greek original, though not quite complete, was first published by Conr. Gesner, with a Latin translation by J. B. Rasarius, and Scholia, Zürich, 1559, 8vo. More complete MSS exist at Hamburg, in the Vatican library, and at Paris, and from them the subsequent editors have completed the text of the treatise. The next edition after that of Gesner is that of J. A. Fabricius, in his 'Bibliotheca Graeca' (ix., p. 433, &c. of the old edition), which was followed by that of J. G. F. Franz (Frankfort and Leipzig, 1774, 8vo., with various readings, notes, and a glossary; a second and improved edition appeared at Leipzig, 1779, 8vo.), and that of Naples (1794, 8vo., with new various readings and notes by the editor Caietanus de Ancora). The best critical edition of the Greek text is that of A. Coray (Paris, 1814, 8vo.), which also contains Galen's work on the same subject. It is Coray's opinion that the author of the work 'On the Nutriment derived from Animals' is not the physician Xenocrates, but the philosopher Xenocrates.

XENOPELTIS, Reinwardt's name for a genus of serpents which have two great triangular and imbricated plates behind the eyes, so that they are confounded with the scales which succeed them, and which alone become smaller. The form belongs to the great group of *Coluber* (*Coluberidæ*, Swainson, who writes *Zenopeltis*).

XENO'PHANES (Ξενοφάνης), a native of Colophon in Ionia. His period is uncertain. Diogenes says that he flourished in the 60th Olympiad (B.C. 538), which will bring him somewhat about the period of Anaximander. Cicero says that he was a little before Anaxagoras. Apollodorus fixes his birth in the 40th Olympiad, or about B.C. 620. Though it is not said that he ever resided at Elea (Velia) in Italy, yet this must be assumed to be so, as he is always considered the father of the Eleatic school. Elea was was founded by the Phocaeans of Ionia, after they had left their country, which was invaded by the Persians under Cyrus (B.C. 546). The date of the foundation of Elea is fixed about B.C. 536; but there is no direct evidence to the fact that Xenophanes was one of the colonists of Elea. The statement of Diogenes Laertius is, that, being driven from his country, he lived at Zancle and Catana in Sicily, which is rather vague. According to Timæus, Xenophanes was still living in the time of the first Hiero and Epicharmus, or about B.C. 477, which is entirely inconsistent with the statement of Apollodorus. His verses quoted by Diogenes Laertius make him ninety-two years of age at the time when they were written, and, according to the chronology of Apollodorus, this would be his age in the year B.C. 527. But according to Apollodorus he lived even till the time of Darius and Cyrus; and the first year of the first Darius is B.C. 521. In all this uncertainty perhaps it is safest to adopt the opinion that he lived between the time of Pythagoras and Heraclitus, for he mentions Pythagoras and is mentioned by Heraclitus.

Xenophanes was a poet and a philosopher. He was one [illegible] legiac poets of Greece, and his elegies are of the symposiac character. A pleasing fragment of one of his symposiac poems is preserved in Athenæus (xi., p. 462 ed. Casaub.), who has also preserved some of his elegiac verses (x., p. 413), in which Xenophanes exalts wisdom above strength, and six verses on the luxury of the Lydians (xii., 527). He also wrote an epic of two thousand verses on the foundation of Elea; and a poem on the foundation of his native city, Colophon. The philosophical doctrines of Xenophanes were expressed in a poetic form, and from the few fragments of his poetry which remain, and the brief notices of him by other writers, we collect what we know of his doctrines. He attacked Hesiod and Homer, both in hexameter verses, elegiacs, and iambic verses (as Diogenes states), for their representations of the deities, to whom those poets attribute all the weakness and vices of mortals. He taught that God was One, unlike men either in form or mind. He said that men thought that the gods were produced, and had bodies and feelings like their own; and to show the absurdity of likening the divine to the human, he added, that if animals could make representations of the deities, they would make the representations like themselves. Assuming that the deity is the most powerful of beings, he proves that he must of necessity be One, all alike, all endued with equal powers of seeing, comprehending, and hearing; he is the comprehensive unity in which all things are; or, as Cicero expresses it, 'all things are One, and this One is unchangeable, and it is God, unproduced and eternal.' He is eternal, because he could not proceed from anything else; pure intellect and reason. His notions of the deity were obscurely expressed and not very logically maintained in his assertion that the deity is of a spherical form, neither limited nor unlimited, neither moving nor at rest. God rules and directs all, and things as they appear to us are the imperfect manifestation of the one eternal. We cannot through them attain to a perfect knowledge of what he is, and all our inquiries into the true nature of things are vain.

> "No man has seen the truth, and man shall never
> Know what is truth of God and of the Universe.
> For should one chance to say what's near to truth,
> Still he knows nought, and doubt is over all."

Thus God's true nature cannot be known. Man must contemplate individual things as they appear, which have no real existence of themselves, and while he strives to reach the knowledge of God, he is distracted between this vain effort and the appearances to which he cannot assign truth. Something like this seems to be the meaning of his doctrines, the striking feature of which is the recognition of the opposition between the pure truth and the sensuous appearances. [ELEATIC SCHOOL.] His physical doctrines are hardly known, except by a few vague statements, and it is difficult to reconstruct this part of his system. It is not easy to see from the extant fragments what is the connection between his physical and theological systems, but the right conception of his physical system is connected with the right understanding of his theology. It is worth mentioning, as an isolated fact, that, according to Cicero, he said that the moon is inhabited, and that it contained many cities and mountains. Cicero remarks that his verses were not so good as those of Empedocles.

It has been a matter of dispute whether the system of Xenophanes was Pantheistic. A modern writer (Cousin) has taken some pains to clear him from what he calls the accusation of Pantheism, or the conception of every thing as the one God. The notion of an absolute unity is the necessary result of all reflection upon the nature of things: the mind can conceive only one first cause, one power which pervades and sustains all things. When men first began to attempt to express their conceptions of the Deity and of the universe, the language of philosophy was unformed, and hence it is possible that their words may to us sometimes express what was not intended. Now some later writers certainly attribute expressions to Xenophanes from which we might infer that his doctrine was Pantheistic; but the passages of the earlier writers, such as Aristotle, distinctly show that, in such passages at least, he speaks of God as a Being eternal and distinct from the visible universe. In order to bring him under the imputation of Pantheism, we ought, as Cousin remarks, to be able to show that he applied those terms to the visible universe which, according to Aristotle and other good authorities, he applied to God. Xenophanes did form, it appears, a distinct conception of the unity of the Deity, but he did not reduce to any systematic form the mode in which the Deity must be viewed in relation to the visible phenomena. He speaks of the Deity as a self-existing all-powerful Being; and he also speaks of all things as being God. Thus his system, so far as we can ascertain it, left room either for the Pantheistic interpretation or for the doctrine of pure Deism. Aristotle says (*Metaph.*, i. 5) that Xenophanes introduced the doctrine of the unity of the one according to reason and the one according to matter; but he said nothing clear on this subject, nor did he ascertain the nature of each, but looking at the whole heavens he said, the One is God. The system of Xenophanes is discussed at great length by Cousin (*Biog. Univ.*, art. 'Xenophanes'), and with considerable ingenuity. This article and the references at the end of the present article will indicate all the sources which the reader may wish to consult on this obscure subject.

The work attributed to Aristotle, entitled 'On Xenophanes, Zeno, and Gorgias,' should be entitled 'On Melissus, Xenophanes, and Gorgias:' it contains a condensed view and a criticism of the Eleatic philosophy. (*Biographical Dictionary* of the Society for the Diffusion of Useful Knowledge, art. 'Aristotle.')

The chief fragments of Xenophanes are collected in Ritter and Preller, 'Historia Philosophiae Graeco-Romanae ex fontium locis contexta,' Hamburg, 1838; and they were edited by Simon Karsten, Brussels, 1830, 8vo.

(Diogenes Laertius, *Xenophanes*; Ritter, *Geschichte der Philosophie*, vol. i.)

XE'NOPHON (Ξενοφῶν), the son of Gryllus, an Athenian citizen, was a native of the Attic demus Ercheia. The only extant biography of Xenophon is by Diogenes Laertius, which, as usual, is carelessly written; but this biography and the scattered notices of antient writers, combined with what may be collected from Xenophon's own works, are the only materials for his life.

There is no direct authority either for the time of Xenophon's birth or death, but these dates may be approximated to with reasonable probability. Laertius and Strabo state that Socrates saved Xenophon's life at the battle of Delium, B.C. 424, a fact which there seems no reason for rejecting, and from which it may be inferred that Xenophon was born about B.C. 444. In his 'Hellenica' (vi. 4, 35) he mentions the assassination of Alexander of Pherae, which took place B.C. 357, and Xenophon was of course alive in that year. This agrees well enough with Lucian's statement that Xenophon attained the age of above ninety (*Macrob.* 21). Much has been said as to Xenophon's age at the time of his joining the expedition of the younger Cyrus, B.C. 401; and the dispute turns on the point whether he was then a young man between twenty and thirty, or a man of forty and upwards. Those who make him a young man rely on an expression in the 'Anabasis' (ii. 1, 12), where he is called *neaniscus* (νεανίσκος), but in this passage, in place of 'Xenophon,' the best MSS. read 'Theopompus:' it is also observed that the term *neaniscus* was not confined to young men, but was sometimes applied to men of forty at least. Besides this, those who contend that he was forty or upwards in the year B.C. 401, rely on another passage in the 'Anabasis' (vii. 2, 8), where he is spoken of as a man who seemed old enough to have a marriageable daughter. On the whole there is nothing in the 'Anabasis' inconsistent with a date about the year B.C. 444, which may be assigned as that of his birth. This subject and other points in the chronology of Xenophon have been discussed by C. W. Krüger (*De Xenophontis Vitâ Quæstiones Criticæ*, Halle, 1822).

According to Laertius, Xenophon became the pupil of Socrates at an early age. There is also a notice in Philostratus of his receiving lessons from Prodicus of Ceos while he was a prisoner in Boeotia, but there is no other evidence as to the fact of his having fallen into the hands of the Boeotians. In the fable of the Choice of Hercules (*Memorab.*, ii. 1) Xenophon does not give any indication of his personal acquaintance with Prodicus; but nothing can be concluded from such an omission. Photius states that he was also a pupil of Isocrates, who was however younger than Xenophon. If this is true, it is probable that he was a pupil of Isocrates before the year B.C. 401. Athenæus (x. 427, ed. Casaub.) also quotes a saying of Xenophon at the table of Dionysius the Tyrant, but he does not say whether the older or younger tyrant is meant. The older tyrant reigned till B.C. 367, and it is more likely, if Xenophon ever went to Syracuse, that he went before B.C. 367 than after. It is not known if Xenophon wrote anything before the year B.C. 401, though Letronne with considerable plausibility would assign the composition of the 'Banquet,' or 'Symposium,' and of the 'Hiero,' to a period before B.C. 401.

There is another question in the life of Xenophon that remains to be discussed, which is somewhat connected with the chronology of his own life and with that of Thucydides. Laertius states, 'it is said that Xenophon made known the books of Thucydides, which were then unknown, though it was in his power to appropriate them to himself.' There has been a difference of opinion as to the time of the death of Thucydides, and Dodwell, by misunderstanding a passage in the history of Thucydides (iii. 116) as to the third eruption of Aetna, which is there mentioned, has concluded that he was alive in the year B.C. 395. But this is a mistake. The third eruption there spoken of is that of the year B.C. 425, the sixth year of the Peloponnesian war. The history of Thucydides closes with the eighth book, and the year B.C. 411, the twenty-first year of the Peloponnesian war; and there is no evidence to render it in the slightest degree probable that he ever finished it. That he intended to finish it, is clear enough from the first chapter of the first book. The 'Hellenics' of Xenophon commence where the history of Thucydides breaks off, and are a continuation of the work of Thucydides. Thucydides was recalled from exile B.C. 403, but it is not known how long he survived his recall. The fact of his not having finished his history leads to a probable conclusion that he did not survive the termination of the war many years, but such conclusion is only a moderate probability, for there are many reasons besides want of time why a man does not finish a large undertaking.

Letronne assumes that Thucydides did not survive the year B.C. 402, but there is no evidence for fixing on this year, and Letronne has been induced to do it simply in order to give to Xenophon the honour of making known the books of Thucydides before the year B.C. 401; for we are certain, he says, that Xenophon was at Athens in the year B.C. 402. But though we may admit the truth of the story, that Xenophon was the first editor of Thucydides, and may even have added the eighth book from the materials collected by the historian, there is no reason for fixing the date of this publication before the year B.C. 401 rather than after.

In B.C. 401 Xenophon went to Sardes to Cyrus, the Persian, the brother of Artaxerxes Mnemon, king of Persia. He tells us himself (*Anab.*, i. 1) the circumstances of this journey. Proxenus, Xenophon's friend, was then with Cyrus, and he invited Xenophon to come, and promised to introduce him to Cyrus. Xenophon took the advice of Socrates, who, fearing that Xenophon might incur the displeasure of the Athenians if he attached himself to Cyrus, inasmuch as Cyrus was supposed to have given the Lacedaemonians aid in their recent wars against Athens, advised Xenophon to consult the oracle of Delphi. Xenophon went to Delphi and asked the god (Apollo) to what gods he should sacrifice and make his vows in order to secure success in the enterprise which he meditated. The god gave him his answer, but Socrates blamed him for not asking whether he should undertake the voyage or not. However, as he had obtained an answer from the god, Socrates advised him to follow the god's commands, and accordingly Xenophon set out for Sardes, where he found Cyrus and Proxenus just ready to leave the city on an expedition. This story is characteristic both of Socrates and Xenophon.

It was given out by Cyrus that his expedition was against the Pisidians, and all the Greeks in the army were deceived, except Clearchus, who was in the secret. The object of Cyrus was to dethrone his brother, and after advancing a short distance it became apparent to all the Greeks, who however, with the exception of a few, determined to follow him. After a long march through Asia Minor, Syria, and the sandy tract east of the Euphrates, the two brothers met at Cunaxa, not far from Babylon. Cyrus fell in the almost bloodless battle that ensued, his barbarian troops were discouraged and dispersed, and the Greeks were left alone in the centre of the Persian empire. Clearchus was by common consent invited to take the command, but he and many of the Greek commanders were shortly after massacred by the treachery of Tissaphernes, the Persian satrap, who was acting for the king. It was now that Xenophon came forward. He had hitherto merely followed the army of Cyrus, and had neither held a command nor even been considered as a soldier. He introduces himself to our notice at the beginning of the third book of the 'Anabasis' in that simple manner which characterizes the best writers of antiquity. From this time Xenophon became one of the most active leaders, and under his judicious guidance the Greeks effected their retreat northwards across the high lands of Armenia and arrived at Trapezus (Trebisond), a Greek colony on the south-east coast of the Black Sea. [ANABASIS.] From Trapezus Xenophon conducted the Greeks to Chrysopolis, opposite to Byzantium. Both he and the army were in great distress, for they had lost everything in the retreat, and they were therefore ready enough to accept the proposals of Seuthes, king of Thrace, who wished to have their aid in recovering the kingly power. The Greeks performed the stipulated services, but the Thracian would not pay the amount agreed on, and it was not till after some negotiations that Xenophon obtained a part of what was due to the army. At this time the Lacedaemonian general Thimbron was carrying on a war against Tissaphernes and Pharnabazus, and he invited the Greeks under Xenophon to join him. At the request of his soldiers Xenophon conducted the troops back into Asia, and they joined the army of Thimbron (B.C. 399). Immediately before giving up the troops, Xenophon with a part of them made an expedition into the plain of the Caïcus, for the purpose of plundering a wealthy Persian named Asidates. The Persian was taken, with his women, children, horses, and all that he had. Xenophon received a good share of the plunder. (*Anab.*, vii. 8, 23.)

It is uncertain what Xenophon did after giving up the troops to Thimbron. He remarks (*Anab.*, vii. 7, 57), just before he speaks of leading the troops back into Asia, that he had not yet been banished; but as it is stated by various authorities that he was banished by the Athenians because he joined the expedition of Cyrus against the Persian king, who was then on friendly terms with the Athenians, it is most probable that the sentence of banishment was passed against him in the year B.C. 399, in which Socrates was executed. It seems reasonable enough that the execution of Socrates should be followed or accompanied by the banishment of his pupil, who was adding to his former offence that of putting troops in the hands of the Lacedaemonians to act against the Persian king. Letronne assumes, in the absence of evidence, that he returned to Athens in B.C. 399. But it is much more likely that he stayed with Thimbron, and with Dercyllidas, the successor of Thimbron; and there are various passages in the 'Hellenica' which favour the conjecture.

Agesilaus, king of Sparta, was sent with an army into Asia, B.C. 396, and Xenophon was with him during the whole, or a part at least, of this Asiatic expedition. Agesilaus was recalled to Greece B.C. 394, and Xenophon accompanied him on his return (*Anab.*, v. 3, 6), and he was with Agesilaus in the battle against his own countrymen at Coroneia, B.C. 394. According to Plutarch, he accompanied Agesilaus to Sparta after the battle of Coroneia, and shortly after settled himself at Scillus in Eleia, near Olympia, on a spot which the Lacedaemonians gave him, and here, it is said, he was joined by his wife Philesia and her children. Philesia was apparently the second wife of Xenophon, and he had probably married her in Asia. On the advice of Agesilaus he sent his sons to Sparta to be educated. Thus Xenophon had become an exile from his country for an act of treason, or what was equivalent to treason; he had received a present of land from the Lacedaemonians, the enemies of the Athenians, and he was educating his children in Spartan usages.

From this time Xenophon took no part in public affairs. He resided at Scillus, where he spent his time in hunting, entertaining his friends, and in writing some of his later works. Diogenes Laertius states that he wrote here his histories, by which he must mean the 'Anabasis' and the 'Hellenica,' and probably the 'Cyropaedia.' During his residence here also he probably wrote the Treatise on 'Hunting,' and that on 'Riding.' The history of the remainder [illegible] somewhat doubtful. Diogenes says that the Eleians sent a force against Scillus, and as the Lacedaemonians did not come to the aid of Xenophon, they seized the place. Xenophon's sons, with some slaves, made their escape to Lepreum; Xenophon himself first went to Elis, for what purpose it is not said, and then to Lepreum to meet his children. At last he withdrew to Corinth, and he probably died there. The time of his expulsion from Scillus is uncertain; but it is a probable conjecture of Krüger, that the Eleians took Scillus not earlier than B.C. 371, in which year the Lacedaemonians were defeated in the battle of Leuctra. Letronne fixes the date at the year B.C. 368, though there is no authority for that precise year; but he considers it most probable that the Eleians invaded Scillus at the time when the Lacedaemonians were most engaged with the Theban war, which would be during the invasion of Laconia by Epaminondas. Xenophon must have lived above twenty years at Scillus, if the date of his expulsion from that place is not before the year B.C. 371. The sentence of banishment against Xenophon was revoked by a decree proposed by Eubulus; but the date of this decree is uncertain. Before the battle of Mantineia, B.C. 362, the Athenians had joined the Spartans against the Thebans. Upon this Xenophon sent his two sons Gryllus and Diodorus to Athens, to fight on the Spartan side against the Thebans. Gryllus fell in the battle of Mantineia, in which the Theban general Epaminondas also lost his life. Letronne assumes that the decree for repealing the sentence of banishment against Xenophon must have passed before B.C. 362, because his two sons served in the Athenian army at the battle of Mantineia. But this is not conclusive. Krüger, for other reasons, thinks that the sentence was repealed not later than Ol. 103, which would be before the battle of Mantineia. No reason is assigned by any antient writer for Xenophon not returning to Athens: for in the absence of direct evidence as to his return, we must conclude that he did not.

Several of his works were written or completed after the revocation of his sentence: the 'Hipparchicus;' the Epilogus to the 'Cyropaedia,' if we assume that his sentence was revoked before B.C. 362; and the treatise on the 'Revenues of Athens.' Stesicleides, quoted by Diogenes, places the death of Xenophon in B.C. 359; but there is much uncertainty on this matter. (Clinton, *Fast. Hellen.*, B.C. 359, and his remarks on the death of Alexander of Pherae.) Probably he died a few years after B.C. 359.

The extant works of Xenophon may be distributed into four classes: Historical—the 'Anabasis,' the 'Hellenica,' and the 'Cyropaedia,' which however is not strictly historical, and the 'Life of Agesilaus;' Didactic—the 'Hipparchicus,' 'On Horsemanship,' and 'On Hunting;' Political—the 'Republics of Sparta and Athens,' and the 'Revenues of Attica;' Philosophical—the 'Memorabilia of Socrates,' the 'Œconomic,' the 'Symposium, or Banquet,' the 'Hiero,' and the 'Apology of Socrates.' There are also extant certain letters attributed to Xenophon, but, like many other antient productions of the same class, they are not genuine. The works of Xenophon as enumerated by Diogenes agree exactly with those which are extant, and we may therefore conclude that we have at least as many works as Xenophon published, though all of them may not be genuine. It is true that Diogenes says that Xenophon wrote about forty books (βιβλία), but he says that they were variously divided, from which expression, and the list that he gives, it is certain that by the word *biblia*, he intends to reckon the several divisions or books, as we call them, of the 'Anabasis,' 'Hellenica,' 'Cyropaedia,' and 'Memorabilia,' as distinct biblia, and thus we have in the whole the number of thirty-eight, which is near enough to forty.

The editions of the collected works of Xenophon and of the separate works are very numerous. The 'Hellenica' was the first work that appeared. It was printed at Venice, 1503, fol., by the editor Aldus, under the title of 'Paralipomena,' and as a supplement to his edition of Thucydides, which was printed in 1502. The first edition of the works of Xenophon was printed by P. Giunta, Florence, 1516, fol.; but the Agesilaus, the Apology, the treatise on the revenues of Athens, and a part of the treatise on the constitution of Athens are wanting. The edition of Andrea of Asola, 1525, folio, contains everything except the 'Apology.' The first complete edition of the works of Xenophon was the Giunta edition of Hall, 1540, 3 vols. 8vo., with a preface by Melanchthon, who also added the

'Apology,' which had been edited by John Reuchlin (Capnio) at Hagenau, 1520, 4to. The Basle edition of 1545, fol., printed by Nic. Brylinger, is the first which contains the Greek text with the Latin version. The editions of Henry Stephens, 1561, 1581, contain an amended text: the edition of 1561 has no Latin version, but that of 1581 has. The editions of Stephens were the foundation of the three editions of Johann Loewenklau, [1572, commonly called Leunclavius, Basle, 1569, Frankfort, 1594, accompanied with the Latin version. The edition of B. Weiske, Leipzig, 1798-1804, 6 vols. 8vo., did nothing towards a new recension of the text, though it is corrected in many places. The most pretending edition of all the works of Xenophon is that of Gail, on which it is fair to take the opinion of his own countryman Letronne. This edition is entitled "'Œuvres complètes de Xénophon traduites en Français, accompagnées du texte, de la version Latine, et de notes critiques,' 6 vols. 4to., 1797-1804. There is a seventh volume, in three parts, one of which (1808) contains the various readings of three MSS.; a second (1814) contains the notices of the MSS., and observations, literary and critical; and the third an Atlas of maps and plans. Gail has kept to the old text, and has made no use of his various readings for improving it. His literary and critical observations, in which he discusses certain difficult passages, are more useful for the understanding of Xenophon than for the correction of the text. The convenient division into paragraphs has unfortunately been only adopted in the last volume, which contains the 'Memorabilia,' the treatise on Hunting, and the 'Oeconomic.' The Latin version is that of Leunclavius, which is corrected in some passages. The French version is only new in parts. The author acknowledges that he has taken those of the 'Cyropaedia,' the 'Memorabilia,' and the 'Anabasis,' by Dacier, Levêque, and Larcher, with some few alterations, made, as he says, for the following reason:—'I was induced to copy these three versions; but the publisher of one of these three versions having given me notice of certain claims of his own (des prétentions), to avoid all discussion, I made some alterations.' There are indexes of the contents of each volume, except the first, which has only a title of the chapters, and that very insufficient," &c. This is very moderate praise, but it is quite as much as Gail's pompous edition deserves. Zeune published an edition of the various works of Xenophon, except the Hellenica, between 1778 and 1785, in vols. 8vo. Schneider revised this edition: he published the 'Hellenica' in 1791; the 'Memorabilia' in 1790 and 1801; the 'Cyropaedia' in 1800; the 'Oeconomic' and the 'Agesilaus' in 1805; the 'Anabasis' in 1806; and the Political minor works in 1815.

The 'Anabasis' ('Ανάβασις), in seven books, is the work by which Xenophon is best known. It contains the history of the expedition of the younger Cyrus against his brother Artaxerxes Mnemon, and the retreat of the Greeks who accompanied him. The first book contains the march of Cyrus to the neighbourhood of Babylon, and ends with his death at the battle of Cunaxa. The six remaining books contain the account of the retreat of the Ten Thousand, as the Greek army is often called. [ANABASIS.] The work is written in an easy agreeable style, and is full of interest as being a minute detail by an eye-witness of the hazards and adventures of the army in their difficult march through an unknown and hostile country. The impression which it makes is favourable to the writer's veracity and his practical good sense; but as a history of military operations, it is as much inferior to the only work of antiquity with which it can be compared, the 'Commentaries' of Cæsar, as the writer himself falls short of the lofty genius of the great Roman commander. There are numerous editions of the 'Anabasis,' which have merit enough so far as concerns the critical handling of the text, but not one of them contains a sufficient commentary. The work of Major Rennell is still the best commentary, 'Illustrations, chiefly geographical, of the History of the Expedition of Cyrus,' &c., London, 1807, 4to. There are several English translations, of which that of Spelman is the best known.

The authorship of the 'Anabasis' is not quite free from doubt, owing to a passage in the third book of the 'Hellenica' (iii. 1, 1), where the author refers to a work of Themistogenes of Syracuse for the history of the expedition of Cyrus and the retreat of the Greek army to the Euxine. This however is not a complete description of the contents of the 'Anabasis' of Xenophon, whose narrative also conducts the army from Trapezus on the Euxine to Byzantium. Still the retreat may fairly be considered as having terminated when the army reached a Greek colony on the Euxine, and so indeed it is viewed in the 'Anabasis' (v. 1, 1). There is then perhaps no doubt that Xenophon does refer to the 'Anabasis' which we have; and if this be admitted, the difficulty is not easy of solution. Plutarch (*De Glor. Athen.*) supposes that Xenophon attributed the work to Themistogenes, in order that people might have more confidence in what was said of himself. But this is not satisfactory. Others suppose that there was a work by Themistogenes which gave the history of the retreat as far as Trapezus, and that Xenophon published his 'Hellenica' in two parts, and that he first continued the history of the Peloponnesian war to the capture of Athens, which would complete the history of Thucydides, and also carried it to the year B.C. 399. This is the conjecture of Letronne, who connects it with the assumption of Xenophon returning to Athens in B.C. 399, as to which there is no evidence. The history up to the year B.C. 399 comprehends the first two books of the 'Hellenica,' and the first paragraph of the third book, in which Themistogenes is mentioned. Letronne assumes that this first part was begun before Xenophon joined the expedition of Cyrus, and was finished either in the interval of his assumed return from Asia and his departure to join the army of Agesilaus, or in the early part of his retreat at Scillus, at which time it is further assumed that he had not yet written the 'Anabasis,' and was obliged to refer to the 'Anabasis' of Themistogenes, which, it is still further assumed, was already published and known. The rest of the 'Hellenica,' it is assumed, was written later, and perhaps not published till after the death of Xenophon, by his son Diodorus or his grandson Gryllus. If all this assumption is necessary to explain the fact of Xenophon referring to the work of Themistogenes on the 'Anabasis,' we may as well assume that there was no such work of Themistogenes, for we know nothing of it from any other quarter, and that Xenophon for some unknown reason spoke of his own work as if it were written by another person. In reading the 'Anabasis,' it is difficult to resist the conviction that it is by Xenophon, especially when we turn to such passages as that in the fifth book, where he speaks of his residence at Scillus, and other passages in which he speaks of his dreams, his thoughts, and other matters which could only be known to himself.

The 'Hellenica' ('Ελληνικά), in seven books, comprehend a period of forty-eight years, from the time when the history of Thucydides ends, B.C. 411, to the battle of Mantineia, B.C. 362. They record however, as already observed, the assassination of Alexander of Pherae, which took place B.C. 357. The hypothesis that this history consists properly of two works or parts has been mentioned. This is Niebuhr's opinion. [THUCYDIDES.] The 'Hellenica' have little merit as a history. The author was altogether deficient in that power of reflection and of penetrating to the motives of action which characterize the great work of Thucydides. It is generally a dry narrative of events, and contains little to move or affect, with the exception of a few incidents which are given with more than the usual detail. The parts also are not treated in their due proportions, and many important events are passed over briefly. This, the only proper historical work of Xenophon, does not entitle him to the praise of being a good historical writer. It may be urged that the work was only a kind of *Mémoires pour servir*, as some have supposed; but if it is to be taken as a continuation of Thucydides, it is a history, and as such it has been considered both in antient and modern times. There is an English translation of the 'Hellenica' by W. Smith, the translator of Thucydides.

The 'Cyropaedia' (Κύρου παιδεία) is not an historical but a political work, in which the ethical element prevails. Its object is to show how citizens can be formed to be virtuous and brave, and to exhibit also a model of a wise and good governor. Xenophon chooses for his exemplar Cyrus, the founder of the Persian empire, and the Persians are his models of men who are brought up in a true discipline. The work has no authority whatever as a history, nor is it even authority for the usages of the Persians, some of which we know from other writers to be different from what they are represented to be by Xenophon. Xenophon borrowed his materials from the [illegible] and especially from Lacedaemon; and the [illegible] one of the many proofs of his aversion to the usages and the political constitution of his native city. The genuineness of the epilogus, or conclusion of the work, has been doubted by some critics. Its object is to show that the Persians had greatly degenerated since the time of Cyrus. The 'Cyropaedia' is one of the most laboured of Xenophon's works, and contains his views on the training of youth, and of the character of a perfect prince. It is an agreeable exposition of principles under the form of a history, and, like Xenophon's other treatises, it contains more of plain practical precepts, founded on observation and supported by good sense, than any profound views. The dying speech of Cyrus is worthy of a pupil of Socrates. There is an English translation of the 'Cyropaedia' by Maurice Ashley Cowper.

The 'Agesilaus' (Ἀγησίλαος) is a panegyric on Xenophon's friend, the Lacedaemonian king, another evidence of his Laconism or Spartan predilections. Cicero (*Ad Fam.*, v. 12) says that he has in this panegyric surpassed all the statues that have been raised in honour of kings. Many modern critics have passed an unfavourable judgment on this work, and some maintain that it is the work of a sophist or orator of a later age. It has been described as a kind of cento made up of passages copied literally from the 'Hellenica' and other works of Xenophon.

The 'Hipparchicus' (Ἱππαρχικός) is a treatise on the command of the cavalry, in which Xenophon gives instructions for the choice of cavalry men, and remarks on the duty of a commander of cavalry. There is internal evidence that this treatise was written at Athens, but there are different opinions as to the time when it was composed.

The treatise on 'Horsemanship' (Ἱππική) was written after the 'Hipparchicus,' to which reference is made at the end of this treatise. The author says that he has had much experience as a horseman, and is therefore qualified to give instruction to others. He speaks at the beginning of a work on the subject by Simon, in whose opinions he coincides, and he professes to supply some of his omissions. This work is translated into English, and was printed by Henry Denham, London, 1584, 4to.

The 'Cynegeticus' (Κυνηγετικός) is a treatise on Hunting, a sport of which the author was very fond. It contains many excellent remarks on dogs, on the various kinds of game, and the mode of taking it. [ARRIAN.]

The treatises on the Republics of Sparta and Athens were not always recognised as genuine works of Xenophon, even by the antients: and some modern writers have adopted this opinion. But there is nothing in them which can be urged against Xenophon's authorship. They show his attachment to Spartan institutions, and his dislike of democracy. There is an English translation of the 'Republic of Athens,' by James Morris, London, 1794, 8vo.

The treatise on the 'Revenues of Athens' (Πόροι ἢ περὶ προσόδων) has for its object to show how the revenues of Athens, and especially those derived from the mines, may be improved by better management and be made sufficient for the maintenance of the poor citizens and all other purposes, without requiring contributions from the allies and subject states. The matter of this treatise is discussed by Boeckh, in his work on the 'Public Economy of Athens.' This treatise was translated into English by Walter Moyle, 1697, 8vo., and reprinted in Moyle's whole works.

The 'Memorabilia of Socrates,' in four books (Ἀπομνημονεύματα Σωκράτους), is the chief philosophical work of Xenophon. He defends his master against the charges of irreligion and corrupting the youth of Athens, and in a series of conversations he introduces Socrates after his fashion as developing and inculcating various moral truths. The tendency of the work is entirely practical, and it may be true, as some writers maintain, that Xenophon has exhibited the teaching of Socrates in a manner more conformable to his own notions than in the full sense and spirit of the Socratic method. But Xenophon was a hearer of Socrates, lived for a long time on terms of intimacy with him, and as he was anxious to defend the memory of his master, and certainly had no pretensions to originality himself as a thinker, we may assume that the matter of the 'Memorabilia' is genuine, that the author has exhibited a portion of the moral and intellectual character of Socrates, such part as he was able to appreciate, or such as suited his taste; and that we have in this work as genuine a picture of Socrates as his pupil Xenophon could make. There is an English translation of the 'Memorabilia' and the 'Apology for Socrates,' by Sarah Fielding. The 'Apology' (Ἀπολογία Σωκράτους πρὸς τοὺς Δικαστάς) is not, as the title imports, the defence which Socrates made on his trial, but it contains the reasons which determined him to prefer death rather than to humble himself to ask for his life from his prejudiced judges. Valcknaer and others do not allow this to be Xenophon's work, because they consider it to be unworthy of him; but if a man is to lose the discredit of a bad work simply because he has written better, many persons may disown their own books. The 'Apology' is indeed a trivial performance, but Xenophon did write an 'Apology,' according to Laertius, and this may be it.

The 'Symposium,' or 'Banquet of the Philosophers' (Συμπόσιον), has for its object the delineation of the character of Socrates. It is in the form of a dialogue between Socrates, Antisthenes, Critobulus, and others, at the house of Callias. It contains the opinions of Socrates on the subject of love and friendship. It is an antient tradition that Xenophon wrote this work after the 'Symposium' of Plato, and that he designed to correct the view of Socrates which is there given by Plato. Boeckh thinks that Plato wrote his 'Symposium' after reading that of Xenophon, and that his purpose was to exhibit the ideal of a wise man in the person of Socrates. Ast is of the same opinion, and thinks that the 'Symposium' is a juvenile work. The 'Banquet' was translated by James Wellwood, M.D., 1710, and reprinted in 1750.

The 'Hiero' (Ἱέρων ἢ τυραννικός) is a dialogue between Hiero, tyrant of Syracuse, and the poet Simonides. The tyrant describes the dangers and vexations incident to the possession of power, and contrasts the tyrant's condition with the tranquillity of the private man. The poet shows that the tyrant has it in his power to oblige persons more than private individuals can, and he offers some suggestions as to the best mode of using power and making the people happy. It has been already stated that there is one brief notice of Xenophon making a voyage to Sicily, and Letronne conjectures that the composition of this little treatise may have been suggested by what Xenophon saw of a tyrant's life at the court of Dionysius. This little piece has considerable artistic merit, and it is justly observed that it savours of the school of Isocrates more than any other of Xenophon's works. There is a translation of this work attributed to Queen Elizabeth, but we do not know on what authority. It first appeared in 1743, 8vo., in 'Miscellaneous Correspondence,' No. 11, with the title 'A Translation of a Dialogue out of Xenophon in Greek, between Hiero, a king, yet some tyme a person, and Simonides, a poet, as touching the life prince man. By Elizabeth, Queen of England.' lation also appeared in 1793, 8vo., which is attı the Rev. R. Graves, who translated Marcus Anto

The 'Oeconomic' (Οἰκονομικός) is a discourse on nagement of a household and on agriculture, Socrates and Critobulus. In the fourth chapter speaks of Cyrus the Younger, and his love of hort This passage was written after the death of Cyrus, whole work probably belongs to a late period of phon's life, though Socrates is introduced as prono the panegyric of Cyrus. It is a confirmation of thorship of the 'Anabasis' being rightly assigned to phon, that he speaks of Cyrus, his character, and in the same manner, and almost in the same words are used in the 'Anabasis' (*Oeconom.*, c. 4; *Anab.*, i. The seventh chapter contains a charming conversatio tween Ischomachus and his wife on the duty of a g wife, which consists in the proper management of the terior of the house; it is the husband's business to lab out of doors and to provide that which the house require it is the wife's business to take care of what the husba produces, and to apply it to the uses of the house. The husband's employment, as here represented, is agriculture in a country where slaves are the labourers; but the picture of married life will suit every condition, and modern wives might learn from this excellent treatise that their employment is at home; that the object of marriage is the happiness of the husband and wife, the procreation of children, and their proper nurture and education. Fidelity to her husband, frugal management of his substance, and the care of his children are the wife's duties, which are incompatible with gadding abroad. This is one of the best treatises of Xenophon. It was translated into Latin by Cicero. There are

ral English translations. The first is by Gentian
vet, London, 1534, 8vo., which has been reprinted se-
l times. There is also a translation by Robert Bradley,
.S., London, 1727, 8vo.

he general character of Xenophon may be estimated
a this brief sketch of his life and writings. Before
heap upon him all the abuse which some modern
ers have done, we ought to have the facts of his life
sufficient minuteness to enable us to judge of every
of it. He did not like the democracy of his native
, and he may have been glad of the opportunity of
ing Athens which the invitation of Proxenus offered.
is own statement is true, he was not to blame for join-
the expedition of Cyrus, though it is very probable
he was blamed for it at Athens, and supposed to have
well acquainted with the design of Cyrus from the
. The fact of his delivering up the troops to Thim-
, the Lacedæmonian, after the campaign in Thrace,
well calculated to add to the jealousy of the Athenians,
his native city cannot be charged with more than her
l severity in banishing him for his part in the expe-
n of Cyrus and the subsequent events. So far there
othing which will justify us in attaching any serious
utation on Xenophon. Though a man is born in a
ocracy, he may not like it; and nobody would blame
for leaving it for some other country that he liked
er. Xenophon's presence at the battle of Coroneia
ot be so satisfactorily explained; but it may be that
id not take part in it; and after having joined Agesi-
in Asia, it is very probable that he could not safely
d accompanying him back into Europe. Being ba-
ed from Athens, his only safety was in keeping with
iends the Lacedæmonians. One step in a man's life
decides all the rest, and involves him in a train of
mstances which he could not foresee, and which leave
haracter not free from imputation. This was, in Xe-
on's case, his joining the expedition of Cyrus. There
proof of his active hostility against Athens after his
shment: there is proof enough that he preferred
ta and Spartan constitutions; and if that is blame,
eserves enough of it.

enophon appears to have been humane and gentle in
racter. He evidently liked quiet. He was fond of
ning, hunting, and rural occupations generally. His
nts would have suited him for administration in a well
ered community, but he was not fitted for the turbu-
e of Athenian democracy. He was a religious man,
s we are now pleased to term it, a superstitious man.
elieved in the religion of his country, and was scrupu-
in performing and enforcing the observance of the
ceremonies. He had faith in dreams, and looked
them as manifestations of the deity. His philosophy
e practical: it had reference to actual life, and in
actical matters and everything that concerns the
ry conduct of human life he shows good sense and
able feeling. He was in understanding a plain
e man, who could express with propriety and in an
le manner whatever he had to say. As a writer
erves the praise of perspicuity and ease, and for
ualities he has in all ages been justly admired. As
orical writer he is infinitely below Thucydides: he
depth of reflection, no great insight into the fun-
tal principles of society. His 'Hellenica,' his only
cal effort, would not have preserved his name, except
importance of the facts which this work contains and
eficiency of other historical records. His 'Anabasis'
es its interest from the circumstances of that memo-
retreat, and the name of Xenophon is thus connected
an event which exposed to the Greeks the weakness
he Persian empire, and prepared the way for the future
npaigns of Agesilaus and the triumphs of Alexander.
narrative of the retreat may be compared with Hero-
us for the minute detail of well selected facts, the sim-
ity of the narration, and the general clearness of the
le. Some difficulties may be owing to corruption of
text, and in some cases the author's memory or his
s may have deceived him. The 'Anabasis' is a work
e kind which few men have had the opportunity of
ng, and there is no work in any language in which
nal adventure and the conduct of a great under-
g are more harmoniously and agreeably combined.

e works of Xenophon, which are called philosophical,
d be entitled treatises on practical ethic and œconomic. Philosophy to him never was known as a science: the character of his mind and his writings do not allow him to be compared in any way either with Plato or with Aristotle, the two great examplars of philosophy among the Greeks. Yet the Memoirs of Socrates and the treatise entitled Œconomic have a great charm, both from the representation which they give of the personal character of Socrates, and the easy agreeable form in which his lessons are inculcated. These two works and the 'Anabasis' are the best works for giving a young student a knowledge of the Greek language; and if the 'Memorabilia' and 'Œconomic' cannot be considered an introduction to Greek philosophy, they will at least teach nothing erroneous, and they will lead the student to the contemplation of the Greeks in their domestic relations and their moral habitudes.

The following books will enable the reader to find nearly all that has been said of Xenophon and his writings: Fabricius, *Bibliotheca Græca;* Schoell, *Geschichte der Griechischen Literatur*, German edition; *Biog. Univ.*, art. 'Xenophon,' by Letronne; Hoffmann, *Lexicon Bibliographicum*, 'Xenophon,' which contains a list of all the editions of the separate works, of the translations into English and other languages not here mentioned, and of the works which have been written in illustration of Xenophon's writings.

XENOPHON OF EPHESUS. There is extant a Greek romance entitled 'Ephesiaca, or a History of Anthia and Abrocomas' (Ἐφεσιακὰ, τὰ κατὰ Ἀνθίαν καὶ Ἀβροκόμην). The author calls himself Xenophon of Ephesus. We know nothing of his life, and there is no evidence as to the period when he lived. From indications in the work itself, Locella places him in the age of the Antonines, and others in the fourth or fifth century of our æra. Peerlkamp, the last editor, considers him the oldest of all the Greek writers of romances. The style of the work is simple, and the narrative is concise, clear, and free from confusion, though many persons are introduced. The incidents are not multiplied beyond the limits of propriety and probability. Suidas is the only person who mentions the author of the 'Ephesiaca,' and he says that there are ten books; but there are only five now, and apparently the work is complete, or nearly so. Only one MS. of the work exists. The first edition of this work, accompanied with a Latin translation, was by Ant. Cocchi, London, 1726, 8vo. and 4to. This edition is printed from a very incorrect transcript of the original MS. The Baron A. E. de Locella brought out at Vienna, 1796, 4to., a good critical edition, founded on a careful examination of the MS. This edition contains a new translation and a commentary. The latest edition is by P. Hofmann Peerlkamp, Haarlem, 1818, 4to. There are German, French, and Italian translations of this romance. An English version, by Rooke, appeared at London, 1727, 8vo.

XENOPS, Illiger's name for a genus of birds, placed by Mr. Swainson in his family *Certhiadæ*, as the last genus of his subfamily *Certhianæ*.

Generic Character.—Bill moderate, straight, acute, much compressed, and inversely curved; the top of the upper mandible being straight, and the edge of the lower ascending or recurved. *Nostrils* basal, lateral, oval, small, and covered by a naked membrane. *Wings* rather lengthened, rounded. *Tail* moderate, rounded, slightly stiff; the feathers obtusely pointed. *Tarsus* very short. Middle and hinder *toes* longer than the tarsus; lateral toes unequal, the inner shortest, and both slightly connected at the base; hinder toe shorter than the middle; its claw shorter than the toe.

Mr. Swainson considers this as the fissirostral type.

Example, *Xenops genibarbis.*

Description.—Above reddish, beneath grey-brown; chin, eyebrows, and spots on the throat and breast whitish; beneath the ears a snowy spot; lesser quills blackish, the base fulvous, the tips and margins rufous. (Sw.)

Locality, Brazil.

Mr. Swainson remarks that this extraordinary and not inelegant little creature has a bill totally different from that of any other bird. Its general habit, he states, evinces a close connection with the *Sittæ*, particularly those of New Holland; some of which have their bills (which are slender) slightly inclining upwards, thus forming a connection between *Xenops* and the straight-billed *Sittæ* of the Old World.

These observations occur in the first series of Mr. Swainson's *Zoological Illustrations*, and in his *Classification of Birds* the genus is, in effect, immediately followed by the subfamily of *Sittinæ*, or Nuthatches.

Xenops genibarbis. (Sw.)

XEREZ, or JEREZ, the name of a mountain in Portugal, and of several towns in Spain and South America.

Xerez, a small town among the mountains, 31 miles east of Granada. There are iron-mines in the vicinity, and some inconsiderable iron-works in the town. Population, in 1833, 1900.

Xerez de Badajoz, more generally known by the name of Xerez de los Caballeros, a town of Estremadura, 34 miles south of Badajoz. Population, in 1833, 9000. It is a walled town, and contained before the last revolution nine convents and two hospitals. There is a considerable trade in cattle, and manufactories of cloth, leather, hats, pottery, and soap. There are silver and sulphur mines in the neighbourhood. The town is called De los Caballeros from its having belonged at one time to the Templars. Basco Nuñez de Balboa, the first who crossed the isthmus of Central America to the Pacific, was a native of Xerez de los Caballeros.

Xerez de la Frontera, the name of a town situated in 36° 41′ N. lat. and 6° 7′ W. long. It is about a mile and a half distant from the right bank of the Guadalete, on the high road from Cadiz to Seville; 12 miles north-east of the former city, and 46½ miles south-south-east of the latter. The population was understood to amount to 31,000 souls in 1833. The old town, inclosed within the walls, has narrow and crooked streets; those of the new town, outside, are broad and regular. There are eight parish churches. Before the last revolution there were eleven convents for men and seven for women. There are in the town one college, two free-schools, four hospitals, one hospital for orphans and another for foundlings, and a public granary. There are no manufactures, except for articles consumed by the inhabitants. The only trade of Xerez is in the wine of the surrounding district, the well-known Sherry, of which 450,000 arrobas have been produced in a good year. The inferior wines are consumed in the district; the sorts able to bear exportation are almost all sent to England. The magazines of the wine-merchants are remarkable for their extent. The olive was formerly cultivated to a great extent in the neighbourhood of Xerez, but this br [illegible] agricultural industry has declined of late years. Considerable attention i
keeping up the race of Andalusian horses. Th
quarries and sulphureous springs of Jigonza ar
south-east from the town, on the same bank of
dalete. Xerez received the distinctive epithet 'd
tera' to distinguish it from other towns of the s
in the interior. Miñano mentions that the n
was believed to be a Moorish corruption of
name of one of the tribes which inhabited the
the time of the Romans. Xerez de la Frontera i
by some to stand on the site of the antient A
others place that town at Mesa de Asta, betwee
three miles distant. Thomas de Morla, general
was a native of Xerez.

The name of Xerez de la Frontera has been
1, a small town of Brazil, in the province
Grosso, a little to the east of the Paraguay, now
2, a small town of Central America, in the stat
duras and district of Tegucilpa, on the river Xe
from its mouth in the Gulf of Fonseca, near a
but now exhausted gold-mine in a country whic
much cocoa and indigo.

(Miñano, *Diccionario Geographico-estadisti
paña y Portugal; Dictionnaire Géographi
versel.*)

XERXES I. (Ξέρξης), king of Persia, succ
father Darius, the son of Hystaspes, B.C. 485.
was raised to the throne, Darius had three sons by
a daughter of Gobryas, of whom the eldest wa
zanes. After he became king, he had four sons b
the daughter of Cyrus, of whom Xerxes was the
Darius appointed Xerxes his successor.

Darius died during his preparations for war aga
Egyptians and the Athenians. In the second yea
his father's death, Xerxes marched against Egypt,
had revolted in the time of Darius. He redu
country to obedience, and gave the administration
brother Achæmenes. He next employed himself f
full years in making preparations for his Greek exp
The immense force which was assembled for this p
was collected from every part of the Persian dom
The fleet was supplied from Egypt, Phoenicia, C
Cilicia, and other maritime parts which were withi
limits of the Persian government. Xerxes also e
into negotiations with the Carthaginians, who enga
attack the Greek cities of Sicily and Italy, while the P
king invaded Greece.

In the autumn of B.C. 481, Xerxes arrived at Sard
capital of the Persians in the west, and he wintered
In the spring he advanced to the Hellespont wi
forces, and crossed at Abydos by a bridge of boats.
first bridge that was made was destroyed by a sto
which the king ordered that three hundred blows
lash should be inflicted on the rebellious Hellespont
superintendents of the work had their heads cut
their pains. A new bridge was constructed, the f
which is minutely described by Herodotus (vii. 36)
army was seven whole days and nights in crossi
bridge from Abydos on the Asiatic to the Europea
The march was continued from the Hellespont thro
Thracian Chersonese. The fleet did not enter the
pont, but took a western course along the Thraci
On arriving at the plain of Doriscus, which is nea
and is traversed by the river Hebrus, Xerxes num
force. The ships took their station close by
The infantry amounted to 1,700,000 men. The
was ascertained not by tale, but by measure: an
was formed large enough to contain ten thousand
it was filled and emptied till the whole army w
(Herod., vii. 60.) After being measured, the fo
arranged according to nations. Herodotus has l
the most curious historical records that exists
scription of the various nations that composed th
force, and of their military equipment (vii. 61, &
cavalry amounted to 80,000, besides camels and
The war-ships (τριήρεις) were 1207. Herodotus
merated the several nations which supplied and
the ships (vii. 89). From Doriscus Xerxes cont
march through Thrace. Herodotus, who had
gone over the ground, has described the route of
with great distinctness. On reaching the isthm
connects the mountain peninsula of Athos with
land, the fleet avoided the circumnavigation w

roved so dangerous to Mardonius in B.C. 492, by passing rough the canal of Athos. This canal had been con- ructed by order of Xerxes. It is described by Herodotus vii. 22; see the article Athos). From Acanthus, near the thmus of Athos, the army marched to Therme, afterwards alled Thessalonica (now Saloniki), on the Axius. The eet at last reached Sepias on the coast of Magnesia, in hessaly; and the army reached the pass of Thermopylæ. o far, says Herodotus, they had sustained no harm, and e numbers of the army and of the navy were then as fol- w (Herod., vii. 184): the whole number of men in the 207 ships was 277,610, reckoning for each ship 200 men f the country to which each ship belonged, and also 30 r Persians, Medes, and Sacæ in each of them. The enteconters (πεντηκόντεροι), which Herodotus had not in- luded in his former enumeration, were 3000, and, reckon- g 80 to each, there would be 240,000 men in them. hus the whole naval force would amount to 517,610; nd the whole armament, both military and naval, would mount to 2,317,610 men, which includes 20,000 men, ot before enumerated, camel-drivers and drivers of Libyan chariots. This is the amount of the force which assed over from Asia, and it does not include the camp ollowers, the vessels that carried provisions, and the men on board these vessels. To this must be added 120 European vessels, containing 20,400 men, that joined the avy of Xerxes. The forces supplied by the Thracian ibes, the Macedonians, Magnesians, and others, amounted 300,000 men; thus the whole number of fighting men s 2,641,110. Herodotus considers that all the followers d those in the provision vessels would be more than the hting men, but we will suppose them to be equal. s the sum total is 5,282,220; and Xerxes, says Hero- us, conducted so many as far as Sepias and Thermopylæ. to the number of women who followed to cook the isions, and of concubines and eunuchs, no one could the amount, nor that of the beasts of burden. The calamity that befel this mighty host was a storm in neighbourhood of Sepias, which caused great loss. rtemisium there was an encounter between some of ersian ships and those of the Greeks, in which the ks were victorious. The army, after passing through saly, found itself stopped at the narrow pass of Ther- yle by Leonidas and his gallant band. The Persians ined a heavy loss in endeavouring to force the pass, they could not effect it till Epialtes, a Melian, showed Persians a track over the mountains of Œta, which ght them on the rear of Leonidas [Leonidas], who with his brave men after an obstinate conflict.

the sea-fights off Artemisium, the Persians again ined loss (Herod., viii. 11, &c.). The Persian army advanced through Phocis, burning and destroying all re them. On entering Boeotia, they were joined by Boeotians. A detachment was sent by Xerxes to at- the temple of Delphi, but the invaders sustained a al defeat, and those who survived escaped into Boeotia. the mean time the Grecian fleet moved from Arte- sium to the island of Salamis, off the coast of Attica erod., viii. 40). The Athenians sent their females and ves to Troezen, Ægina, and Salamis, and left their city the mercy of the Persians, who, after burning Thespia nd Platæa, the only towns in Boeotia that did not join hem, entered Athens and destroyed it also. The Persians ad occupied three months in their progress from the Hel- espont to Athens. The fleet of Xerxes sailed from Histiæa Euboea through the channel of the Euripus, and in hree days reached Phalerum in Attica. Notwithstanding e losses of the Persians, Herodotus considers that the nd and sea force which reached Attica was as large as at which had reached Sepias and Thermopylæ. The ecian fleet was collected about the island of Salamis and the narrow passage between Salamis and the mainland. rxes, having resolved on an engagement, took his station the shore of the mainland under Mount Ægaleos, oppo- e to Salamis; and here he had the misfortune to see his ghty armament defeated and dispersed [Salamis; The- tocles], B.C. 480. Shortly after the battle he retreated land to the Hellespont, which he reached in forty-five s, and crossed over into Asia. He was attended as far the Hellespont by Artabazus with 60,000 men. (Herod., . 126.) Mardonius, who was left in Greece with the y, was defeated in the following year, B.C. 479, at tæa in Boeotia by the combined Greeks, and on the same day the Greeks gained another victory over the Persians at Mycale in Ionia. This was followed by the siege and capture of Sestos on the Hellespont (B.C. 478), an event with which the history of Herodotus ends. It was reported, says Herodotus (viii. 166), that on the very day of the battle of Salamis, Gelon and Theron defeated, in Sicily, Hamilcar and his Carthaginian army. Thus the Greeks were successful both in the east and the west. [Gelon.]

The Greeks continued the war against the Persians after the capture of Sestos. Little more is known of the personal history of Xerxes. He was murdered (B.C. 465) by Artabanus, and succeeded by his son Artaxerxes, called by the Greeks the 'Long-handed.' Xerxes, as he is represented by Herodotus, was cruel, vain, cowardly, and of feeble understanding. The great event of his reign is the invasion of Greece with his enormous army and fleet, of which we have in Herodotus (books vii.-ix.) a most minute account. The historian lived soon enough after the event to be able to collect trustworthy materials, and that he spared no pains is evident from his work. Much has been said on the large numbers of the army and navy of Xerxes, as stated by Herodotus; but, incredible as they seem at first sight, an attentive consideration of the whole narrative of the historian will remove much of the doubt; at any rate, if the numbers are exaggerated, it is clear that Herodotus only followed his authorities.

XERXES II., king of Persia, succeeded his father Artaxerxes, the Long-handed, B.C. 425. He was assassinated after a short reign of a year, or, according to some accounts, two months, by Sogdianus, who succeeded him.

XIME'NIA, a genus of plants belonging to the natural order Olacaceæ. It was named in honour of Francis Ximenes, a Spanish monk, who published a work on the plants and animals of New Spain. The species of this genus are trees or shrubs, usually armed with spines, and having alternate, ovate, or lanceolate exstipulate leaves. The calyx is small, permanent, and 4-cleft; the petals 4, hairy inside and conniving at the base, valvate in æstivation; the stamens eight, with capillary filaments; the anthers 2-celled, fixed by the base; the ovary 4-celled and 4-seeded; the fruit a drupe, with one cell and a single seed arising from abortion. There are four species, natives of America; the most remarkable is the *X. americana*. It has spiny branches, oblong entire leaves, the peduncles axillary and umbellate, the lower ones changed into spines. This plant is a shrub, attaining a height of about fifteen feet, and is a native of South America. It produces a yellow fruit about the size of a pigeon's egg, which has a sweet acid taste, and is eaten by the natives. The flowers are small, of a greenish yellow colour inside, and sweet-scented. De Candolle describes two varieties: one growing in Brazil, with ovate leaves; the other, in Guiana, with oblong leaves. (Don's Miller; Burnett's *Outlines*.)

XIME'NEZ, CARDINAL. [Cisneros.]

XI'PHIAS (ξιφίας), the Sword-fish, an inhabitant of the Mediterranean and Atlantic, occasionally visiting our coast, is a fish of the mackerel tribe, remarkable for its elongated upper jaw, which forms a sword-like weapon, whence its name. It measures from 10 to 15 feet in length. Its body is lengthy and covered with minute scales, the sword forming $\frac{3}{10}$ths of its length. On its back it bears a single long elevated dorsal fin. There are no central fins. The tail is keeled. The lower jaw is sharp; the mouth without teeth. The upper part of the fish is bluish black merging into silver below.

The sword-fish is said to attack the whale, wounding it with its beak. There are many well authenticated instances of the planks of ships being perforated by the upper jaw of this powerful creature, which it has been supposed occasionally attacks the hulls of ships in mistake for the whale. Specimens of ship's timbers penetrated by its sword are preserved in many mansions. The Xiphias is mentioned by Aristotle (*Hist. Animal.*, viii. 19), who notices the fact of its striking vessels. The young fish is said to be good eating. When very young the body is covered with small tubercles, which disappear before it attains the length of three feet.

(See Yarrell's ***British Fishes***; and Cuvier and Valencienne's *Hist. Nat. des Poissons*, vol. viii.)

XI'PHIAS, a name for the constellation Dorado.

XIPHILINUS, JOANNES (Ξιφιλῖνος), Patriarch of Constantinople, was of a noble family of Trebizond. In

1066 he was made patriarch of Constantinople: he died in 1075. This Xiphilinus has often been confounded with his nephew. He is the author of an 'Oration on the Adoration of the Cross,' which was first published, in Greek and with a Latin version, in Gretser's work on the Cross, Ingolstadt, 1616, fol. Some other works of less importance are attributed to him, among which are three Constitutions on matters of ecclesiastical discipline, two of which refer to betrothment, and are in the 'Jus Græco-Romanum' of Leunclavius.

XIPHILI'NUS, JOANNES, of Trapezus (Trebizond), was the nephew of the Patriarch Xiphilinus. At the command of the emperor Michael Ducas, whose reign ended A.D. 1070, he made an Epitome of the history of Dion Cassius. The Epitome, as we now have it, commences at the thirty-fifth book, and goes down to the death of Alexander Severus, A.D. 235. His work is not distributed like the original, but is divided into sections (τμήματα), each of which comprises the history of an emperor. We can judge of his work by comparing it with those parts of Dion which are extant. He generally keeps to the expression of his author, but he omits what he considers not essential to the narrative. He has also generally omitted to mention the consuls, who are always recorded in the extant books of Dion, and thus he has done much towards confusing the chronology of the period. Like all other epitomes, it destroys the character of the original work; and it is worthless except as supplying the main historical facts of the large part of Dion which is lost. Xiphilinus was a Christian. The first edition of Xiphilinus was by R. Stephens, Paris, 1551, 4to.; and in the same year Stephens printed the Latin version of G. Blanc. The edition of H. Stephens appeared in 1592, fol., with Blanc's translation, revised by Xylander. There is an English translation by Manning, London, 1704, 8vo., of the 'Epitome' of Xiphilinus.

XIPHORHYNCHUS, written by Mr. Swainson *Ziphorhynchus*, a subgenus of *Certhianæ*, or *True Creepers*, according to that zoologist.

Subgeneric Character.—Bill lengthened, slender; both mandibles considerably curved, typically falcated; the sides compressed from the nostrils. Wings rather lengthened; the second quill hardly shorter than the third. Tarsus short, slender, of equal length with the two external toes. Hinder toe shorter than the tarsus. Tongue cartilaginous, flat, as long as the bill.

Example, *Xiphorhynchus procurvus.*

XIPHOSO'MA, Fitzinger's name for a genus of Serpents.

Cuvier remarks that his fifth section of the great genus BOA consists of those species which want fossets or little pits on the jaws, and have the muzzle furnished with slightly prominent plates cut obliquely from behind forwards, and truncated at the end so as to terminate in a wedge. Their body is very much compressed, and their back carinated. He observes that these are inhabitants of the East Indies, and may afford ground for including them in a distinct subgenus.

The species which he quotes are the *Boa carinata* of Schneider, or *ocellata* of Oppel; and the *Boa viperina* of Shaw (Russel, pl. iv.). These two subdivisions form, he adds, the genus *Xiphosoma* of Fitzinger, *Cenchris* of Gray.

XIPHOSU'RA, the name by which M. Milne Edwards designates a subclass of crustaceans, which he arranges at the end of his system and next to the SUCTORIAL CRUSTACEANS.

M. Milne Edwards observes that the singular animals which compose this small group are so remote from all the other crustaceans, that some naturalists have been inclined to exclude them altogether from that class, and arrange them among the ARACHNIDA, and that in entirely rejecting this opinion it becomes necessary to isolate them as much as possible, and to form a particular subclass, which is connected with that of the BRANCHIOPODA and that of the TRILOBITES, but is distinguished from those crustaceans and all the other animals of the same class by the character of its organization. The natural position then of these Xiphosures should, in the opinion of M. Milne Edwards, have been near the Branchiopods, but he has preferred the place which he has assigned to them, in order that he might not break the connection which unites all the Maxillated Crustaceans.

ORGANIZATION.

The *body* of these animals is described by M. Milne Edwards as composed of three portions—a *cephalo-thorax*, an *abdomen*, and a *tail*; the two first portions are each covered by a horny shield, and the third assumes the form of a long stiletto. The *cephalo-thoracic buckler*, which represents the carapace of *Apus* [BINOCULUS] and of the superior crustaceans, is the largest; it is convex above, concave below, and rounded in front and on the sides, whilst posteriorly it is deeply notched for the reception of the base of the abdomen. On its upper surface is an unequal space, slightly or not at all convex, which is circumscribed in front and on the sides by two curved crests, and occupies behind the whole length of the straight portion of the posterior border articulated with the abdomen. This space, which may be termed the *occipital region*, is subdivided longitudinally into three lobes by two furrows which curve inwards anteriorly; and on the median line may be also remarked a median ridge or elevation more or less distinct, at the anterior extremity of which is a small smooth tubercle having the aspect of a *stemma*, and on each side of which in fact is a very small *smooth eye*. This conformation led Latreille and others to attribute three *stemmata* to these animals. Towards the middle and on the outside of the lateral ridges which circumscribe the occipital region on each side are situated the *compound eyes*, which are of an oval form, and exhibit hexagonal* divisions on their transparent cornea. The anterior and lateral or *marginal region* of the cephalo-thoracic buckler forms in front and on the sides a very inclined plane, and presents nothing remarkable; the only point that requires notice is, that posteriorly it is prolonged beyond the occipital region, so as to constitute on each side a sort of horn directed backwards.

The second buckler, or *abdominal portion* of the body, is much less wide than the preceding, but long also, and of an inequilateral hexagonal form, whose posterior border is more or less concave. Its anterior border is articulated with the posterior border of the occipital region of the carapace, and its latero-anterior edges correspond to the oblique borders by which the marginal region of the same buckler is terminated behind. The latero-posterior borders, which are in general longer than the preceding, form with these last a very obtuse angle, and present a series of eight† teeth separated from each other by six depressions, in each of which is inserted a large moveable spine whose point is directed backwards. Above, this abdominal buckler is convex and divided into three lobes, of which the two lateral are very large, and the median lobe narrowed behind and separated from the preceding by two rows of small depressions. From the middle of the posterior border of this second portion of the body springs a long styliform piece, which, being situated above and behind the *anus*, should be considered as the analogue of the caudal ring.

On the lower aspect of the body appears anteriorly a flat and triangular surface, which is on a level with the frontal border; but in the rest of its extent the cephalo-thoracic buckler is deeply excavated for the lodgment of the feet. These last immediately surround the buccal aperture, and are so disposed that their basilary joint performs the functions of the mandibles and jaws of the ordinary crustaceans, whilst their internal branch is elongated in order to constitute an ambulatory and prehensile member: there are six pairs of these feet. The first, termed mandibles by Fabricius and Latreille, and palps by Cuvier, are much smaller than the others, and situated before the mouth, near the median line: they are inserted on an unequal membranous eminence which fulfils the functions of a labrum, and are composed of three joints, the two last of which are disposed so as to constitute a claw. The four following pairs of feet, or rather *jaw-feet*, much resemble each other, and are each composed of six joints: the first of these joints is very large, and terminates on the inside by a lamellar prolongation, armed with strong spines, and performing the function of a jaw: there is also, under its internal and anterior angle, a small moveable piece. The succeeding joints constitute an elongated and slightly compressed foot; and in the females the penultimate joint is prolonged below the last, so as to form with

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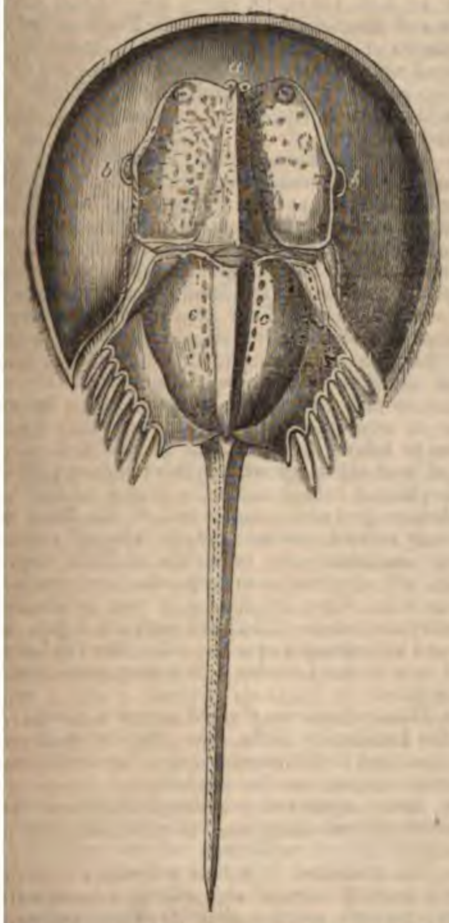
* They are circular: see post, p. 630.

† Seven.

law with equal branches: this is sometimes the same
male; but in some species of *Limuli* this sort of
is wanting in the feet of the second and third pair,
rolongation representing the immoveable finger not
developed. The sixth pair of feet differs much from
receding: their basilary joint is larger, terminates on
ternal side in a toothed surface bearing some resem-
e to that of a grinding mandible, and carries at its
nal angle a flabelliform appendage. Sometimes
exists a small lamellar appendage at the extremity
fourth joint, and the next joint carries on its anterior
many of those subfoliaceous and elongated laminæ
hide nearly entirely the succeeding joint, as well as
nall didactylous hand which terminates it. Lastly,
en the base of these feet, at the posterior part of the
, are two small lamellar pieces which are obtuse at

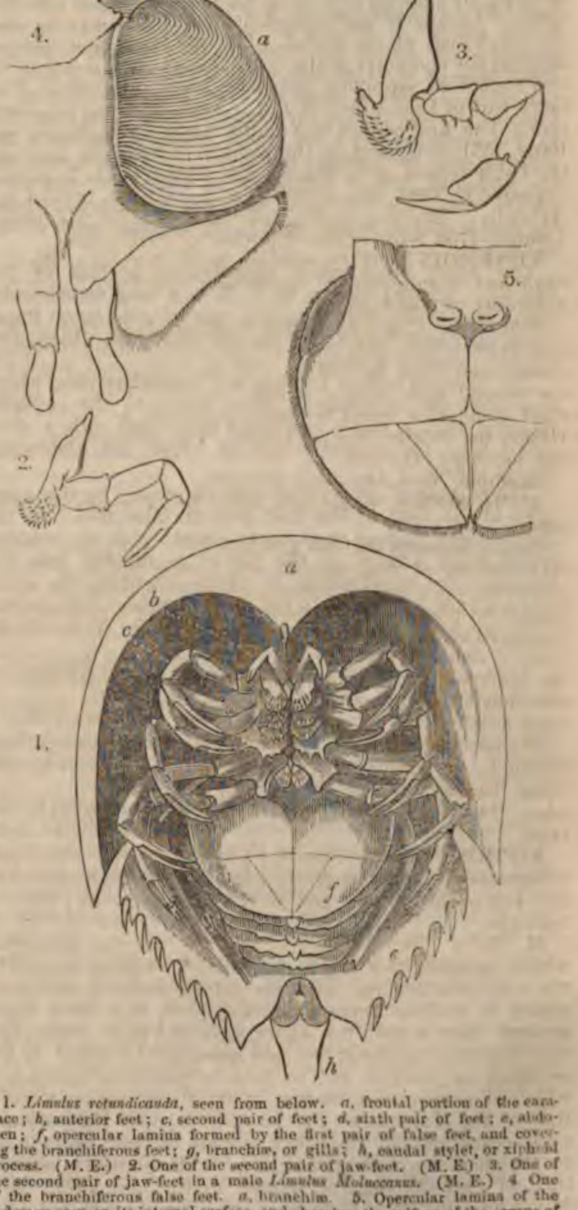


imulus Moluccanus, reduced one-fourth, and seen from above.

n of the two smooth eyes; *b b*, lateral composite eyes; *c c*, respiratory apertures.

d and furnished with spines, which seem to be the
s of a seventh pair of limbs. The abdomen is hol-
out into a rather deep cavity, which is very ana-
to that in *Sphæroma* and many other Isopoda. In
vity are lodged the abdominal *false feet* and the
iæ fixed to their posterior surface. There are six
f these members, but the most anterior are not dis-
nd are united on the median line, so as to consti-
great foliaceous and nearly circular valve, but
is truncated anteriorly, and which entirely covers
ceeding false feet: in each half of this operculum
be distinguished one or two basilary pieces and two
al laminæ, which represent the two branches which
ily terminate these organs: one of these pieces,
d near the median line, is small, and separated from
the opposite side by a fissure; the other is very
finally, on the superior or posterior surface of this
ir of false feet the two orifices of generation are

The succeeding false feet are equally foliaceous,
ited on the median line throughout the whole
of their basilary piece; but the two branches which
ate each of these organs are free and more developed. The internal branch is composed of two joints, the first of which is quadrilateral and elongated, the second foliaceous and oval. The external branch is represented by a very wide lamina, which is rounded externally, and resembles that of the operculum. The two external thirds of the posterior surface of the basilary portion of these limbs are occupied by a great gill formed of a considerable number of laminæ, or rather of cutaneous folds, disposed transversely, and piled one on the other like the leaves of a book. These leaves adhere to the false feet throughout the length of their base or anterior border, and are free in the rest of their extent. They are triangular, with a curved border, and increase in size from the upper extremity of the branch to its base, so as to give to this last the form of a pyramid, the posterior ridge of which is curved, the two free surfaces convex, and the base rounded. The free edge of each leaf is furnished with a small horny band destined to sustain it, but throughout the rest of their extent these folds are membranous: there are about one hundred and fifty of them in each of the first pair of gills, and a few less in the succeeding gills; the last has only about one hundred and thirty.



1. *Limulus rotundicauda*, seen from below. *a*, frontal portion of the carapace; *b*, anterior feet; *c*, second pair of feet; *d*, sixth pair of feet; *e*, abdomen; *f*, opercular lamina formed by the first pair of false feet, and covering the branchiferous feet; *g*, branchiæ, or gills; *h*, caudal stylet, or xiphoid process. (M. E.) 2. One of the second pair of jaw-feet. (M. E.) 3. One of the second pair of jaw-feet in a male *Limulus Moluccanus*. (M. E.) 4. One of the branchiferous false feet. *a*, branchiæ. 5. Opercular laminæ of the abdomen seen on its internal surface, and showing the orifices of the organs of generation. (M. E.)

The *mouth*, situated towards the posterior third of the lower surface of the cephalo-thoracic buckler, is surrounded, as has already been noticed, by the feet, the basilary joint or haunch of which is armed with spines or teeth, and disposed so as to serve for the work of mastication. This aperture is infundibuliform, and continued with the digestive tube, which is directed at first directly forward, then curves upwards and backwards, and proceeds in a direct line to the extremity of the abdominal buckler, where it presents anew a small curvature in its course to the anus. The first portion of this canal, directed forwards and situated below the intestine, constitutes the *œsophagus:* it is narrow, rather long, and furnished internally with longitudinal plaits. The stomach is represented by the curved and anterior portion of this same tube; it is small and directed vertically; its walls are very fleshy, and puckered (froncées), internally; an internal furrow separates it from the œsophagus, and its pyloric extremity advances in form of a cone in the cavity of the intestine, so as to constitute a species of valvule. The third portion of the intestinal tube occupies nearly the whole length of the body, and represents the *duodenum*, or chylific ventricle: it is cylindrical, straight, and has towards its two extremities some transverse folds of the internal membrane, and more or less projecting papillæ. On each side, a little above the level of the mouth, are two small circular orifices, which belong to the biliary apparatus, and its posterior extremity is suddenly contracted in order to its continuation with the fourth portion of the digestive tube, which may be considered as the *intestinum rectum*. It is very short, plaited longitudinally in its interior, and curved downwards at its extremity in order to reach the *anus*, which is situated in front of the insertion of the caudal sword. The *liver* fills in the cephalo-thorax the space situated between the intestine and the muscles of the feet: it extends also into the abdomen, and is composed of blind and contorted canals, which are continued with the excretory conduits, the four trunks of which open in the anterior part of the duodenum.

The *heart* bears much resemblance to that of the *Squillæ*. [STOMAPODS, p. 83.] It is a long dorsal vessel with fleshy walls, which present on each side seven transverse apertures furnished with valvules, and which give origin to various arteries.

The *nervous system* consists in a medullary ring which surrounds the œsophagus, gives origin to the cephalo-thoracic nerves, and is continued backwards with a stout chord, from the posterior part of which the abdominal nerves spring.

The *organs of generation* open externally by the apertures at the base of the first pair of false feet. In the *female* these orifices each communicate with an oviduct, which when arrived in the thorax is divided into two branches, the ramifications of which constitute the ovary and embrace the liver. In the *male*, in place of the *vulvæ*, there is a small cylindrical penis. (*Histoire Naturelle des Crustacés*, 1840.)

Such is the statement given by M. Milne Edwards of the organization of this highly interesting form.

Professor Owen, in his 'Hunterian Lectures' (1843),* has touched upon certain points, for whose detailed illustration zoologists are anxiously looking, especially with regard to the development of the nervous system.

The Professor states that the *Xiphosura*, typified by the *Limulus*, or Molucca crab, have the head and thorax more completely blended together than in the true crabs, which they resemble in the general form of the body: but that they are peculiarly distinguished from all other crustacea by having the office of jaws performed by the first joint of the thoracic legs, which surround the mouth. The large cephalo-thoracic segment is, he remarks, protected above and laterally by an expanded crescentic shield obscurely divided by two longitudinal impressions into three lobes, supporting the organs of vision on their highest part. The tergal parts of the segments of the second division of the body are also blended, he observes, into one trilobate clypeiform piece, their original separation being indicated by the branchial fissures, and the number of the segments by that of the lamelliform appendages attached to their inferior surface. The termination of the intestine beneath the last segment of the second division of the body of the Limulus proves, in Professor Owen's opinion, and correctly, as we think, that division to answer to the abdomen in the *Malacostraca*; but admitting the sessile eyes to indicate a distinct segment, not more than sixteen segments can, he remarks, be determined by the appendages to er
the composition of the entire crust of the Lim
cluding the sword-shaped appendage, which is a
in the Professor's view, to the last or post-anal se
the higher crustacea, and consists of a single
segment.

Professor Owen then adverts to the small *Ento*
in which the number of the thoracic and abdor
ments generally exceeds that in the *Malacost*
adduces as an example the *Branchipus stagnal*
CHIOPODA, p. 343], which has eleven thoracic seg
nine abdominal or caudal rings, besides a distinct
tected by a thoracic shield. In the *Isaura*, in
shield is developed, as in *Cypris*, *Daphnia*,
Entomostraca, to the extent and in the form of
shell enveloping the whole body, the number c
and abdominal segments exceeds, he remark
four.

These and other observations of the Professor
the segments of the crustacea are highly intere
considered with reference to a race of that clas
no living analogue exists; and he thus poin
value of this part of their conformation as ap
the subject:—

'The distinction between the Entomostraca
Malacostraca in the number of the segments of
is of the first importance in determining the a
the antient extinct crustacea called TRILOBITI
remarkable animals were almost the sole represe
the present class in the periods which intervene
the deposition of the earliest fossiliferous strata
of the coal formation. They appear to have b
out antennæ and feet; the structure of the te
only of their body-segments is yet known; but
grouped together to form a distinct head, th
abdomen or tail. The head is formed by a la
circular or crescent-shaped shield; the thorax c
from ten to fifteen segments, and the abdomen c
cludes at least eight segments in this *Calymene* (P
208), in which it is bent under the thorax, as in th
the abdomen, post-abdomen, or tail, as the third
is variously termed, contains fifteen fettered seg
Asaphus caudatus: the segments of both the
abdomen are very similar to each other, and gradu
crease in size. They are divided by two longitud
rows into three lobes. The head supports a pair
compound eyes situated near the sides, like the la
pair of eyes in the *Limulus*, which they resemble
and structure.

'The Malacostraca are divided into two groups,
ing to the attachment of the eyes: those with imm
sessile eyes form the *Edriophthalma*; those with m
pedunculated eyes, the *Podophthalma*.

'The lower organized or edriophthalmous fo
malacostracous crustacea resemble the Trilobite
non-confluence and uniformity of the segment
thorax and abdomen. Certain genera, as *Ser*
Bopyrus, have the tergal arcs of the segments t
but they exceed not the characteristic number
Malacostraca, and the seven rings of the thorax an
indicated in each by the seven pairs of articula
which they support, although these are very small
parasitic *Bopyrus*. In the *Cymothoa* the seven t
and seven abdominal segments are more distinct
racterized.'

With regard to the nervous system and senses, Pr
Owen, after alluding to Cuvier's description of th
of the organization in the common crab, Mr.
illustrative dissections and beautiful plates of the
and the able display of the corresponding structure
Maia by Audouin and Edwards, observes that a
logous concentration of the nervous system, but wi
teresting modifications, has been described by Pr
van der Hoeven in the *Limulus*, or King-crab, the
gigantic form of the Entomostracous tribe, and pr
the only existing genus from which we may derive
sight into the organization of the extinct Trilobitic
taceans. Professor Owen was therefore induced
the well-preserved specimens of *Limulus* given to th
lege of Surgeons in London by Mr. Boott, of Boston,
into the hands of Mr. Goadby, the anatomical assist
the College, whose beautiful dissections and prepar
will be found in the museum of the College. The
be nervous system so displayed, together with th

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* 8vo., Longman & Co.

my of the *Limulus*, will be published by the
College.
wen observes in his lectures that the large
und eyes of this crustacean are sessile. The
oceeds to state, is divided into a considerable
all circular facets, each of which corresponds
; and the optic nerve, after its long course as
rd without forming a ganglion, divides near
pencil of fine filaments, which severally re-
ressions from their respective ocelli, of the
which the large lateral eye is composed: the
nple median eyes, which are almost in con-
d the space before the head which is out of
he large compound eyes. Each simple eye,
forms us, receives its distinct nerve from the
of the corresponding cerebral lobe.
sile eyes of the *Edriophthalma*, as, for ex-
Serolis,' says Professor Owen in continua-
er layer only of the cornea is divided into
cets, corresponding with the number of the
lline lenses of the compound eye. But in
the cornea presents the same subdivided
the *Limulus;* and the position of the two
ith that of the corresponding compound pair
xisting Entomostracan. The eyes are more
e Trilobites. In the *Asaphus caudatus* the
ided into at least 400 compartments, each
ircular prominence; its general form is that
f a cone incomplete towards the middle line
ut commanding so much of the horizon in
ns, that where the distinct vision of one eye
the other begins. In the mandibulate crus-
guished by having their compound eyes sup-
veable peduncles, the form of the corneal
they are square in the river craw-fish, hexa-
ermit and common crabs. There is a conical
ns behind each facet imbedded in a small
ur, upon which the optic filament expands,
lus is lodged in a pigmental cell, which like-
e bulb of the optic nerve; the cavity con-
mpound eye is closed behind by a membrane
th the inner layer of epiderm, and pierced
ge of the optic nerve. In the Podophthal-
ea there is generally a spacious furrow or
ch the eye can be lodged and protected, and
e orbit. In one or two species the eye-stalks
d the margins of the carapace.'
acute observer, speaking of the organs of
ese large crustaceans, which form the only
nted by species which co-existed with Tri-
rks that the *Limuli* differ from all other
ea in their organs of mastication, which are
hard joints of the five posterior pairs of legs:
pair, serving to bring the food to the mouth,
on a rudimental labrum. He refers to the
Mr. Charles Stokes of a distinct subquadrate
y emarginate anteriorly in *Asaphus platyce-*
BITES, p. 233], and remarks that the nearest
his the only known part of the trophi of the
ns to be made by the entomostracous genus
h however the labium is truncated. A few
organized crustacea, as CALIGUS, *Nymphon*,
on, obtain their aliment, he adds, like the
ction. [SUCTORIAL CRUSTACEANS.]
ring to the structure of the mouth in the
us Crustacea, and pointing out that the ali-
l is most simple in the Suctorial Crustaceans,
resents no noticeable difference from that in
he hepatic appendages however being more
better developed, he thus describes this part
ation in Limulus:—
imulus the mouth is situated nearly in the
inferior surface of the great cephalo-thoracic
œsophagus is continued from it in a very un-
forwards, and expands into a stomach, which
the anterior part of the head. This organ is
upon itself upwards and backwards, and is
a gradual diminution of diameter, as appears
ernal view, into the intestine, which passes
ith a slight vertical bend, to the base of the
abdominal segment. When we examine the
alimentary tract, the distinction between
intestine is effected, as Van der Hoeven
has shown, by a conical valvular pylorus, which projects into the commencement of the intestine. The stomach is lined by a very dense and corrugated horny membrane. The hepatic mass, which, with the generative glands, fills the greater part of the cephalo-thoracic cavity, pours its secretion into the commencement of the intestine by two ducts on each side.' (Prep., No. 477, A.)

In the heart of the Crustacea, Professor Owen remarks, we may trace a gradational series of forms, from the elongated median dorsal vessel, to the short, broad, and compact muscular ventricle in the lobster and the crab. In all the Crustacea, he reminds us, as in all the other articulate animals, the heart is situated immediately beneath the skin of the back, above the intestinal tube, and is retained *in situ* by lateral pyramidal muscles. In the lower, elongated, slender, many-jointed species of the Edriophthalmous Crustacea the heart, he observes, presents its vasiform character: it is broadest and most compact in the crab.

'In this series,' continues Professor Owen, 'we may trace a general correspondence in the progressive development of the vascular as of the nervous system, concomitant with the concentration of the external segments, and the progressive compactness in the form of the entire body. But there is a remarkable exception to this concomitant progress in the Limulus, indicative, with the general condition of the instruments of locomotion and respiration, of the essentially inferior grade of organization of that genus, which, as has already been observed, seems to be the last remnant of the once extensive group of Trilobitic Crustacea which swarmed in the seas of the antient secondary periods of the earth's history.'

'We have seen,' continues the Professor, 'in the compact and broad existing representative of those extinct gigantic Entomostracans, that the nervous system exhibits a concentration of its principal central mass around the mouth, analogous to the condition in the common crab, but with a ganglionic double chord continuing from it. The heart however is far from presenting a corresponding degree of concentration: it remains an elongated fusiform tube, extending parallel with the intestine from the pylorus to the rectum: it is contained in a pericardium with thin membranous walls, formed by the central sinus of the venous system, and it receives the blood from that sinus and from the branchial veins by a series of from seven to ten lateral vertical slits, defended by valves as in the higher crustacea.* An aortic trunk proceeds from each extremity of this heart. The anterior aorta is the largest, and immediately divides into three branches. The middle and smallest branch passes forwards to the anterior edge of the cephalic shield, following the curve of its middle line, and supplying the small median ocelli in its course. The two larger lateral branches form arches, which curve down the side of the stomach and the œsophagus, giving branches to both those parts and to the intestine, and becoming intimately united with the neurilemma of the œsophageal nervous collar. They unite at the posterior part of that collar, and form a single vessel, which accompanies the abdominal nervous ganglionic chord to its posterior bifurcation, where the vessel again divides. Throughout all this course the arterial is so closely connected with the nervous system as to be scarcely separable or distinguishable from it. The branches of the arterial and nervous trunks, which accompany each other, may be defined and studied apart.

'The posterior aorta is chiefly destined for the supply of the sword-like tail of the Limulus: the first part of its course is wavy, to adapt it to the strong inflections of that appendage. The aërated is mixed with the venous blood in the heart, and is propelled in that mixed condition throughout the body, in the Limulus as in the lobster.'

With regard to the generative apparatus, Professor Owen observes that most of the small Entomostraca carry the impregnated ova in appended ovisacs, like those of the Lernææ. These sacs are not developed, he remarks, in the Limulus, which also differs from the smaller Entomostraca, inasmuch as the ovarian mass interblends its lobes and processes with those of the liver: the oviducts, he adds, form more frequent communications with each other than in the higher crustacea, but ultimately terminate, like the vasa deferentia, by two distinct but continuous orifices on the back part of the first abdominal lamelliform appendage.

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* Van der Hoeven, pl. 2, f. 3.

METAMORPHOSIS.

M. Milne Edwards has shown that the Xiphosures undergo in their youth considerable changes of form. At first there is no sword-like or styliform tail, which in the adult Limulus equals, at least, the rest of the body in length; their abdominal buckler is rounded posteriorly, and the last pairs of false feet are not developed. M. Milne Edwards observed this in the embryos on the point of exclusion from the egg, at which period the abdomen supports only three pairs of appendages.

GEOGRAPHICAL DISTRIBUTION AND HABITS.

The Xiphosures inhabit the sea, and sometimes come upon the sandy beaches. They are found in the Indian and Japanese seas, and in the Atlantic, on the coasts of North America; but they do not appear to have a higher range than the 44th degree of N. lat., and seem confined to the northern hemisphere. Their food consists of animal substances; and when stranded, they often bury themselves in the sand as a protection against the heat of the sun, which is soon fatal to them.

ARRANGEMENT.

The only genus is

Limulus. *Müller.*

M. Milne Edwards remarks that Leach, it is true, has restricted this generic name to those species the whole of whose feet are cheliform, and has proposed a new genus, under the designation of *Tachypleus*, for those whose anterior feet are monodactyle; but, he observes, it is now well known that this last character is only met with in the male of certain Limuli, and does not coincide with other peculiarities of structure of any importance, so that it does not appear a sufficient basis on which to found a generic division. M. Milne Edwards thus arranges the only recent species known, five in number.

§ 1. Species whose second and third pairs of jaw-feet (two first pairs of Latreille) are monodactyle in the male, and in which the moveable spines of the lateral border of the abdomen are of two sorts, namely, very long and very short.

Limulus moluccanus.—*Description.*—Cephalo-thoracic buckler regularly rounded anteriorly in both sexes, and above showing three rows of small spiniform points, situated one on the median crest, the others on the crests which separate the occipital region from the lateral regions; the posterior and lateral borders finely dentilated. The abdominal buckler smooth above, and terminated by two very short teeth, the internal border of which is very long, and the external border (comprehended between the point and the insertion of the last spine) very short; tooth of the latero-anterior border moderate, and situated towards the middle of that border; moveable spines of the latero-posterior border moderate, and all nearly of the same length in the male; the three first rather long in the female; but the three last extremely short, and much wider than they are long. Caudal stylet triangular, spiny on its upper border, and slightly concave on its inferior surface. Last pair of jaw-feet furnished towards the end with four elongated appendages, which are lamellated, flattened, and sublanceolate. (M. E.)

This is the *Cancer moluccanus* of Clusius; *Cancer perversus* of Rumphius; *Limulus Polyphemus* of Fabricius; *Limulus gigas* of Müller; and *Limulus moluccanus* of Latreille.

M. Milne Edwards is of opinion that Leach's *Limulus Latreilli* probably belongs to this species, as well as *Limulus tridentatus* of the same author.

Limulus moluccanus is apparently the *Cancer* figured by Bontius in the fifth book of his 'Natural and Medical History of the East Indies,' p. 83, in which he notices its sword-like appendage, and states that if any incautious fisherman is wounded by it, the pain is like that caused by a scorpion, adding, that its flesh is not so delicate as that of the other crabs. The chapter is headed by the following verses, which refer to the painful wound inflicted by the tail:—

'Quisquis cauda'i sensisti tela Paguri
[illegible] meo exemplo morsus vitare dolosos
[illegible] quos aula volubilis infert
[illegible] ejus retinet fors cauda venenum.'

Milne Edwards states that this species, the female only of which is known to a strong resemblance to *Limulus moluccanus*, tinguished from it by the conformation of th feet, the penultimate joint of which is extremel surrounded at its base with seven spines, which being flat, very much elongated, and rathei rounded, conic, and very much pointed. Th pairs of feet were broken in the only individua Milne Edwards had examined, so that he coul the character indicated by Latreille, the nam scriber of the species, drawn from the monodac formation of the second pair (first pair of La is also worthy of note, M. Milne Edwards ad cephalo-thoracic buckler is less convex than ceding species.

The same author observes that the *Limulus* the Paris museum under the name of *Polyphe dactylus*, Lam., and ticketed by Latreille, seem be the male of the preceding species; but the the posterior feet prohibits positive certainty o

Limulus longispina. M. Milne Edwards no a species closely approximating to *Limulus mol* having the teeth or posterior angles of the buckler larger and more regularly triangular; t border of these teeth being nearly as long as border, and their base much less wider than th between them, and occupied by the caudal styl surface of the abdomen covered with small s tooth of its latero-anterior border large, and si near that which separates that border from the terior border; moveable spines of the six p males and of the three first pairs in the female three last pairs very short, but sharp in the femal stylet triangular, and spiny on its borders. Fro of the male strongly notched and sinuous, so a trilobate.

Locality.—Coasts of Japan, and probably of

This is the *Kabuto-gani* (Helmet-crab) of the *Un-kiie*, or *Umi-do-game* of the Chinese.

§ 2. Species in which the third pair of ja cheliform in both sexes, and in which the spines of the latero-posterior border of the diminish gradually in length in both female.

a. Second pair of jaw-feet monodacty male. Caudal stylet triangular and its upper border.

Limulus Polyphemus.—*Description.*—Cephalo buckler more convex than in the preceding spe preserving for a longer period the seven spines sit its upper surface. Posterior teeth of the abdo large, and representing an equilateral triangle, being longer than they are wide at their bas moveable spines of the latero-posterior border a rate, and similar in both sexes; the three teet median line project more than in the preceding and the caudal stylet is less long. (M. E.)

Localities.—The Atlantic Ocean, coasts of Nor rica, and the Antilles.

This is the *Araneus marinus* of De Laet; *Can luccanus* of Wormius; *Monoculus Polyphemus* of L but he confounds under this name both the Orie American species; *Limulus cyclops* of Fabricius; *Americanus* of Leach; *Polyphemus occidentalis* marck; and *Limulus Polyphemus* of Ranzani.

John de Laet, in his 'Novus Orbis' (1633), giv fair figure of this species in the 19th chapter of hi book, and states that the arms of the Indians (A quosy) of 'Wijngaerden Eylandt' in 'New Fra lances, clubs, bows and arrows, which, for want they sharpen with the crustaceous tail of the fish *Signoc*, *Siguenoc*, or *Araneus marinus*, name the Limulus there engraven is known to th and Dutch. De Laet gives a good description says that it loves the shallows, and is mostly æstuaries, of various sizes, not a few having a tail a palm in length.

M. Milne Edwards observes that *Limulus S* Leach is a variety of this species, having the la tooth of the upper surface of the abdomen more than it is ordinarily to be seen in adults.

a a. All the jaw-feet cheliform in the ma as in the female: caudal stylet round *mulus rotundicauda.—Description.*—Cephalo-thoracic kler wider than in the preceding species, less convex, deprived of the series of small spines between the t teeth of its upper surface, but with a great number iese spiniform points scattered on the occipital region; inal teeth of the abdomen short, and having their inal border about twice as long as the external border; moveable spines nearly as in the preceding. Caudal t obscurely triangular, with rounded borders. (M.E.)

ocality.—The Moluccas.

iis is the *Cancer marinus perversus* of Seba.

Fossil Xiphosura.

ie fossil forms of this group, contemporaneous as some em were with the Trilobites, to which they bear so g a relationship, are among the most interesting. fossil species, *Limulus trilobitoïdes*, Buckl., from the stone of the coal formation, Coalbrook Dale, figured l. 46 of the 'Bridgewater Treatise,' is very trilobitic in arance, and in the early state of the animal, before development of the caudal stylet, the resemblance have been still more striking; nor will it escape the rvation of our palæological readers that some of the oites are furnished with a long caudal appendage.

ological Distribution, &c.—*Limulus*, as Dr. Buckremarks in the work above noticed, has been found in the coal formation of Staffordshire and Derby-; and in the Jurassic limestone of Aichstadt, near enheim, together with many other marine crustaceans igher order.

Milne Edwards notices the numerous species which been recorded. That figured by Desmarest under ame of *Limulus Walchii* (*Cancer perversus* of Walch Knorr) is found, he observes, in the lithographic slate lenhofen and Pappenheim. In M. Edwards's opinion proaches *Limulus longissimus* more than any other ing species, but appears to have the latero-posterior ongations of the cephalo-thoracic buckler less deped, and the abdomen wider, with its latero-anterior ers very short; as to the moveable spines, they are, emarks, six in number, and are all long and slender.

ther fossil Limuli have, M. Milne Edwards adds, been ntly discovered, not only in this formation, but also in muschelkalk and the Jurassic limestone, by Count nster, who has given figures of them in the excellent k of Van der Hoeven on the Limuli; but M. Milne wards thinks that these fossils have not been as yet debed with sufficient details to enable naturalists to assign cific characters to them; and he confines himself to observations that *Limulus intermedius*, Munst., found olenhofen, and *Limulus brevicauda* (*brevi-caudatus?*), nst., found at Aichstadt, are remarkable for the form he abdomen, which represents a rhomboid rather than exagon, its anterior border being nearly confounded its latero-anterior borders. *Limulus ornatus* of the author, in the opinion of M. Milne Edwards, appears pproach *Limulus Walchii* closely, but presents a much er furrow throughout the length of the caudal stylet.

Milne Edwards finally calls attention to *Limulus bitoïdes*, Buckl., above mentioned, remarkable for the form prolongations of the lateral angles of the cephaloacic buckler and many other characters.

.B. *Xiphosurus* has been used by Fitzinger to desige a genus of Saurians arranged by Mr. Swainson as a genus of Anolis.

ORULLO, or JORULLO, is a volcano situated in the e of Michoacan, one of the United States of Mexico, in 9′ N. lat. and 101° 32′ W. long. This volcano has risen of the earth in modern times; and of its origin we have account. The Monte Nuovo near Naples, which was ned in 1538 by a volcanic eruption, did not continue e a volcano, and is at present not distinguished by any uliarity from other hills composed of loose earthy er. The phenomena which attended the formation of nt Xorullo, in 1759, were collected by Alexander von boldt, in 1803, from the mouth of eye-witnesses.

ount Xorullo is 100 miles from the shores of the fic Ocean, and 116 miles from the nearest active vol-

It is in the midst of a plain, which is 3436 feet e the sea-level, and it rises 1683 feet above this plain, at its summit is 5119 feet above the sea. The plain hich the volcano stands is called Las Playas de Xofrom the name of a wealthy landed proprietor.

The plain on which the volcano rose was, up to 1759, chiefly covered with sugar and indigo plantations, which were irrigated by the waters of two small rivers; but it is surrounded by basalt rock, the structure of which appears to indicate that this part of the country, at some remote period, has experienced more than once the effects of volcanic eruptions. In the month of June, 1759, a subterraneous noise was heard, which continued for 50 or 60 days, and was frequently attended with earthquakes. At the beginning of September all was quiet, but in the night from the 28th to the 29th of September, a terrible subterraneous crash put the inhabitants into such a fright, that they abandoned their houses, and took refuge on the mountains of Aguasarco, which surround the plain on the east. A portion of the plain, covering an area of from 22 to 30 square miles, rose in the form of a bladder, and is at present called El Mal Paes, a name which frequently occurs in Mexico, and is given to such tracts as are rendered sterile by the effect of volcanic action. The border of this raised tract is still clearly marked by the fractured rocks which constitute it. Near the border the raised ground is not quite 40 feet above the plain, but as we advance towards the centre and the base of the volcano it rises gradually to more than 520 feet. Over the surface of the raised ground some thousands of small conical eminences are dispersed. Their summits are only from seven to ten feet above their bases, and have openings on their most elevated points, from which a thick smoke continually issues, which rises from 40 to 60 feet in the air, and in several of them a subterraneous noise is heard, which seems to indicate that not far below the surface there is a hot fluid. Though the heat of the air produced by these vapours had, according to the statement of the natives, much diminished during the last fifteen years preceding the visit of Humboldt, that traveller found that the thermometer rose to 183° when placed over the fissures which discharged a watery vapour. In a line traversing the raised ground from north-north-east to south-south-west, stand six large hills, rising from 1500 to 1683 feet above the antient level of the plain. The most elevated of these hills is the volcano of Xorullo. It is still active, and has thrown out on the north side an immense quantity of scorified and basaltic lavas, which contain small fragments of primitive rocks. Up to the month of February, 1760, the eruptions of this volcano were very violent and frequent, but since that time they have become less violent and more rare. During the first eruptions the roofs of the houses in Queretaro, though 135 miles distant, were covered with ashes. Humboldt descended into the crater to the depth of 180 feet below the outer edge, but he could not go lower on account of the dense vapours which ascended from it. According to his estimate, the bottom of the crater was nearly 180 feet below the point which he reached in his descent.

Persons who had observed the progress of this volcanic formation from the mountains of Aguasarco, stated that they saw the flames issuing from the earth over a surface of more than four square miles; that the fragments of red-hot rocks were thrown up to a great height; and that through a thick cloud of ashes, which was illuminated by the volcanic fire, resembling the sea in violent motion, it appeared as if the softened crust of the earth was swelling. The two rivers which watered this part of the plain rushed into the fiery vents. The decomposition of the waters contributed to increase the flames, which rose to such a height as to be visible in the town of Pascuaro, which stands on a large plain 3760 feet above that on which the volcano rests. In the small cones at the foot of the volcano balls of basalt are found, which are enclosed in hard clay lying in concentric layers; whence Humboldt infers that subterraneous waters have been very active in this extraordinary revolution. The two rivers above mentioned are at present lost under the lava, but on the western side of the Mal Paes there are now found some hot-springs, in which the thermometer rises to 105° Fahrenheit.

(Humboldt, *Essai Politique de la Nouvelle Espagne; Vue des Cordillères et Monumens des Peuples Indigènes de l'Amerique et Recueil d'Observations Astronomiques.*)

XYLANDER, GULIELMUS. Xylander's real name was Holzmann (Woodman), which, after the fashion of the scholars of the day, he changed into the equivalent Greek form of Xylander. He was born at Augsburg, December 26, 1532, of poor parents. He obtained the patronage of

Wolffgang Relinger, a patrician of Augsburg, who procured for him the necessary means for prosecuting his studies till he was received into the College of Augsburg, where he had a certain allowance, which was appropriated to a limited number of pupils. From this we must infer that as a boy he had shown great talent. In 1549 he went to Tübingen, and in 1556 to Basel. His studies were the mathematics and Greek and Latin literature. After the death of J. Micyllus, in 1558, he was made Greek professor at Heidelberg, but he was still very poor and was obliged to add to his means by his pen. He died in February, 1576, having shortened his life by his excessive labour, and, according to some accounts, by drinking. It is the statement of Jöcher that his salary as professor was insufficient for his maintenance, and that he was therefore obliged to work for the booksellers; but in the 'Biographie Universelle' (art. 'Xylander,' by Weiss) it is maintained that his salary was sufficient. If he was drunken and extravagant, it may very well have happened that he was always poor and glad to work for money. In the elegiac verses prefixed to his translation of Dion Cassius, and placed at the end of his dedicatory epistle, he complains of his poverty. This dedication is dated November 1, 1557, and in the following year he was appointed professor at Heidelberg. The greater part of his works appeared after his appointment at Heidelberg. Xylander was also named by the elector palatine Frederic, secretary to the convocation at Maulbrunn, which was held for the settlement of some differences among the Protestants. He is said to have received money for his services from this prince, and also from the duke of Würtemberg. It seems probable therefore that, with all these means and what he received for his literary labours, if he was poor after he went to Heidelberg, it must have been through his own improvidence.

Xylander's works are very numerous. A large part of them consists of translations from Greek and Latin authors. His translations into Latin are:—1, Plutarch's Works, Basel, 1561-70; 2, Strabo, accompanied with the Greek text, Basel, 1571, fol.; 3, 'The Chronicle of Cedrenus,' with the Greek text, Basel, 1565, fol.; 4, Tryphiodorus, in Latin verse; he is said to have made this version when he was sixteen years of age. 4, The work of Michael Psellus, 'De Quatuor Disciplinis Mathematicis,' with notes, Basel, 1556, 8vo.; 5, The History of Dion Cassius, Basel, 1558, fol., with the Latin translation of Xiphilinus by W. Blanc, which he corrected [XIPHILINUS]; 6, 'The Meditations of the Emperor Marcus Aurelius,' Zürich, 1558, 8vo.; Lyon, 1559, 12mo.; Greek and Latin, Basel, 1568, 8vo. To this last and corrected edition Xylander added the versions of Antoninus Liberalis, the work generally attributed to Apollonius Dyscolus, and which here appears under the Latin title of 'Historiae Commentitiae;' Phlegon Trallianus, and Antigonus Carystius 'De Mirabilibus' (Ἱστοριῶν Παραδόξων Συναγωγή). 7, Diophantus, with the Greek text, Basel, 1575, fol.: this work was dedicated to the duke of Würtemberg, who made him a present of five hundred reichsthaler on the occasion. Though the translation is not free from faults, it is acknowledged to have great merit, considering the difficulty of the subject and the haste with which it was made. 8, Xylander made the first German translation of the first six books of Euclid, Basel, 1562. This is a very rare work: the seventh, eighth, and ninth books had been already translated into German by Johann Scheybel, Tübingen, 1555, 4to. 9, Polybius, into German. 10, The New Testament, into German.

Xylander commenced an edition of Pausanias, which was completed by Sylburg, and published in 1583. The Greek text of the edition of Stephanus Byzantinus, printed by Oporinus, at Basel, 1568, fol., was amended by Xylander, but, as it appears, without the aid of MSS. He also superintended the edition of Theocritus, Basel, 1558, 8vo., which contains the Greek scholia and notes by Xylander; and the edition of Horace, Heidelberg, 1575, 8vo.

Among his other labours, he drew up 'Institutiones Aphoristicae Logicae Aristotelis, ita scriptae ut adolescentibus proponi commode, eorumque ad Aristotelea percipienda acuere ingenium et memoriam juvare possint,' a work intended for the instruction of youth and as an introduction to the study of Aristotle, Heidelberg, 1577, 4to. The writer of this article has never seen the 'Institutiones,' and can only conjecture that it somewhat resembles in plan and design Trendelenburg's 'Elementa Logices Aristotelicae,' Berlin, 1842, 2nd ed. Trendelenburg however has not mentioned Xylander's work in his preface, from which we conclude that he was either unacquainted with it, or that it is not exactly what we might conjecture it to be.

There are other works of Xylander, but the above are the principal. The Life of this laborious scholar deserves and requires to be written with more care than it has been yet. The ordinary accounts are at variance with one another: some of them attribute to him works that he had either little to do with or perhaps nothing at all; and some omit several works that are undoubtedly his. Xylander was a man of great ability, well versed in Greek and Roman literature, both as to the matter and the language. He wrote Latin with great ease and correctness, and his versions are generally correct.

(Jöcher, *Allgem. Gelehrten Lexicon*, probably not very accurate; Bayle, *Dict.*, art. 'Xylander,' a very insufficient article; *Biog. Univ.*, art. 'Xylander,' by Weiss, is a much better and more complete article, and it contains the references to the original authorities for Xylander's Life and Works; *Biographical Dict. of the Society for the Diffusion of Useful Knowledge*, art. 'Apollonius Dyscolus.')

XYLITE. According to Gmelin, when commercial pyroxylic spirit is submitted to distillation from chloride of calcium, a vapour rises, which condenses into a liquid which he calls *xylite*.

The properties of this substance are, that it strongly resembles alcohol; its odour is like that of æther and agreeable, and its taste is empyreumatic; its specific gravity is 0·816 and its boiling-point about 143° Fahr.: it is miscible with water, and burns with a white flame. The density of its vapour was found by experiment to be 2·177; by theory it should be rather lighter. It appears to be composed of

Six equivalents of carbon . . .	36
Six equivalents of hydrogen . .	6
Two and a half equivalents of oxygen	20
	—
Equivalent . .	62

With acids xylite produces æthereal compounds, which have not been minutely examined; and by partial decomposition it gives rise to *xylitic acid*, *xylite naphtha*, *xylite resin*, and *xylite oil;* these substances however have not hitherto been very particularly subjected to experiment.

XYLOCARPUS (from ξύλον, wood, and καρπός, fruit), a genus of plants belonging to the natural order Meliaceæ. This genus, with *Persoonia*, has been referred by Aublet and other botanists to the genus *Carapa*, which is thus defined:—Calyx coriaceous, 4-5-lobed; petals 4 or 5, coriaceous; stamens 8-10, the filaments of which are joined into a tube, which is toothed at the apex, and bears the anthers on the inside of the throat; the style short; the stigma broad and truncate, with a furrowed margin; the drupe dry, globose, woody inside, 4-5-furrowed, 4-5-valved, 4-5-seeded; the seeds thick and without albumen.

Carapa Guianensis, the *Persoonia Guareoides* of Willdenow, is a native of the forests of Guiana. It has 8 or 10 pairs of leaflets, alternate or opposite, elliptical, acuminate, coriaceous, and shining. The seeds of this tree yield an oil, which is extracted by the natives of Guiana by boiling, and is used by them for applying to the hair and anointing their bodies. The oil is thick and has a bitter taste. This tree attains a height of 60 feet, and the trunk is used for making masts for small vessels. The fruit is about the size of an apple. The Caribbees call the tree *Carapa*, the Caripous *Y-Andiroba*. *C. Guineensis* is a native of Sierra Leone, and the oil of the nut is used for making soap, and for anointing the body by the natives.

C. Moluccensis, the *Xylocarpus Granatum* of Kœnig, is a native of the Moluccas. It has 3 pairs of opposite, ovate, acute leaflets. It is called by the Cingalese *Cadol Guha*, and by the Tamuls *Candalarya*. It has an extremely bitter taste.

(Don's Miller; Lindley, *Natural System.*)

XYLO'COPA (that is, *wood-cutters*), a genus of the subfamily Scopulipides, Latreille, or Anthophorides. The insects composing it are characterised by the very thick coating of hairs upon the hind legs of the females, which constitute pollen-brushes. The basal joint of the posterior tarsi usually exhibits its extremity angularly produced. They have no pollen-plates, and the abdomen is destitute of a ventral pollen-brush. The wings have usually three perfect submarginal cells; the third joint of the antennæ is

ently long and elevate, being very slender at the base;
outh is sometimes considerably developed. Notwith-
ing the shortness of the wings and the comparative
of the body, these insects fly with much strength and
ty, and with a loud buzzing noise.

e sexes differ considerably (in many cases), both in
r and structure; the males in some cases having very
antennæ, while in others the posterior femora are
thickened, and in a few the tarsi of the interme-
legs are furnished with curious brushes of hair. The
is frequently of a pale yellow colour. The females
sually of darker and more obscure colours than the
. They form their nests in crevices of old walls or
nks exposed to the sun. Their cells are composed of
and are very smooth in the inside, and the mouth of
est is closed with the same material.

e wings of the Xylocopa, or (as they are frequently
ed) carpenter-bees, are most frequently (although not
s) black, with a fine purple or violet gloss. The
, &c. of a French species, the *X. violacea*, have
carefully studied. The females of this species appear
spring, and select posts, palings, &c. in which they
ruct burrows from 12 to 15 inches in length, and
r more than half an inch in diameter. The two ex-
ties of the tunnel are covered, leaving a narrow
ge at each end. Upon the completion of these works,
deposit an egg at the bottom, with a due supply of
n-paste; the whole is then covered with a layer of
tinated sawdust, formed during the construction of
urrow. The layer thus formed is made to act in the
e capacity of a roof for the original cell and a floor
other above it. In this manner about 12 cells are
ly formed. When the larvæ are full grown, they
e the pupa state, head downwards, so as to allow the
most and oldest to make its way out of the bottom of
urrow as soon as its wings are sufficiently developed,
hich consequently occurs sooner than in those in the
cells.

males of some of the large species, X. latipes and
others not yet properly described, have the fore-legs
y dilated. An excellent history of the Xylocopa is
by Réaumur (*Mém.*, tom. vi., mém. iv.).

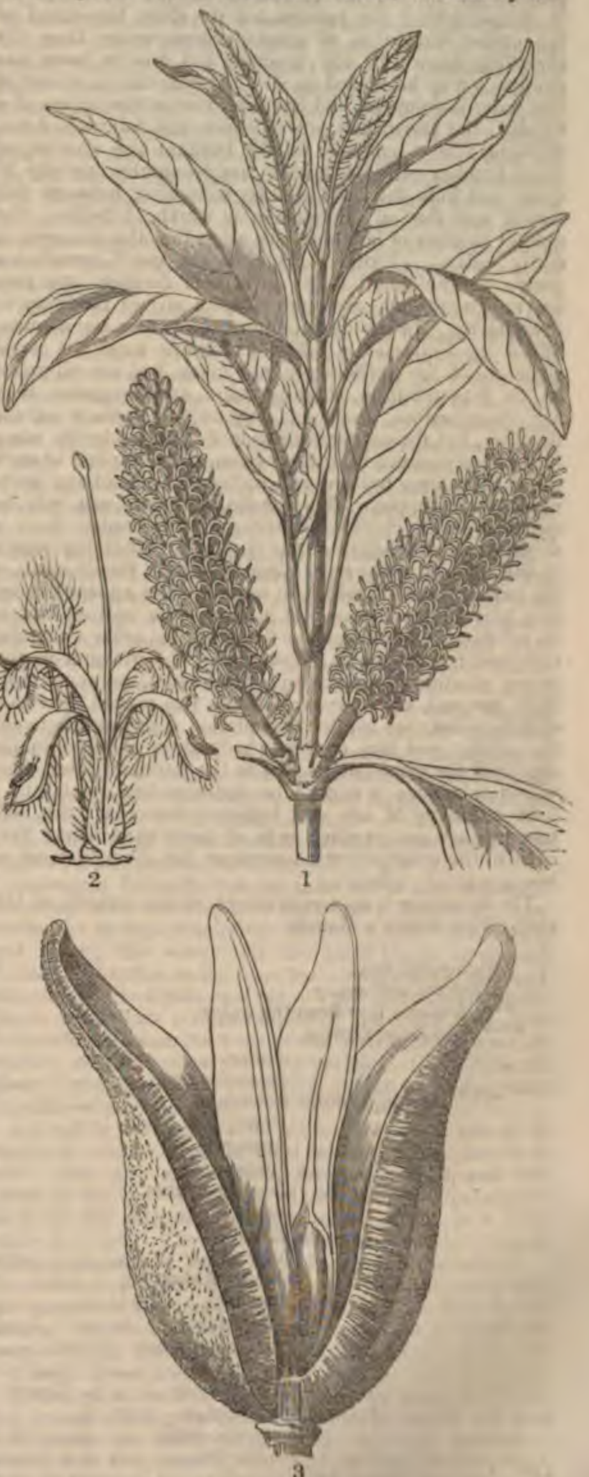
LOÏDINE. This name has been given to paper
has been immersed for a moment in strong nitric
and then washed in distilled water. The paper as-
the feel and toughness of parchment, and is so com-
le as to serve for tinder.

LO'MA, a genus of fungoid plants approaching in
cter to that of Sphæria. From this genus it was
rly distinguished by negative characters, such as the
ia not being external. All the species which were
ed to this genus are placed by Berkeley under the
a Sphæria, Hysterium, Phacidium, &c. The most
on species of this genus are found on the decaying
of trees, especially of the sycamore and maple, the
of which are frequently covered with black spots,
sults of the attacks of fungi formerly referred to this

LOME'LUM (that is, 'wood-apple'), a genus of
belonging to the natural order Proteaceæ. The
aceæ are placed by Lindley in his tubiferous group of
plete Exogens. The type of this order is Protea,
was so named on account of the variable forms of
e prevailing amongst its species. Nor has the subse-
discovery of numerous genera and species rendered
ame at all inappropriate for the whole family. Our
ledge of these plants is entirely of a recent date, only
ecies of the genera Protea and Leucodendron being
n to Linnæus. Jussieu was the first who established
rder, in his 'Genera Plantarum,' and his definition of
lies to nearly all the species and genera since added,
is to Brown that we are more indebted for our
ledge of this order than to any other writer.

order Proteaceæ possess the following characters:
perianth or calyx is 4-leaved, the sepals distinct, or
ing into a tube with a 4-cleft limb; the sepals sub-
eous, coloured, pubescent externally, and valvate in
tion; the stamens definite, opposite the lobes of the
and generally exserted with very short filaments
just below the edges of the sepals; the anthers
e, 2-celled, linear, and dehiscing longitudinally; the
is normally triangular, sometimes elliptic or cunate,
spherical; occasionally there exist four hypogynous
scales or glands, or barren stamens, alternating with the lobes of the calyx and prefiguring a corolla; the germen is free, often stipulate, formed of a single carpel, the style simple and terminal, and the ovules 1, 2, or many; the fruit is variable, either dry or succulent, and either dehiscent or indehiscent, 1, 2, or more seeded; the seeds without albumen, often winged, and furnished with a chalaza; the embryo straight and white, with two or more cotyledons, the plumule scarcely visible, and the radicle inferior and short.

The species are shrubs or small trees, with usually umbellate branches, and hard, dry, divided or undivided, opposite or alternate leaves without stipules, and the cuticle often covered on both sides with stomates.



Xylomelum pyriforme.
1, Branch with leaves and flowers; 2, flower separated; 3, fruit split open.

This order is very easily distinguished by the hard, dry, woody texture of the leaves, by the irregular perianths having a valvate æstivation, the stamens placed on the lobes of the perianth, and by its dehiscent fruit. Another character by which this order is distinguished from those which are allied to it is that the radicle points towards the base of the fruit. In this order there is one herbaceous plant, the *Symphionema paludosum*. Pubescence is very general, and consists either of a short impalpable tomentum or of soft hairs. The existence or absence of this pubescence in the leaves cannot always be relied on in distinguishing the species, but the short tomentum of the under surface is of greater consequence than the spreading hairs. In the bracteæ and flowers more dependence may be placed on it. The external envelope of this order is coloured, and has the external characters of a corolla; but Brown has, with Jussieu and Adanson, denominated this a calyx, 'chiefly because the stamina, of equal number with its laminæ, are constantly opposite to them, and from the close analogy subsisting between this family and that of Thymeleæ, in which, I believe, the greater number of botanists will allow that this envelope is really calyx.' (Brown.) One of the most remarkable points in the calyx is its invariable division into four leaves or segments, although it has a strong tendency to irregularity. In the distinction of the genera the stamens afford good characters. The deviations from the usual structure of the anthers are not many, but are singular. In the genera Simsia, Conospermum, and Synaphea, they are syngenesious, and not only do the anthers adhere together, but the corresponding lobes of these being, when considered separately, entirely open, are so applied to each other as to form but one cell without a trace of any intermediate membrane. This peculiar structure can only be seen before the calyx is expanded. In Synaphea there is a remarkable structure of the stigma, in which that organ or the summit of the style inosculates with the divisions of the barren filament, which in some species appear beyond it in horn-like processes, but in others are entirely lost in its substance. Amongst the fruits of this order a singular circumstance occurs in Persoonia: 'The ovarium in this genus, whether it contain one or two ovula, has never more than one cell, but in several of the two-seeded species a cellular substance is after fecundation interposed between the ovula; and this gradually indurating acquires in the ripe fruit the same consistence as the putamen itself, from whose substance it cannot be distinguished; and thus a fruit originally of one cell becomes bilocular; the cells however are not parallel, as in all those cases where they exist in the unimpregnated ovarium, but diverge more or less upwards.' (Brown.)

The following is an arrangement of the genera of this order, from Brown's Memoir.

* Indehiscent fruit.
** Distinct anthers.
*** Anthers free from the calyx.
**** Diœcious flowers.
Aulax.
Leucodendron.
**** Hermaphrodite flowers.
Pterophila.
Isopogon.
Protea.
Leucospermum.
Serruria.
Mimetes.
Nivenia.
Sorocephalus.
Spatalla.
Adenanthos.
Guevina.
Brabejum.
Cenarrhenes.
Agastachys.
Symphionema.
Bellendena.
*** Anthers adnate with the calyx.
Franklandia.
** Coherent anthers.
Simsia.
nospermum.
hea.

* Dehiscent fruit.
** Unilocular.
*** Ovary 2-seeded.
Anadenia.
Grevillea.
Hakea.
Lambertia.
Xylomelum.
Orites.
Ropala.
*** Ovary 4-seeded.
Knightia.
*** Ovary many-seeded.
Embothrium.
Oreocallis.
Telopæa.
Lomatia.
Stenocarpus.
** Bilocular.
Banksia.
Dryandra.

A great many of these genera are named afte
and patrons of botany.

Nivenia was named in honour of Mr. James
intelligent botanist, to whom we are indebted f
covery of many new species of South Afric
Simsia was named after Dr. John Sims, for m
editor of the 'Botanical Magazine.' *Frankl*
named in honour of Sir Thomas Frankland,
has studied very successfully the submarine flo
country. *Persoonia* was named by Sir J. S. S
C. H. Persoon, who wrote several papers on cr
botany, and published a complete edition of the
Vegetabilium' of Linnæus. *Bellendena*, named
Bellenden Ker, who has published many valua
on botany in the 'Annals of Botany' and the '
Magazine.' *Grevillea* was named by Brown in
the right honourable Charles Francis Greville,
natural history, and formerly a vice-president of
Society. This name will also be always assoc
every botanist with that of Dr. Greville of Edinb
author of the 'Scottish Cryptogamic Flora.' *L*
was named by Smith in honour of A. B. Lambert
botanist and a distinguished patron of the scienc
tany. *Knightia* is a genus which was discovere
Joseph Banks, and, at his suggestion, named by
honour of Thomas Andrew Knight, author of many
papers on various departments of vegetable phy
Banksia was named by the younger Linnæus in h
Sir Joseph Banks. *Dryandra*, a genus closely a
Banksia, was named in honour of Mr. Dryander, a
librarian to Sir Joseph Banks, and a learned and
botanist.

The geographical distribution of these plants is i
ing. They are almost entirely confined to the s
hemisphere, an observation first made by Mr. Dr
Their diffusion is very extensive in this hemisph
merely in latitude and longitude, but also in el
They cover not only the larger southern contine
are also found in New Zealand and New Caledon
they have not hitherto been found in Madagascar
lesser islands of the South Seas. In America th
been found in Terra del Fuego, in Chili, in Peru, a
Guiana. The American species have more affin
those of New Holland than of Africa. It may be
that this family of plants is diffused over Africa,
are abundant at the Cape of Good Hope, and Bru
a genuine species of Protea in Abyssinia. Whe
shores of New Holland have been explored, an ab
of Proteaceous plants have been found, the grea
the order existing here in about the same latitu
Cape of Good Hope. On the south-west coast
Holland this order forms a much more decided f
the vegetation than on the east. From the pa
the mass, the order diminishes in both directions
diminution towards the north appears to be more
the east than on the west coast. The most r
genera are those which are the most widely
Grevillea, Hakea, Banksia, and Persoonia con
largest amount of species, in the order in which
mentioned, and are found spread nearly in the s
portion. Those genera which consist of one or
species, and which exhibit the most remarkable d

rom the structure of the order, are the most local, and are ound either in the principal parallel or in the highest atitude. The range of the species of the order is very mited, and there has been no instance recorded of a pecies of this family common to the eastern and western ores of New Holland. Banksia integrifolia is probably e most widely extended species; but although its range latitude is very considerable, its extension in longitude very small.

'The favourite station,' says Brown, 'of Proteaceæ is in y, stony, exposed places, especially near the shores, here they occur also, though more rarely, in loose sand. arcely any of them require shelter, and none a good soil. few are found in wet bogs or even in shallow pools of esh water; and one, the Embothrium ferrugineum of avanilles, grows, according to him, in salt marshes. Reecting the height to which plants of this order ascend, few facts are already known. The authors of the 'Flora eruviana' mention in general terms several species as ing alpine: and Humboldt, in his valuable chart of quinoctial botany, has given the mean height of Emthrium emarginatum about 9300 feet, assigning it a nge of only 300 feet. 'On the summits of the mountains Van Diemen's Island, in about 43° S. lat., at the comted height of about 4000 feet, I have found species of nbothrium, as well as other genera hitherto observed in other situation. Embothrium however, as it is the st southern genus of any extent, so it is also, as might ve been presumed, the most alpine of the family. Two nera only of this order are found in more than one conent. Rhopala, the most northern genus, which, though iefly occurring in America, is to be met with also in chin-China and in the Malay Archipelago; and Emthrium, the most southern genus of any extent, is comon to New Holland and America.'

None of the plants belonging to the natural order Proceæ are remarkable for their medicinal properties. The it of a species of the genus Guevina is said to be sold in e markets of Chili under the name of *Avellano*. At the pe of Good Hope the plants of this order are most freently made use of as fire-wood. For this purpose the y woody character of their leaves peculiarly fits them. ey are most of them handsome evergreen shrubs, and e much prized by gardeners, and form a part of every od collection of plants. One of the finest collections of se plants in this country is at the Royal Gardens at w, where a great variety of this singular and interesting up of plants may be seen. The genera most commonly nd in this country are Grevillea, Banksia, and Dryandra. e fruit of the *Xylomelum pyriforme*, which the cut acpanying this article represents, is very hard, and is wn in New Holland under the name of Wooden Pear.

Proteaceous plants may be propagated in this country seeds, which must come from their places of growth. e seeds should be sown in pots filled with a sandy loam, d placed in a hot-bed: when the plants come up, they uld have air given them. Some of the species may be pagated by cuttings, which should be planted in the ing or summer, and placed in a hot-bed. These plants uld not have much water, nor be treated very tenderly.

(Brown, 'On the Proteaceæ of Jussieu,' in vol. x. of *inn. Trans.*; Jussieu, art. 'Protées,' in *Dictionnaire des iences Naturelles*; Burnett's *Outlines of Botany*; Lindy, *Natural System*.)

XYLO'PHAGA. [Pholas, p. 108.]

XYLO'PHAGI (that is, *wood-eaters*), a family of insects of the order Coleoptera Tetramera: they are distinguished from the family which usually precedes them (the Weevils) by the absence of a proboscis. The antennæ are thickened towards their extremities, or perfoliated from the base; always short, and usually composed of less than eleven joints. The tarsi, which in some cases appear to be 5-jointed, are usually entire, the penultimate joint being dilated in ome species and cordiform in others. In the latter case he antennæ are always terminated by a club, either solid nd ovoid or trifoliate, and the palpi are short and conical. hese insects generally live in wood, which is perforated nd channelled in various directions by their larvæ. Some pecies are destructive to pines and firs, some to olives, hile others feed on fungi.

This family is divisible into three sections.

Section I.

Those which have the antennæ composed of ten joints at least, either terminated in a thick club, generally solid, or having three elongated plates, or forming a cylindric and perfoliate club from the base; the palpi are conical: the anterior tibiæ in the majority are toothed and armed with a strong hook, and the tarsi generally have the penultimate joint bi-lobed. Some have the palpi very short, and the antennæ terminated in a solid or trilamellar mass, preceded by five joints at the least.

These Xylophagi compose the genus

Scolytus. Geoffroy.

In some the penultimate tarsal joint is bi-lobated, and the antennæ have seven or eight joints preceding the club. *Scolytus* proper (*Eccoptogaster*, Herbst) has the antennæ straight and naked, the club solid and very compressed, its annuli forming concentric constrictions. *S. destructor* (Hylesinus scolytus), the common elm-destroying scolytus, commits great ravages in the neighbourhood of London. This insect does not appear to restrict itself to the elm, but has also been found upon the plum. Dr. Hammerschmidt, who has frequently observed them in the bark of this tree (in the neighbourhood of Vienna), considers however that it differs slightly from the *S. destructor*, and terms it *S. pruni*. Except in being smaller, there appears no other distinction.

The perfect insect or beetle is only two lines long, and the majority of them are still smaller; its breadth is about half a line, and it is firm and resisting to the touch. The head and throat form the principal part of the body; they are black and shining, very finely and thickly dotted, and the former (the head) covered with short yellowish grey hairs. The antennæ are of a light pitch-brown, ending in a knob. The wing-cases are obliquely cut off behind, and at the base near the thorax somewhat hollowed: they are marked in dotted lines, and their colours pitch-brown. The abdomen from the base to the apex appears as if slantingly cut off, and is of a similar colour to the thorax and dotted. The legs are of a reddish brown, and the tibiæ dilated. The larva is of a yellowish white, and has a relatively large yellow shining head and a brown mouth. It is from one to two lines long, and it exhibits a whitish transparent swelling between the head and the first ring on the throat, which appears to be characteristic of the larva of this species. They confine themselves to the inner bark, forming winding and convoluted paths in it. Much important matter upon the habits and economy of the elm-destroying *scolytus* will be found in the communication of Audouin and Spence upon this subject, to the respective Entomological Societies of Paris and London.

Hylesinus, Fabr., has the club of the antennæ solid and annulated, but pointed at the tip.

Hylurgus, Latreille, has the club of the antennæ solid, globular, and annulated. *Hylurgus* (*Hylesinus*) *piniperda*, the *Scotch-Pine Black Beetle*, is somewhat shaggy and black; the wing-cases are pitch-black, irregularly striated and entire at the tips; thorax anteriorly narrowed; antennæ and feet brownish red. The larva is thick, cylindrical, milk-white on the middle of the body; the head dull yellow, as also the front of the body and the anal extremity, only somewhat of a lighter tint. The abode and place of propagation of the perfect insect are in the pith of the side-twigs of the pine.

According to Bechstein, it bores through shoots of the spruce-fir when there are none of the Scotch pine to be had. The eggs are laid under the bark of sickly and felled pines, in the bark of which the maggot resides, while it feeds on the stagnated fermented juice which is found under the bark. The larvæ feed on the trunks of dead or dying trees, and the beetle only places her brood on healthy trees when compelled by necessity to do so. In one respect the ravages of this insect do less injury than those of some others, inasmuch as it generally only attacks the side-twigs, leaving the leading shoot untouched.

Camptocerus, Dej. [Camptocerus.]

Phloiotubus, Latr., differs from all the rest in the club of the antennæ being formed of three long filaments.

In others the tarsal joints, apparently five in number, are entire, and the club of the antennæ commences at the sixth or seventh joint.

Tomicus, Latr., has no notches at the sides of the thorax, and the tibia are not striated.

Platypus, Herbst, has the sides of the thorax notched to receive the femora, and the tibiæ are transversely striated.

Fossil specimens of this genus have been found embedded in amber.

The others have the palpi large, very visible, and of unequal length: body depressed and narrowed anteriorly: the antennæ either 2-jointed (the second joint being very large and irregularly shaped) or 10-jointed and entirely perfoliated; tarsi entire.

These insects are of great rarity and very singular appearance, and are also foreign to Europe. They compose the genus

Paussus. Linn.

Paussus proper has only two joints to the antennæ, the second very large and compressed.

Paussus sphærocerus. Professor Afzelius observed a dim phosphoric light to be emitted from the singular hollow antennæ of this insect. (*Linn. Trans.*, iv. 281.)

Hylotorus, Dalm., composed of a single species, apparently with ocelli, and with the antennæ scarcely longer than the head, and 2-jointed.

Cerapterus, Swed., has the antennæ 10-jointed and perfoliated. (See Westwood's Monograph upon the genus *Paussus*, in *Trans. Linn. Soc.*)

Section II.

Those which have only 10-jointed antennæ, and the maxillary palpi do not taper to a point, but are either of equal thickness throughout or dilated at the extremity. The joints of the tarsi always entire.

They are divisible into two principal genera, according to the mode in which the antennæ terminate. The three terminal joints form a perfoliate club in the first, or

Bostrichus. Geoffr.

Bostrichus proper has the body more or less cylindrical; the head rounded, nearly globular, and capable of being received into the thorax as far as the eyes: the thorax is never less convex before, and forms a kind of hood. The two first joints of the tarsi, as well as the last, are elongated. The species is found in old wood and timber.

B. dispar (*Apate dispar*, Fabr.), *Xyloterus dispar*, Erichson. This *Apple-Bark Beetle* is very common in Austria, but rare in this country. It is termed *dispar* because the male is not only about half the size of, but differently formed from, the female, bearing more resemblance to *Anisoplia horticola* than to the bark-beetles generally. The head and thorax are black; the extremity of the palpi and antennæ reddish; the wing-cases long, blackish, and somewhat hairy; the feet dilated, and of a reddish yellow; the thighs black. The female somewhat resembles the *Long-haired Bark-Beetle, Bostrichus villosus*, but the wing-cases are not deeply furrowed, and the spots not so deep as they are in that species. The male (as we have previously observed) is smaller than the female, and it has chestnut-brown wing-cases and reddish thighs. These insects restrict their attacks almost entirely to the apple-tree. They make no distinction between the age or healthy state of the tree, whether it is young or old, or whether it may shoot out much or little; all that they require is that it should not be of a less thickness than about half an inch in diameter. Having found a suitable place, the female bores a completely round but somewhat oblique hole, penetrating nearly to the centre of the tree: she first goes upwards to the side, and then downwards. Upon coming near the bark, she turns back, and goes to the other side or downwards, forming a new path. These paths, leading upwards and downwards, seldom exceed one inch and a half in length. The minute particles of wood, or worm-meal, which are ejected, indicate the presence of the insect. In the case of the pine-beetle, *Bostrichus typographus* and *piniperda*, it is stated by Bechstein to be ejected by the larvæ, but in this case it is thrown out by the beetle itself. We give the following extract from Köllar's work 'On Insects injurious to Fruit-Trees,' &c., because the facts are perfectly new, and, if correct, quite at variance with the recorded habits of the family:—'At the end of the entrance the female makes a somewhat wide apartment, and lays her eggs in it in a heap: they are of a snow-white, longish, and of a somewhat posteriorly pointed form, from seven to ten in number, and sometimes fewer. The path however is previously pretty thickly covered with a whitish substance, which [illegible] crustation of salt. I consider this [illegible] on which the hatched larvæ fee[illegible] their principal nourishment, as [illegible] ber in which the eggs were laid no full-grown larvæ in the passages and chambe this substance was not consumed. As has b it is whitish, easily rubbed with the finger to powder, melts on the tongue, and is without any taste. I am of opinion that the female forms thi from the sap of the tree, to which she adds juice.'

Bostrichus typographicus, the *Typograp Beetle*, is perhaps the most destructive of the It particularly attacks the silver-firs (*Picea* but when that tree is not abundant, it will atta other species of pines and firs. The perfect be two to two and a half lines long, and from one a quarter broad, and hairy. As long as it rem the bark, it is of rusty yellow; but on exposur changes to a brownish black colour.

The injury this insect does is chiefly effe larvæ, which destroy the sap-wood; and thus, numerous, can kill a healthy fir in the cour weeks.

This beetle committed immense devastation i in the north of Germany about the close of th tury.

Bostrichus orthographus, Duftsch., or the *Bark Beetle*; *B. laricis*, Fabr., or the *Larch-B* *B. Pinastri*, Bechst., or *Red Bark-Beetle*, requ ticular notice.

Psoa, Fabr., has the body narrower than Bost the thorax flat.

Cis, Latr., has the body oval, depressed, or elevated; last tarsal joint much longer than t head of the males frequently horned. Many min are found on fungi.

Nemosoma, Desmar., has the body long, linea mandibles robust and exserted. *N. elongata* i and rare British species, sometimes found under of old palings.

The second genus is distinguished from the having the club or tenth joint of the antennæ button-shaped; the body is elongated, with the the head narrowed into an obtuse snout or mu palpi are very small, and, as well as the mandi prominent.

This genus is termed

MONOTOMA.

Monotoma proper, Herbst, has the head as larg thorax, and separated from it by a narrower part.

Cerylon, Latr., has the front of the head produ an obtuse triangle, the first joint of the antenn longer than the second; the body nearly oval or p piped, and the elytra not truncate behind.

The genera *Synchita*, Helw., *Rhyzophagus*, He are included in *Monotoma*, but are not deserving especial remarks.

Section III.

The Xylophagi of this division have eleven disti in the antennæ; the palpi filiform, or thicken tips in some, or slender at the tips in others; joints entire. Those in which the club of the consists only of two joints constitute the genus

Lyctus.

Lyctus proper, Fabr., has the mandibles and b of the antennæ exposed. *Diodesma*, Megerle, an Herbst, are included in the genus *Lyctus*.

In some the mandibles are concealed or scarce These are the genus

Mycetophagus.

Mycetophagus proper has the antennæ at le as the thorax; body oval; thorax transverse; club of the antennæ commencing at the sixth joint.

Silvanus has the body nearly linear, of grea than breadth, and as broad as the base of the ely nearly filiform. *S. dentatus*, a small flat insect, found floating in tea and coffee, being introduce sugar. In others the mandibles are entirely ex large; the body often narrowed and depresse insects constitute the genus

Trogosita. Olivier.

Trogosita proper has the antennæ shorter [illegible] the mandibles shorter than the head, an [illegible] almost square, and not prolonged be [illegible] the maxillæ have but a single lobe.

Trogosita mauritanica, Linn., a flat beetle, four lines ong, of a pitch-black colour, found in nuts, bread, and e bark of trees: its larva is known in Provence under e name of *Cadelle*, and is said to commit great devasta-on on grain.

Prostomis, Latr. (*Megagnalus*, Meg.), and *Passandia*, alm., belong to this genus.

The reader who has carefully followed us over the three ctions of the *Xylophagi* will readily perceive that La-eille makes use of this group for the purpose of effecting transition between the *Curcilionidæ* and *Cerambycidæ*, ommencing with those which have the club of the an-nnæ solid, and proceeding through those families in hich the club is less compactly constructed, as far as the rogositæ. In this single character the transition is cer-inly obvious enough; but in other and more important ints, as for instance in the structure of the imago, as ell as in that of the larva, it cannot be maintained; and estwood is probably right in transferring many of the ylophagi, especially the Trogositanæ, to the *Necrophaga*.

XYLO'PHILI (that is, *wood-lovers*), a section of the enus *Scarabæus*, Linn., comprising two divisions, corre-onding with the families *Dynastidæ* and *Rutelidæ* of acLeay.

The *Dynastidæ* (comprising the *Geotrupes* of Fabri-us) constitute an extensive series of gigantic insects, the ales of which are pre-eminently distinguished by various ingular protuberances, horns, or tubercles arising from he head and thorax, and often from both those parts ccasionally giving the insect a very peculiar appear-nce), and of which the females are destitute. The clypeus small, triangular, pointed in front, or terminated by two all obtuse teeth; the labrum is a broad membranous ate, entirely concealed by the clypeus; the jaws are ry robust and horny, and furnished with one or two use teeth. The maxillæ are either terminated by a iaceous ciliated lobe, or by an elongated corneous piece, ing one or several acute teeth on its inside; the men- is large, concealing the labrum, and of an ovoid or ngular form, truncated in front; the prosternum is not duced behind into a lobe; the tarsal claws are of an al size, and the scutellum is distinct; the elytra do not irely cover the extremity of the abdomen; the antennæ 10-jointed, with the club 3-jointed, the central lamellæ being enclosed within the two external ones.

The colour of these insects is usually of a dark rich wn or chestnut colour. They reside either in rich etable mould or in the putrid detritus arising from the omposition of trees.

Oryctes, Illiger, is a very numerous genus, having the s all nearly of the same length, with the four hind tibiæ ck and crooked. As a type of this genus, we may take common continental species, *O. nasicornis*, which is quently found in the larva state in tan-pits. The eggs e oblong, about the size of a grain of hempseed, and of yellow colour: the larva continues in that state four or e years, and then encloses itself in an oval and very ooth cocoon: the pupa lies upon its back, and the ago remains in its cell for about a month after it has tained the perfect state. The insect is about one inch nd a half long, and the male is distinguished by having a urved horn upon the head.

Some of the *Dynastidæ* acquire an immense size. The *Scarabæus hercules*, Linn., an inhabitant of South Ame-ica, is five inches long.

The *Dynastidæ* chiefly occur in the tropical zone, there eing only six or eight species found in Europe.

According to MacLeay, the proportion of tropical to ex-a-tropical species may be estimated at about eight to one.

The *Rutelidæ* consist entirely of exotic and, for the ost part, brilliantly coloured insects, of a moderate e, having the body of an ovate, sub-convex, or depressed rm, and shorter and more rounded than in the previous mily, from which they also differ in the absence of the culiar horns or prominences which are present on the ads of the male Dynastidæ. The antennæ are 10-jointed, e club 3-jointed; the labrum is exserted with the ante-r margin coriaceous; the mandibles are short and rny, and more or less exserted with a notch on the outer argin near the tip; the maxillæ are also horny and trun-nd with four or six strong teeth at the tip, with the sometimes membranous; the labrum is concealed mentum; the elytra do not conceal the extremity of the abdomen; the thorax is transverse-quadrate; the scutellum large and distinct; the mesosternum is anteriorly produced between the base of the middle legs; the legs are robust, with the posterior femora sometimes greatly thickened; the claws of the tarsi are generally unequal in size, and occasionally divided; the clypeus commonly exhibits a transverse section, dividing as it were into two parts before the eyes. (Westwood.) The head and thorax are identical in both sexes.

With a few exceptions, the Rutelidæ are confined to the equatorial regions of America.

Hexodon, Oliv., composed of two African species, *Cyclocephala*, Latr. (*Chalepas*, MacLeay), *Rutela*, Latr., *Pelidnota*, MacLeay (*Ophognathus*, King), *Macraspis*, MacLeay, *Chasmodia*, MacLeay, *Ometis*, Latr., &c., belong to this family.

Two of the most remarkable species are the *Chrysophora chrysochlora* [CHRYSOPHORA] and the *Scarabæus Macropus*, which was depicted long since by Francillon under the name of the Kangaroo Beetle.

XYLOPHYLLA, a genus of plants belonging to the natural order Euphorbiaceæ. The species of this genus are shrubs, with a hard and rigid foliage. The flowers are monœcious. The male flowers have a calyx cut into six segments, three of which are interior; there are no petals; and a nectary composed of six globular glands. The calyx and nectary of the female flowers are the same as the male; the styles are three; the stigma is 3-cleft; the fruit is a 3-celled capsule with six valves, and two seeds in each cell.

This genus closely resembles Phyllanthus. Most of the species are natives of the West Indies, where they are known by the name of sea-side laurels and love-flowers. They vary principally in the form and character of their leaves, and their specific distinctions are chiefly founded on this character. These plants have many of them been cultivated in the stove in European collections. They may be propagated by seeds or by cuttings, and always require the employment of the hot-bed. They require the constant protection of the stove in winter, but in the hot summer months they may be exposed to the open air if taken in on cold nights.

XYLO'PIA, a genus of plants belonging to the natural order Anonaceæ. It has a 3-5-lobed calyx, with ovate coriaceous acutish segments; 6 petals, of which the 3 outer ones are largest; numerous stamens inserted into a globose receptacle; from 2 to 15 carpels on short stipes, flattened, 1-celled, 1-2-seeded, sometimes dehiscent, sometimes baccate; the seeds obovate, shining, furnished with an aril. About twelve species of this genus have been described, all of them natives of South America. They are trees or shrubs, with oblong or lanceolate leaves, and axillary, bracteate, 1- or many-flowered peduncles. The wood of all is bitter, hence they are called *Bitter-woods*.

X. frutescens, Shrubby Bitter-wood, is a native of Brazil and Guiana. It is a shrub about 6 feet in height, and has oblong-lanceolate acuminate leaves, with the under surface silky, the peduncles very short, and the carpels smooth. The bark of this plant is manufactured into cordage. The leaves and wood are aromatic. The seeds also contain an acid aromatic oil, and are used in Guiana by the negroes as a substitute for pepper.

X. glabra, Smooth-leaved Bitter-wood, is a native of the islands of Barbadoes and Jamaica. It has oblong-ovate smooth leaves, with 1-flowered peduncles, solitary or in pairs, and smooth carpels. This plant is a tree, and attains a height of 40 feet. The wood, bark, and berries have an aromatic bitter taste resembling that of the orange seed. Pigeons feed on the berries, and the flesh of these birds is improved in flavour during the season they eat this fruit. When fresh gathered from the tree, the berries have an agreeable flavour, and may be eaten with impunity. The wood readily communicates its bitter flavour. Sugar sent to this country in hogsheads made of it could not be sold on account of the bitter flavour it had acquired. Articles of furniture made of it are proof against the attacks of insects. Persons who work the wood complain of the bitter taste which it produces in their mouths from the dust.

X. sericea, Silky Bitter-wood, is a native of Brazil, in the woods of Rio Janeiro. It is a tree about 20 feet high; the branches are clothed with a rufous down; the leaves are lanceolate-oblong, with long points, smooth above silky beneath; the peduncles short, 3-flowered, the petals erect, outer ones oblong-linear, blunt, inner ones triquetrous; the berries few, almost dry, smooth, and 1-valved. This tree is called in Brazil *Pdo d. Embeira* and *Pindaïba.* The bark is fibrous and tough, and is used for making cordage and cables. The fruit is highly aromatic, with the flavour of pepper, for which it might be advantageously substituted. Most of the other species possess the toughness of the bark and the aromatic properties of the fruit.

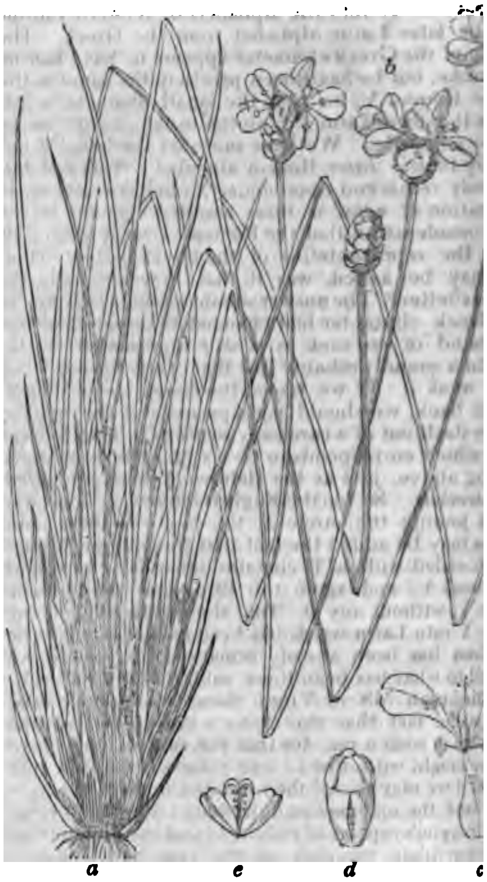
In cultivation in this country all the species of Xylòpia require a stove heat. The best soil for them is a sandy loam, or a mixture of loam and peat. They may be propagated by cuttings or seeds; the former will root readily in sand under a hand-glass; the latter must be procured from their native countries, and sown as soon as possible, as they soon lose their vegetative property.

(Don's Miller; Burnett's *Outlines;* Lindley's *Natural System.*)

XYRICHTHYS, a genus of fishes allied to the *Labrus*, or Wrasse, which the species resemble in general form, but are much compressed and have the head suddenly truncate in front. Their bodies are covered by large scales, but their hands are usually naked. A species which is esteemed as an article of food inhabits the Mediterranean.

XYRIDA'CEÆ, a natural order of plants belonging to Lindley's glumose group of Endogens. The species are herbaceous plants with fibrous roots. The leaves are radical, sword-shaped, scarious, dilated and equitant at the base. The flowers are arranged in terminal naked imbricated heads. The calyx is glumaceous, 3-leaved; the corolla petaloid, coloured with three petals; the stamens 6; 3 fertile, inserted upon the claws of the petals; 3 sterile, alternate with the petals; the anthers 2-celled, and turned outwards; the ovary single, the style bifid; the stigmas multifid or undivided; the capsule 1-celled, 3-valved, many-seeded, with parietal placentæ; the seed with the embryo on the outside of the albumen, and at the end most remote from the hilum.

This order is united with Restiaceæ by Brown and other botanists, but separated by Agardh and Desvaux, who are followed by Lindley in his 'Natural System.' In the character of the seed it resembles Restiaceæ, but its flowers are much more highly developed. As at present constituted this order comprises only the genera Xyris and Abolboda. The species of these genera are found generally in the hotter parts of the world, chiefly in the tropics of America, Asia, and Africa. Some of the
Xyris are found in the southern states of North
Of their properties very little is known. X. *indi*
by Agardh to be used as a remedy in itch and le



Xyris operculata.

a, An entire plant; *b*, heads of flowers; *c*, flower separated: *d*, fr
lower part of the pericarp.

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Y.

as found its way into the alphabets of Western Europe ugh the later Latin alphabet from the Greek. The st form of the Greek character appears to have had no ical stroke, but to have been precisely the same as the lish or Roman V, so that the small character *v* dif- d from the other form only in the usual substitution of rve for an angle. We have said that the letter Y be- ged only to the *later* Roman alphabet. This fact has already remarked upon under X; and an argument onfirmation of what is there asserted may be drawn the consideration that the Romans already possessed heir V the representative of the Greek letter. How , it may be asked, was it that they subsequently pted this letter? The answer should probably be this— the Greek character had changed its power from the inal sound of *oo*, such as is still represented by the an *u*, to a sound probably like that of the French *u*, or to a weak *i*. If we traced the Greek letter Y or V farther back, we should perhaps arrive at the opinion it grew itself out of a carelessly written O. The Hebrew racter which corresponds to O, viz. ע, already exhibits opening above, just as the Hebrew ט does, compared h the Greek Θ. So too the English often write a capital without joining the circle at the top. To these con- erations may be added the fact that the Hebrew alpha- , which ended with a T, contains no other equivalent the Greek Υ: and again the Etruscans had but one acter, V, without any O. That the introduction of the acter Y into Latin words has been carried beyond the er limit has been already remarked [X]; and we d add to what has been there said, that in the well- n Medicean MS. of Virgil there is something sus- us in the fact that this letter always overtops the letters in such a manner that the vertical shaft is of same height with them; and thus it is possible that orns, if we may so call them, were attached by a sub- nt hand, the manuscript until then having merely an See Foggini's reprint of that MS., and the second line e copperplate facsimile of the same (amadryades) urmann's Virgil, vol. i., facing p. xxxvi. of the ce.)

the English language there is a great tendency to use letter at the end of words. This has probably arisen our habit of giving a tail to the last unit of the an numerals, preferring *ij*, *iij*, *vj*, *vij*, &c.; so that to se the eye and give a sort of finish to a word, *say*, *boy*, were preferred to *sai*, *boi*, *thei*. Before we leave the of the letter, it may be observed that in y^e, y^t, for *that*, the *y* has been by an easy error substituted he Anglo-Saxon þ, which had the power of *th*.

e sound of *y*, so familiar to the English at the begin- of words, as in *yes*, *young*, *yoke*, was represented in by a mere *i*, which however, when so used, received the grammarians the distinctive name of *i consonans*. modern editors have for the most part substituted for . Thus, *iugum*, or rather IVGVM, which is now written *m*, commenced with a sound which is commonly held ave been the same with our initial *y* in *yoke*. The in- on of the sound of a *y* before vowels is very charac- tic of the Russian language, the alphabet of which has ess than four characters which denote such a sound.

English too have a habit of expressing the sound, gh they do not write the letter, whenever a long *u* ns a word, as *union*, *unity*, *useful*; so that those who e *an useful contrivance* insert a letter at the end of the word which no one would pronounce. In Anglo-Saxon sound of a *y* was commonly represented by an *e* before o, and by an *i* before *e* or *u*, in which cases the allied uages of Iceland, Denmark, and Sweden for the most employ a *j*. Thus the Anglo-Saxon writes *eorl*, *Eota-*, *eow*, *Eadward*, *eahta*, *beód-an*, for *earl*, *Jutland*, *you*, *ard*, *eight*, *to bid*. On the other hand, *iett*, *iúgoth*, re- ent *yet*, *youth*. In several of these words the initial *y* ger appears in modern English. But it would be o infer that the change always takes place in that . for one who observes children in their early o speak, will find that many are apt to prefix either a *w* or a *y* to all words beginning with a vowel. Thus we have heard a child pronounce *Uncle*, *Agnes*, *apple*—*Yung*, *Yang*, *wap*; so that the prefixing a *y* where there was none, is just as possible as to drop a previously existing *y*. The sound of *y* again is heard where the French write *ll* or *gn*, as in *vaillant*, *agneau*; in the Spanish *ll* or *ñ*, as in *Mallorca*, *Coruña*; in the Portuguese *lh* or *nh*, as in *filho*, *Minho*; and in the Italian *gl* or *gn*, as in *figlio*, *agnello*. For the interchange of *y* with *g*, see G; for the use of *z* with the sound of *y*, see Z; lastly, for the connection between the sounds of *j* and *y*, see J and Z.

YAKUTES. [SIBERIA.]

YAKUTSK. [SIBERIA.]

YALDEN, THOMAS, was, according to Jacob, in his 'Lives of the Poets,' the 'Biographia Britannica,' and Dr. Johnson, in his 'Lives of the Poets,' the youngest of the six sons of Mr. John Yalden, of Sussex, and was born in the city of Exeter, in 1671. Anthony Wood however, who calls him not Yalden, but Youlding, gives a very different account: in his 'Athenæ Oxonienses' (iv. 601), that writer says, 'Thomas Youlding, a younger son of John Youlding, sometime a page of the presence and groom of the chamber to Prince Charles, afterwards a sufferer for his cause, and an exciseman in Oxon after the restoration of King Charles II., was born in the parish of St. John Baptist, in Oxon, on the 2nd day of January, 1669 (in which parish I myself received also my first breath).' This account, though it has not been generally adopted, appears to derive some confirmation from the existence in the antechapel of Merton College of an epitaph recording the interment there of 'John Youlding, gentleman, who was page,' &c., as in Wood: he is stated to have died 25th July, 1670, in his 59th year. Thomas Yalden, or Youlding, was admitted of Magdalen College, Oxford, in 1690; and among his contemporaries there were Sacheverell and Addison, with both of whom he continued to live in friendship ever afterwards. Yalden made his first public appearance as a poet in an 'Ode to St. Cecilia's Day,' which was published, set to music by Purcell, in 1693. This was followed, in 1695, by another performance, entitled 'On the Conquest of Namur, a Pindaric Ode inscribed to his most sacred and victorious Majesty.' He had taken his degree of M.A. with great applause in 1694, and having then entered into holy orders, he succeeded Atterbury, in 1698, as lecturer at Bridewell Hospital. In 1700 he published a poem entitled 'The Temple of Fame,' on the death of the duke of Gloucester, and was the same year made fellow of his college. Soon after this he was presented by the college to a living in Warwickshire, which admitted of being held along with his fellowship, and he was also elected moral philosophy reader, 'an office,' says the 'Biographia Britannica,' 'for life, endowed with a handsome stipend and peculiar privileges.' On the accession of Queen Anne, he wrote another poem, in celebration of that event; and from this time he is said to have unreservedly sided with the high church party. In 1706 he was taken into the family of the duke of Beaufort; and the following year he took his degree of D.D. Some time after this he was presented to the adjoining rectories of Chalton and Cleanville in Hertfordshire; and he is said to have also enjoyed the sinecure prebends of Deans, Harris, and Pendles, in Devonshire. Upon the discovery of what is called Bishop Atterbury's plot, in 1722, Yalden was taken up, and his papers were seized; but it soon appeared that although he was intimate with Kelly, the bishop's secretary, and in the habit of corresponding with him, the treason, if it existed, was certainly in no part of his concoction or privity. All that is further related of him is, that he died on the 16th of July, 1736, having to the end of his life, as Dr. Johnson expresses it, 'retained the friendship and frequented the conversation of a very numerous and splendid set of acquaintance.' Besides the two early poems that have been mentioned, he published, in 1702, a collection of fables in verse, under the title of 'Æsop at Court,' which is reprinted in the fourth volume of Nichols' Collection, pp. 198-226; 'An Essay on the Character of Sir Willoughby Ashton, a poem,' fol., 1704; 'On the Mines of

Carbery Price, a poem;' 'A Hymn to Darkness,' in imitation or emulation of Cowley, which Johnson considers to be his best performance, and to be 'imagined with great vigour, and expressed with great propriety;' 'A Hymn to Light,' which, in the estimation of the same authority, 'is not equal to the other;' a translation of the second book of Ovid's 'Art of Love;' and many other translations and short original prices. Many of Yalden's productions in verse are printed in the third and fourth volumes of Dryden's (or Tonson's) collection of 'Miscellany Poems;' a number of them are also given in the more recent collections of the English Poets, by Johnson and A. Chalmers; but some appear to be lost, or at least they eluded the research of Mr. Nichols (see his Collection, iii. 167, and iv. 198). Yalden, who had considerable humour, is the author of a paper in prose, entitled 'Squire Bickerstaff Detected, or the Astrological Impostor Convicted;' it is a pretended answer to Swift's attacks on Partridge, the astrologer, which he drew up on Partridge's application, and which that person is said to have printed and published without any perception of the joke. It is printed in most of the editions of Swift's Works.

YALLOFFS. [Jalloffs.]

YAM. [Dioscorea.]

YA'MUNA, or JUMNA. [Hindustan, p. 215.]

YANG-TSE-KIANG is the name by which one of the largest rivers of Asia is generally known in Europe. It drains the north-eastern districts of Tibet and the central provinces of China Proper. The source of the river is in the interior of Asia, about 1850 miles from its mouth in a straight line; but as the river frequently changes its direction and makes very large bends, its whole course is computed to amount to 2980 miles, and it probably exceeds 3000 miles. In length it may therefore be compared with the Amazonas (3300 miles) and the Mississippi (3200 miles). The country watered by the Yang-tse-kiang and its numerous tributaries is estimated by Ritter to have an area of 740,000 square miles, and is equal to the western countries of continental Europe, as far east as a line drawn from the most northern corner of the Adriatic northward to the mouth of the Oder in the Baltic.

Upper Course.—The head-waters of this river have never been visited by Europeans, and seem not to have been known in China until the emperor Khanghi sent persons to ascertain them, and wrote a short memoir on them, which has been translated by Klaproth, in his 'Mémoires relatives à l'Asie.' According to the statements in that memoir, the Yang-tse-kiang rises between 89° and 90° E. long. and between 34° and 35° N. lat., in the Bayan Khara mountains, one of the principal ranges of the Kuenluen system in three branches, all of which bear the Mongol name of Oolan muren; but to the most northern the name of Nam-tsi-tu is prefixed; that in the middle is distinguished as Toktonai, and the southern river is called Kat-si. These three rivers run from west to east. The Kat-si-oolan-muren is joined from the south by a small river called Murus-ussu, which comes from the south-east. The united stream preserves the name of the last-mentioned river, which indeed seems to be the denomination by which the Yang-tse-kiang, in its upper course, is known. The Murus-ussu runs northward, and is joined by the Toktonai-oolan-muren from the west; it then turns eastward and receives the waters of the Nam-tsi-tu-Oulan-muren, which enters it from the north. We know nothing respecting the nature of the country watered by these rivers. According to the Chinese maps, the Murus-ussu, after being joined by the Nam-tsi-tu-Oolan-muren, turns southward, being opposed in its eastern course by a branch of the Bayan Khara mountains, but soon afterwards it enters by a south-eastern course that extensive mountain-region which divides the table-lands of Central Asia from the lowlands of China. As the ranges composing this mountain-region run mostly from north to south, the river soon takes a southern direction, and flows in a narrow valley, which is enclosed by mountains whose summits rise far above the snow-line. In these parts the river is called Pho-laï-tshu. In this southern course the river passes the town of Batang (29° N. lat.), which is built in an expanse of the valley and surrounded by a plain
able extent, watered by numerous rivul
by a mild climate and a clear sky
especially apricots, grapes, nuts, and
Where the Pho-laï-tshu runs south

dary-line between Tibet on the west and Proper China on the east. Below Batang the river continues for some distance its southern course in the longitudinal valley, but after passing 28° N. lat. it begins to break through the several ranges of snow-covered mountains which oppose its eastern course. Judging from the course of the river as laid down in the Chinese maps, where it changes its direction several times, the number of ranges which it has to break through must at least be the same. The valley which its waters have scooped out across these chains is rather wide in the western ranges, so as to extend in some places into moderate plains; but in the eastern ranges it is a mere chasm, which is entirely filled up by the great volume of water brought down by the river. In these parts the river is called Kin-cha-kiang, or the river of the golden sand, because small particles of gold are found in it. In its course through the mountain-region the Kin-cha-kiang is joined by several tributaries, among which the largest is the Ya-long-kiang, which rises in the Bayan Khara Mountains, south of the sources of the Yellow River, or Hoang-ho, and runs parallel to the course of the principal river, preserving a distance of about 130 or 140 miles from its banks. The course of this tributary of the Kin-cha-kiang exceeds 600 miles, and the whole of it lies in a narrow longitudinal valley between snow-covered ranges. Near 102° E. long. the Kin-cha-kiang attains its most southern point (26° N. lat.), and near 103° E. long. it turns northward. In the vicinity of the town of Tung-tshuan-foo (26° 30′ N. lat.) it enters a more open and wider valley, and here it begins its middle course. The upper course of the river is about 1280 miles long. It runs about [illegible] miles eastward as far as Murus-ussu, about the same distance southward as Pho-laï-tshu, and about 300 miles eastward as Kin-cha-kiang. It does not appear that the river is navigated in any part of its upper course, and navigation is certainly not possible where it breaks through the mountain-ranges and forms numerous waterfalls, rapids, eddies, and whirls. But great quantities of timber are floated down. The immense rafts of timber which are found in the middle parts of the course floating down to the provinces near the Pacific prove that this supply must be derived from an immense country covered with forests, and such a country is only found on the upper part of its course.

Middle Course.—The middle course of the river is through a hilly country, and extends from Tung-tshuan-foo to King-tsheou-foo, at which place it enters the great Chinese plain. From Tung-tshuan-foo the Kin-cha-kiang flows northward about 180 miles, and then turns to the east, in which direction it runs about 100 miles, when it is joined from the north by the Min-kiang or Ta-kiang, and from this place the name of Kin-cha-kiang is exchanged for that of Kiang (the river) or Ta-kiang (the great river). The Kiang runs in a north-eastern direction about 360 miles, when it passes north of 31° N. lat., where its course is directed to the east by some offsets of the Tapa-ling range, and, flowing in that direction, it reaches King-tsheou-foo, after a course of about 240 miles. Thus the middle course of the river amounts to 880 miles. Though the Kin-cha-kiang below Tung-tshuan-foo runs in a wide valley, it is still within the mountain-region, and its course is interrupted by cataracts. We do not know if it is navigated in this region by barges; but it is certain that it is ascended by large barges to the mouth of the Ya-min-kiang, or Ta-kiang. This tributary, though not one of the largest, is one of the most remarkable, because it is regarded in China as the principal branch of the great river, and on that account the name is continued to it. This circumstance renders it probable that it is the most western of the affluents of the Kiang which is navigable. It rises in the mountains of Sifan, a branch of the Bayan Khara range, and traverses in its southern course a rugged mountain-tract, until it enters the plain of Tching-tu, the capital of Te-tchu-an, which is surrounded by mountains, and which the river waters and fertilizes, dividing into a great number of arms. These arms some distance south of the city, and flow through pression of the mountains to Kia-ting-foo, where the
through a plain to its junction with the Kiang.
This river is navigable to Tching-
it was ascended by the Portugues
a of venteen

the rafts of timber which he daily met with on
They were only ten feet wide, and of different
e longest about a mile and a half in length: but
ber was so great, that if all of them had been
er, they would have covered a space of several
ey. At some places they were fastened to the
he river, and it took him more than an hour, or
a day to pass them. They rose about four or
bove the surface of the water, and consisted of
nds of wood. On the rafts were placed other
mong which he mentioned drugs, parrots, and
but it appears that rhubarb, musk, and chowry-
ore important articles. Some of the timber was
Peking. The hilly country, through which this
e Great River lies, improves lower down. The
ar the mouth of the Ta-kiang is mostly covered
hills, which at some distance rise into moun-
h are not capable of cultivation, but are covered
sive forests, consisting of different kinds of pine,
and juniper, and a part is overgrown with bam-
e remainder is well cultivated, and the fields are
d with large plantations of fruit-trees, among
nges, lemons, and citrons are mentioned. Such
try near Siu-tcheou, a large commercial town at
of the Lesser Ta-kiang. At the mouth of the
iang, which joins the river farther down, and
ich agricultural valley containing several large
the town of Tshung-king-foo, one of the most
on the banks of the river. In these parts the
do not rise to such an elevation as farther up,
eater portion of the country is under cultivation,
rice, cotton, sugar-cane, silk, and fruits of every
undance. Cultivation increases lower down the
e still more important town of Kuei-sheou-foo,
ds on the northern banks of the Ta-kiang, in one
est parts of China, where hardly a spot is to be
h is not applied to some useful purpose, with
tion of the crest of the Tapa-ling range, which
5 or 40 miles distant from the town, and inha-
some mountaineers. But this range supplies
tities of salt, which is sent from Kuei-sheou-foo
er country.

cer Course of the river is 820 miles. From
u-foo the river runs about 100 miles south-east
et of Lake Tung-ting, from that place north-east
th of the Han-kiang about 160 miles, then again
about the same distance to Kieu-kiang, which
channel that unites Lake Poyang with the Ta-
this place the name of the Ta-kiang is changed
f Yang-tse-kiang, which it preserves to its em-
From Kieu-kiang the river runs north-east
miles to Nan-king, the antient capital of the
From Nan-king it flows mostly eastward, and
50 miles it reaches the Great Canal, and flowing
more, it falls into the Pacific. In all this extent
oes not offer any impediment to navigation: its
as gentle as the large volume of water permits.
varies from a mile to three miles. The number
s small, and most of them are rocky. The tides
tible as far as Kieu-kiang, 400 miles from its
d so far upward several kinds of sea-fish ascend
numbers, as sturgeons, porpoises, dorades or
&c.; and some, which seem peculiar to this
at called hongyu, or yellow fish. The larger
er barges used in this part of the river are com-
French missionary to the coasting vessels which
n Nantes and the neighbouring harbours; but
wide and deep enough for much larger vessels.
King-tsheou-foo and Poyang Lake the Ta-
es through an extensive depression, which is
a deep alluvial soil, and distinguished by a
ber of lakes, which are either the remains of a
which formerly covered the whole of the
or have been produced by inundations. This
lies nearly in the centre of China Proper, and
er the greater part of the province of Hupe and
n districts of Hoo-nan, and is considered the
e portion of the whole empire. Besides the
tility of the soil, the means of irrigation are
in any other province, whilst the abundance of
distributed as to be easily managed by art,
ever lays waste the contiguous country, as is
the case in some regions adjacent to the Hoang-ho. This plain may be about 200 miles from west to east and about as much from north to south, and is called Yumichiti. Nearly all the productions of China are here raised in the greatest abundance; no spot is uncultivated, towns and villages cover the country on all sides, and several large towns are found on the banks of the Ta-kiang, as this river and its tributaries supply more extensive and easy means of water-communication than are enjoyed by any other part of China, except the country immediately adjacent to the Great Canal. Besides several smaller rivers, the Kiang receives from the south a great volume of water by the channel which, issuing at the north-eastern extremity from Lake Tung-ting, falls into it east of 130° E. long. This lake is of great extent, being, according to the statement of the missionaries, more than 200 miles long. It is surrounded by an extremely fertile country, which even in the driest seasons yields abundant crops, the means of irrigation derived from the lake never failing. Two large rivers, originating on the northern declivity of the Nan-ling Mountains, and draining a country as extensive as the island of Great Britain, fall into this lake, the Thsing-shui-kiang and the Heng-hiang, each running more than 400 miles. We have no account of the country drained by these large affluents of the Kiang, nor of the rivers themselves, but we know that there are large towns on their banks at a great distance from their mouths. The largest river which from the north joins the Ta-kiang is the Han-kiang, which rises on the southern declivities of the Pe-ling, drains the wide and fertile valley enclosed by the Pe-ling and Tapa-ling ranges, runs nearly parallel with the Ta-kiang, and falls into it after a course of about 500 miles at the town of Han-yang. There are several large towns on its banks, and the river seems navigable nearly to its source. By means of the easy water-communication afforded by these rivers and several large lakes, the country contiguous to the banks of this portion of the Ta-kiang has become the centre of an immense traffic, and the towns built on them are very populous and industrious. King-tsheou-foo, situated where the river enters the plain of Yumichiti, is large, rich, and well fortified. Where the Han-kiang joins the Ta-kiang there are two large towns, Han-yang on the northern and Wan-tshang on the southern shores. The last-mentioned place is compared by the Jesuits to Paris in extent, and the first to the second town of France. The navigation in the neighbourhood of these two places is so active, that from 8000 to 10,000 large river-barges, some equal in size to the coasting vessels of France, may always be seen either at anchor or plying between the two towns. About 30 miles farther down is the large commercial town of Hoang-tshoeu-foo, surrounded by a beautiful and fertile country.

The plain of Yumichiti is separated from Lake Poyang by a rocky country, which rises into low mountains, and comes close up to the banks of both the rivers and the western side of the lake. This mountain-tract is called Li-shan. The lake extends nearly 90 miles from north to south, with an average width of 20 miles. It contains many islands, most of which are cultivated and populous. Both on the west and east it is enclosed by high hills where it approaches the Yang-tse-kiang, but a large low plain surrounds its southern shores, and this plain is traversed by numerous arms of the river Kan-kiang, which is the largest of the rivers that fall into the lake. This river and the country surrounding it are better known in Europe than any other part of China, because they are crossed by the great road from Canton to Peking, by which the embassy of Lord Amherst returned from the capital of China. The course of the river is about 300 miles in a straight line, but with its bends it probably exceeds 400 miles. It rises near the Meiling Pass, through which the great road leads to Canton, and becomes navigable at the foot of the pass, where the town of Nan-gan is built, though at this place its width does not exceed 15 yards. Small river-barges ply between this place and Kan-tsheou-foo, where the river receives a large supply of water by several tributaries which join it near this place. Hence it has sufficient water for large river-boats, but about 10 miles below the last-mentioned place are the Shepotan, or rocks with the eighteen cataracts. They are only rapids, which are feared by the watermen, but do not interrupt the navigation. Barrow thinks that none of them are half so dangerous as the rapids were under old London Bridge at half-flood. The valley of the Kan-kiang up to these rapids is of indifferent fertility, and comparatively thinly inhabited. But south of them begins a wide, fertile, and very populous valley, which extends to the town of Nan-shang-foo, the capital of the province Kiangsi, which is large, well-built, and contains many edifices as large as palaces. Below this town the country extends in a low and level plain, which is traversed by the different arms into which the Kan-kiang branches out before it enters the lake. No impediment to navigation occurs in the Kan-kiang below the Shepotan. In the hills contiguous to the low plain of Lake Poyang, on the east, the best porcelain clay is found, and the china-ware made in the vicinity of Iao-tsheou-foo is considered the best in the empire. There is the village King-te-shing, which is said to have a million of inhabitants and 500 large manufactories of china-ware. It is only called shing (village) because it is not enclosed by walls.

After uniting with the channel which issues from Lake Poyang, the Yang-tse-kiang is always from 2 to 4 miles wide, and contains a great number of islands, most of which are low and formed by alluvium, but a few are rocky and elevated. The country on both sides consists of low hills, composed of sandstone or clay, which terminate on the river in steep declivities, and at some places in precipitous rocks. This country is of indifferent fertility, and a part of it is covered with forests, but is well cultivated. In a depression of this hilly country, forming a considerable basin, is the town of Ngan-king-foo, or Gan-king-foo, a place of great commerce and manufacturing industry. The hilly country ceases where the river Tshao-ho-kiang falls into the Yang-tse-kiang. This river brings to it the waters of the large lake Tshao-ho, and a little lower down the Yang-tse-kiang is joined, near the large town of Taiping-foo, by several small rivers. These, as well as the Tshao-ho-kiang, are navigable to a considerable extent. Farther down the Yang-tse-kiang flows through a rather level country and between high banks, so as not to have a bottom along its bed. This country is of considerable fertility, and extends to the town of Nan-king, and even farther down to the vicinity of Tshing-kiang-foo, or the Great Canal.

About 45 miles below Nan-king the Yang-tse-kiang is joined on the north by the western branch of the Great Canal, and about 10 miles farther down, at the town of Kua-tsheou, by the eastern branch or principal branch. The first branch has only been made to shorten the direct communication between Nan-king and the northern provinces. Both branches unite near the town of Yang-tsheou-foo, one of the largest and most commercial towns in China, whose population is stated to be two millions by the Jesuits, who resided there for a long time: Ritter however thinks that the population of this place is overrated. From Yang-tsheou-foo the canal runs directly northward along the borders of Lake Kao-yeou to the Hoang-ho. Opposite the island which is formed by the two above-mentioned branches of the Great Canal, north of the Yang-tse-kiang, is the entrance to the southern portion of the Great Canal, at the town of Tshing-kiang-foo. This portion of the canal lies nearly parallel to the sea-shore, surrounds at some distance the Lake Tahoo or Taï, and terminates at Hang-tsheou-foo, the capital of Tshe-kiang. By these two canals the navigation of the Yang-tse-kiang is continued over the eastern and northern provinces of China Proper.

At the junction of the canals the width of the river is about two miles, but farther down it increases considerably. This part of the Yang-tse-kiang is very little known to us, as no European vessels have entered the river, nor have the Jesuits given any account of it. Even their map is considered very incorrect in all parts of the empire near the sea, but much less so in the interior of the country. It is however certain that even junks of the largest kind find no difficulty in sailing up the river to Tong-tshu-foo, a large town on the northern shores of the æstuary, and even to Tshing-kiang-foo. According to the maps, the mouth of the river seems to form an opening more than 60 miles wide.

In this opening, but much nearer to the southern shores of the æstuary, is the island of Tsung-ming, which is alluvial. It is supposed by Staunton that this island did not exist five hundred years ago, because it is not laid down in the oldest maps existing in Venice, where the Chusan Islands are entered, and that it has been formed since that time. The earthy matter brought down by the Yang-tse-kiang was, as it is supposed, arrested at this place by the tides, and thus the island by degrees rose out of the sea. But the fact that the island is not destitute of fresh water, but, on the contrary, is traversed by numerous canals and dikes for the purpose of irrigation, seems to militate against this supposition. The island is about 60 miles long, and from 15 to 18 miles wide, which gives an area of about 900 square miles. The population is stated to be half a million, which is more than any tract in England of equal extent contains, except London and its immediate neighbourhood. The whole island is very fertile, and produces abundance of rice, millet, cotton, and vegetables. At some places salt is obtained, which, according to the missionaries, is extracted from a bed of earth, and is of excellent quality.

The depth of the Yang-tse-kiang, as far up as the tides ascend, that is, to Lake Poyang, is very great, and is expressed in the Chinese proverb, ‘The sea has no boundary, and the Ta-kiang no bottom.’ Such a depth is not found in any other river, except in the Amazonas, below the Strait of Obydos. These two large rivers are the only large rivers on the globe which open their wide æstuaries directly opposite the great tide-wave, which reaches them after rolling over a wide sea. Though the tide-water, as it appears, does not rise more than from 6 to 8 feet, it is perceptible at a distance of 500 miles in the Amazons, and of 400 miles from the sea in the Yang-tse-kiang. In these two rivers alone several places are found where at the same time the current follows the impulse it has received by the tide, and advances against the current of the river. [Rivers, vol. xx., p. 27.] To this peculiarity may be ascribed the great depth of these rivers so far as the tide advances. The tide of course affects only the surface-water of the river, and below it the natural current carries the river-water to the sea. This river-water however is pressed to the bottom by the superincumbent tide-stream, and, thus confined, it scoops out a much deeper bed than it does in other circumstances where such a pressure does not exist.

(Du Halde's *Description Géographique, Historique, Chronologique, &c. de l'Empire de la Chine*; Staunton's *British Embassy to China*; Barrow's *Travels in China*; Ellis, *Journal of Lord Amherst's Embassy to China*; Abel's *Narrative of a Journey in the interior of China*; Klaproth, *Mémoires relatifs à l'Asie*; Ritter, *Erdkunde von Asien*, vol. iii.)

YA'NNINA. [Joannina.]

YAOORI. [Soodan.]

YARD. [Weights and Measures.]

YARE. [Norfolk.]

YARKIANG, or YARKAND. [Thian Shan Nan]

YARMOUTH, or GREAT YARMOUTH, a sea parliamentary borough, and municipal borough, in the county of Norfolk, and hundred of East Flegg, 124 miles N.E. from London, by the road; 52° 37′ N. lat., 1° 45′ long.

Great Yarmouth is situated near the confluence of the rivers Yare, Waveney, and Bure, which form a lake called the Braydon Water to the north-west of Yarmouth. The greater part of the town is on the east bank of the Yare, but it extends also along the east bank of the Bure. The hamlet of South Town, sometimes called Little Yarmouth, on the west bank of the Yare, should be considered as part of Yarmouth, being connected with it by a bridge, and included in the boundary of the municipal borough. A new bridge has just been commenced (November, 1843). The town is extending beyond the limits of the old walls, to the north towards Caistor, and to the south towards Nelson's monument, and still more to the east of the walls, between the old town and the sea. The village of Gorlestone, to the south, near the mouth of the river, is now connected with South Town.

The town of Yarmouth, within the boundary of the old walls, consists of three principal lines of streets, nearly parallel with the river, and of about 150 narrow lanes, cal rows, which form the communications between t streets. The rows are extremely narrow, the greater p of them being not more than from five to eight feet w and impassable for ordinary wheel-carriages; the grea part of the traffic of the town is therefore carried o ‘Yarmouth carts,’ which are peculiarly constructed low wheels, and [illegible] of t [illegible] row are drawn by [illegible] edge [illegible] ut

r conveying heavy goods. Some of the rows have
larged, particularly one near the middle of the
which the name of Regent Street has been given.
icipal streets are wide, and the houses are mostly
t, but the most substantial and handsome houses
ted along the quays. The provision-market is
; an open space near the town-hall is used for the
ket. There are two market-days, Wednesday and
. The chief sales of corn are on Saturday. East
own, next the sea, are a great number of houses,
them large and some handsome, which are
in spring and summer by visitors who resort
outh as a bathing-place, certainly the best on
t of Norfolk. The town beyond the walls
chiefly of houses of the poorer classes, intermixed
ehouses, and is not paved, and only partly lighted
amps, but the town within the walls is well paved,
ted with gas. South Town consists for the most
good houses, but is only imperfectly paved and
and Gorlestone is neither paved nor lighted.

ver Yare, falling into the sea about two miles and
uth from Yarmouth, and the Bure, extending to
from Braydon Water, form a kind of peninsula
the rivers and the German Ocean, near the
which the town of Yarmouth stands. The penin-
w and formed wholly of sand. It is probable that
y remote period Braydon Water was an open bay
a. The harbour is in the river Yare. There are
, South Pier and North Pier. South Pier is the
t is about a quarter of a mile long, well con-
and improved by Sir J. Rennie. There is a bar at
nce of the river; but vessels drawing twelve feet
about 200 tons burthen, can pass it at high water,
up to the town. The quay, taken in its whole ex-
ne of the finest in the kingdom; it is in some parts
s wide, and there is a beautiful promenade planted
s along the centre. Opposite the southern part of
h, a jetty, supported on piles, extends about 450 feet
sea; it is 24 feet wide, and in fine weather affords
t promenade.

wn-hall, a handsome building, with a portico sup-
Tuscan columns, stands on the quay. There is
ustom-house, a gaol, a house of correction, a work-
neat theatre, a ball and concert-room, and two
ses. The oldest church is that of St. Nicholas;
ndsome cruciform building, of pointed architec-
h turrets at the west end and a tower and spire in
e. It is one of the largest parish churches in the
, with three wide aisles and a chancel which in-
he whole width. It has a celebrated organ.
xvii. 2.] It was founded in the beginning of the
entury as a chapel to the church of the Holy
t Norwich, which had then a cell at Yarmouth.
g is a perpetual curacy, in the gift of the dean and
of Norwich, and of the net annual value of 430*l*.
ge's church was built in 1716, under authority of
parliament. The living is a curacy, and was in
of the corporation of Yarmouth, but they have
sold the presentation, which is valued at 200*l*. a
. Peter's, which was erected under the commission
ing new churches, is a perpetual curacy, in the
he incumbent of St. Nicholas, and is of the net
alue of 160*l*. There is a small church in South
lled St. Mary's church. The Wesleyan Methodists,
and other classes of dissenters have places of
orship. About one-third of the way from the
ards the mouth of the river is the Nelson
which was erected in 1817: it is a fluted pillar
high, surmounted by a statue of Britannia. Not
the column are barracks, which were built at an
of 120,000*l*. The building was used as a hospital
battle of Waterloo: it is now unoccupied.

ief business of Yarmouth is in fishing for herrings
kerel, and in the curing and exportation of them.
manufactures of crape and silk goods, which are
mploy about 500 persons, chiefly women. Ship-
rope-making, and other trades connected with
are carried on. The importance and prosperity
of Yarmouth arise from its commerce as a sea-
is the chief port for the exports and imports of
Suffolk, and part of Essex. Perhaps not more
-tenth of its shipping is employed in the fishing
t has also an extensive inland trade by the rivers Yare, Waveney, and Bure. The Yare is navigable to Norwich, the Waveney to Bungay, and the Bure to Aylsham. There is an annual fair on the Friday and Saturday in Easter week, but it is only for toys and gingerbread.

According to the Education Returns, there were, in 1833, 5 infant schools, with 167 children; 33 daily schools, with 1077 males and females; 1 boarding-school, with 25 females; 1 day and Sunday-school, attended by 100 males and 40 females daily, and by 80 males and 50 females on Sundays; and 7 Sunday-schools, one of which was supported by the established church, and the others by different classes of dissenters.

On the 31st December, 1842, the number of sailing vessels registered at Yarmouth was 332 under 50 tons (total burthen 10,195 tons), and 328 above 50 tons (total burthen 36,567 tons); and there were four steam-vessels under 50 tons and three above 50 tons. The number of sailing-vessels that entered and cleared coastwise from 31 Dec. 1841 to 31 Dec. 1842, was 2347 (total burthen 176,784 tons) inwards, and 1495 (total burthen 77,891 tons) outwards. The number of steam-vessels that entered and cleared was 205 inwards, and 201 outwards, the total burthen inwards as well as outwards being about 28,400 tons. During the same period there entered and cleared for foreign ports 150 vessels (total burthen 14,127 tons) inwards, and 117 (total burthen 10,492 tons) outwards. Besides which there were five vessels inwards and three outwards from and to the colonies. The net amount of customs'-duty received in 1839 was 54,541*l*. 19*s*. 10*d*.; in 1840, the net amount received was 46,731*l*. 11*s*. 5*d*.

Previous to the Municipal Reform Act the corporation of Yarmouth consisted of a mayor, recorder, high steward, sub-steward, 17 aldermen (besides the mayor), and 36 common councilmen. The first charter, which was granted in 1108 by King John, was confirmed and extended by other charters of Henry III., Edward II., Richard II., Henry VII., Elizabeth, James I., and Anne, which last, granted in 1702, was the governing charter. By the Municipal Corporations Act the borough is divided into six wards, with 12 aldermen and 36 councillors. The borough of Great Yarmouth, which includes the hamlet of South Town, comprises an area of 1270 acres. In 1841 there were 5183 houses inhabited, 164 uninhabited, and 61 building. The number of inhabitants was 24,086, of whom 10,557 were males and 13,529 females. In this number were included 49 persons in the Children's Hospital, 6 in the Royal Hospital, 223 in the workhouse, and 37 in the house of correction and borough gaol; but 173 mariners were not included. The population in 1801 was 14,845; in 1811 it was 17,977; in 1821 it was 18,040; in 1831 it was 21,115.

The parliamentary borough of Yarmouth returns two members to the House of Commons, as it did before the Reform Act, but the limits are now extended so as to include the parish of Gorlestone; the population of the parliamentary borough in 1841 was 27,550. The number of parliamentary electors on the register in 1835-6 was 1719; in 1840 the number was 1904, of whom 742 were 10*l*. householders, and 1162 were freemen or were otherwise qualified to vote.

In the session of 1842 an Act was passed for making a railway from Yarmouth to Norwich. It is to be a single line, and it is intended to adopt the electric telegraph on it. By this Act so much of the Eastern Counties Railway as lies between Norwich and Yarmouth is superseded. It has been projected to extend the line to Cambridge, but an Act has not yet been passed.

From Domesday Book it appears that Yarmouth was a royal demesne, to which belonged 70 burgesses. Henry III. granted a charter, with permission to fortify the town with a wall and moat. The wall had ten gates, and was strengthened with sixteen towers. The place must have been populous in antient times, since no less than 7000 persons died there of the plague in 1348. In 1588, on the alarm of the Spanish Armada, a fortress with four towers, whence beacons might be displayed, was erected in the middle of the town. In 1621 platforms were constructed towards the sea, on which cannon were mounted.

As the navigation off the coast is dangerous, two floating lights are kept in Yarmouth Roads.

(*Municipal Corporation Boundaries; Report on Ecclesiastical Revenues; Population Returns; Parliamentary Documents.*)

YARMOUTH. [Wight, Isle of.]

YARN is the general name given to the threads which are woven into the various kinds of textile fabrics, whether cotton, silk, flax, hemp, wool, or worsted; the terms *twist*, *mule-weft*, *organzine*, *tram*, *abb*, *line*, &c. being particular names applied to particular sorts. A few words of explanation will here suffice supplementary to the details interspersed among earlier articles.

Yarn for *cotton*-weaving is of two distinct kinds, according as it is intended for *warp* or *weft;* each kind being varied to suit different fabrics. *Water-twist* or *throstle-yarn* (the first name having been derived from the 'water-frame' by which this kind of yarn was formerly spun, and the second from the 'throstle' now employed) is smooth and wiry, and is usually employed for warp in heavy goods, such as fustians, cords, or for making sewing-thread. *Mule-yarn* (named from the 'mule' machine by which it is spun) is of a soft and downy nature, calculated for the weft in coarse goods, and for both warp and weft in finer fabrics. Arkwright's name is especially connected with the improvement of the first kind; while Crompton effected most in advancement of the second. The spun yarn is distinguished by certain numbers, which indicate the number of hanks contained in one pound, each hank consisting of 840 yards of yarn. The two kinds of machines are adapted for different numbers; thus, the *throstle* is not now often employed for yarns finer than No. 30 or 40, the higher numbers being generally spun by the *mule*. By successive improvements in the machinery employed, yarn is now spun to so high a number as 250; and instances have been known of 167 miles of yarn being spun from one pound of cotton! In a modern throstle-frame, spinning No. 36, from 24 to 30 hanks per spindle can be spun in a factory-week of 69 hours; but with a mule the quantity varies greatly under different circumstances. The excellence and cheapness of the yarn spun by modern machinery has led to very large exports; thus we find from the 39th volume of the Parliamentary Papers for 1842, that the quantities and declared value of cotton twist and yarn exported for ten years were as follow:—

1831 .	lbs. 63,821,440	£3,975,019
1832 .	75,667,150	4,722,759
1833 .	70,626,161	4,704,024
1834 .	76,478,468	5,211,015
1835 .	83,214,198	5,706,589
1836 .	88,191,046	6,120,366
1837 .	103,455,138	6,955,942
1838 .	114,596,602	7,431,869
1839 .	105,686,442	6,858,193
1840 .	118,470,223	7,101,308

It would be a curious inquiry, how many millions of *miles* of cotton yarn are exported every year; but this could not be determined without knowing the average of all the Nos. so exported.

Flax-yarn is not estimated by No., as cotton, but by terms peculiar to that branch of spinning. Three hundred yards form a *lea* of flax-yarn; 38 leas form a *spindle;* 6 leas form a *rand;* 72 leas, or 21,600 yards, or 12 rands, form a *dozen*. In the process of preparation by spinning, the flax becomes separated into two qualities, the finer obtaining the name of *line*, and the coarser that of *tow;* and the yarn spun from these two qualities is applied to different purposes. The spinning of flax-yarn is mostly effected by the bobbin-and-fly or throstle-frame; and modern improvements have led to the production of such fine qualities of 'line,' that it is now used in combination with silk in pocket handkerchiefs and other fabrics.

With regard to *hemp*, besides the yarn employed for weaving into sacking and other coarse goods, the term 'yarn' is applied in rope-making in a different sense. The yarn in this case is a loose kind of string or cord, and it receives a No. according to the number of such strings required in making ropes three inches in circumference; thus, Nos. 18, 20, or 25 imply such thicknesses of yarn that 18, 20, or 25 of them are required in making a rope of the dimensions just stated.

Silk-yarn has names applied to it not known in the examples just given. The silk is imported as a fine filament, or in the state of 'raw' silk; it is twisted as a means of giving it greater firmness of texture, and then obtains the name of *singles;* two filaments are twisted together rather loosely, and formed into a yarn called *tram*, which commonly forms the weft or cross-threads of man goods; lastly, two or more filaments are twisted into hard *singles*, and then twisted together in a direction, forming a strong silken yarn called o used generally for warp. Silk-yarn in the form organzine, that is, ready for the weaver, is call silk; and in this state much of our silk used ported; but since the removal of the impolitic r formerly laid on the trade, the raw silk import very much larger ratio to the thrown. *Waste* within the last few years, come largely into use i paration of yarn for the weaver; that is, th broken, or imperfect filaments which cannot be into tram or organzine by the labours of the thr now carded, roved, and spun much in the sa cotton; and most of the cheap silk goods now shops are made from yarn so prepared, not un mixed with cotton.

Yarn made from *wool* is called *woollen* or *w* cording as it is formed from short or from long clothing or from combing wool. The former so spun that the elementary fibres shall be in a f felting or fulling; while the latter has the filame more nearly parallel. The worsted yarns are vided into the coarse and the fine, according a to be used for hosiery or for such goods as mous laines, fine merinoes, &c. Worsted yarn is muc combination with silk, in bombazeens, poplins, an and also in combination with cotton, in cheap fancy waistcoatings, the nondescript over-all coa much worn, and a variety of fabrics recently intr great number; the fineness or coarseness of the pending on the nature of the goods.

The silk-yarn or thrown-silk exported from thi is so small in quantity that it need not be presen in a tabulated form; the importation from 1832 varied from 164,669 lbs. to 329,932 lbs. The ex woollen and worsted yarn, and of linen yarn, thus stated:—

	Linen Yarn.		Woollen and Worst	
	Quantity.	Value.	Quantity.	
1832	lbs. 110,188	£8,705	lbs. 2,204,464	£2
1833	935,682	72,006	2,107,478	2
1834	1,533,325	136,312	1,861,814	2
1835	2,611,215	216,635	2,357,336	3
1836	4,574,504	318,772	2,546,177	3
1837	8,373,100	479,307	2,513,718	33
1838	14,923,329	746,163	3,085,892	38
1839	16,314,615	818,485	3,320,441	42
1840	17,733,575	822,876	3,796,644	45

From this table we are enabled to see how rapi been the recent progress of the flax trade. In 183 woollen and worsted yarn exported was twenty tim much as the linen yarn; in 1840 the latter was four as much as the former,

YARNE. [Yorkshire.]

YAROSLAW, or IAROSLAW, an extensive g ment of European Russia, is situated between 56° 4 59° N. lat. and 37° 45′ and 41° 20′ E. long. It is b on the north-west by Novogorod, on the north- Vologda, on the east by Kostroma, on the south dimir, and on the west by Twer. The area, acc Koppen, is 17,000 English square miles, but makes it only 13,500, and Schnitzler thinks eve high an estimate, and prefers another, which g square miles. Koppen however is the late (1840). The population of this government is and it is divided into 10 circles.

Face of the Country; Soil; Climate.—The a pretty high table-land, but level, and on fied by some ridges of low hills and the hig the rivers. The soil is a mixture of sand and and there are extensive morasses, and some s which are wholly incapable of cultivation. G mould is seldom met with; but there are no st perly so called. The hills and the banks of consist of strata of clay, marl, and limesto nineteen rivers, the principal is the Volga, w the government from Twer. runs at first to t Mologa, where it is join then turns to the it makes a small

ma. At Rybinsk, between Mologa and
ed by the Scheksna. All the rivers of
ow into the Volga. The Mologa and
y far the most considerable. The lakes
The largest are those of Rostow (or
ght miles long and about five and a
Nochesero. There are many rivulets;
e government is not very well watered.
er severe: the winter, spring, and au-
ummer short; the weather is pretty
arity of the air is very favourable to ve-
health of the inhabitants.

ural Productions; Manufacture; Trade.
e chief occupation of the inhabitants.
whole only moderately fertile, and the
from sufficient for the consumption of
hough the ground requires to be well
e years, yet the utmost that rye and
cted to yield is sixfold, and generally
d. Wheat and buckwheat yield only
Oats and peas are grown in large quan-
p only for domestic use. Horticulture
and the gardens abound in most of the
Russia; in some parts they are raised
y to leave a large surplus for exporta-
herries thrive in the southern circles,
he best kinds. The forests chiefly con-
aspen-trees, and underwood, so that
y of fuel; but timber for building is
hardly any oaks, and very few pines
nals do not abound: the beasts of prey
nxes, and foxes: the fur-bearing ani-
martens, badgers, and weasels; hares
. The fisheries in the rivers are very
ittle attention is paid to the breeding

uperfluity of natural productions; but
ns to support themselves very comfort-
weaving, both of flax and wool, are
l; in the country there are numbers of
facture gloves, shoes, and cloaks for
, stockings, harness, and agricultural
ense quantities. The manufactories,
re mostly in the towns and the dis-
Rostow, and Uglitsch. The manufac-
en, cotton, silk, tobacco, paper, soap,
are many tanneries. The principal
e Russia leather, sailcloth, the cloth
nen, cordage, some linseed and linseed
ge quantities, and horsehair; the im-
dy, salt, iron, and all kinds of colonial
manufactures. This gives rise to a
roslaw, Rybinsk, Rostow, and Uglitsch
are in this trade.

re almost all Russians. The men are
nd the women very agreeable; 'White
n of Yaroslaw,' is a common saying.
ek church, under the archbishop of
w, whose diocese is of the second class,
arishes. The schools in this govern-
e university of Moscow. Though
dually increased since the beginning
ation is still in a very backward state.
date quoted by Schnitzler is 1835)
s, with 72 masters and 2141 scholars,
re girls, and 9 ecclesiastical schools,
1607 scholars. Krusenstern, in 1837,
information.

pital of the government, is situated,
57° 50′ N. lat. and 39° 30′ E. long.,
frontier, on the bank of the Volga,
oined by the Kotorosla, which issues
tow. It is an open town, surrounded
has a fort or citadel, which is in the
e two rivers, and is surrounded by a
tands on an elevated plateau, and its
s 44 churches and three monasteries,
earance. It is however ill-built, in the
narrow streets, some of which are
street by which the town is entered on
ersburg is broad, and consists of hand-
The institutions for education are, an
ry with 500 pupils, a gymnasium, a district school, and a school for the higher branches of learning, founded in 1803, by Prince Paul Demidoff, who endowed it with a capital of 300,000 silver rubles, and 3600 peasants. It is called the Demidoff Lyceum, according to the revised statutes, which were carried into effect in 1834; they determine that there shall be a director, a chaplain, and eight professors, and that the number of students on the foundation, who are boarded and educated free of expense, shall be forty. After their education is completed they enter the public service. The lyceum has a very good library. There are in this city eighteen poor-houses, a foundling asylum, and a Bible Society. The manufactures are flourishing; the linen and Russian leather of Yaroslaw are highly esteemed. It is the residence of the civil governor of the province, and of the military governor of Yaroslaw and Vologda. Its trade is very considerable, and the merchants have a very large bazaar. The population is 28,500 inhabitants.

The other towns worth notice are: 1. *Rostow*, situated on the lake of the same name (otherwise called lake Nero), one of the most antient towns in Russia. It is six English miles in circuit, which shows its former importance. It has several times suffered by war and fire. It now consists of the city and an extensive suburb. The city is surrounded by a rampart and a moat. It is in an unfavourable situation, being low, and surrounded by water and marshes. The archbishop of Yaroslaw resides here, where he has his principal cathedral, an antient richly adorned edifice, and a vast palace, with a seminary. There are 24 churches in the city, and three convents, two of monks and one of nuns. Besides the bazaar the city contains 200 shops and above 1000 houses, with 6500 inhabitants. The women are celebrated for their beauty. The trade is very considerable, and the great fair, which begins at the end of February and continues for a month, is attended by at least 40,000 Russians, Armenians, Greeks, and Tartars, who bring goods to the value of 14,000,000 of rubles. 2. *Uglitsch*, on the right bank of the Volga, is likewise an antient town, but the time of its foundation is uncertain. It is related that before the invasion of the Lithuanians in 1607, it contained 150 churches, 12 convents, and 30,000 houses. The fire which destroyed it at that time annihilated its property. At present it has two convents, 23 churches, and a fortress built of wood. The streets are narrow and crooked. There are 7000 inhabitants, who have a considerable trade, and some manufactures. 3. RYBINSK, which has been described in a separate article.

(Hassel; Hörschelmann; Cannabich; Schubert; Schnitzler; Krusenstern, *De l'Instruction publique en Russie.*)

YARRIBA. [SOODAN.]

YARROW. [SELKIRKSHIRE.]

YASSY. [MOLDAVIA.]

YAZOO, river. [MISSISSIPPI, STATE OF.]

YEAR. Much connected with this article is to be found in KALENDAR, PERIODS OF REVOLUTION, MOON, SUN, CHRONOLOGY, TIME, &c. We here confine ourselves to matters of useful reference connected with the length and subdivisions of the year, omitting discussion of points of history, which do not directly bear upon chronological reckoning.

The year is, roughly speaking, the period of time in which the sun makes the circuit of the heavens, and the seasons of agriculture run through their course.

A *sidereal* year is the period in which the sun moves from a star to the same again; that is, the interval between the two times when the sun has the same longitude as a given star. The mean period is 365·2563612 mean solar days, or $365^{d}\ 6^{h}\ 9^{m}\ 9^{s}{\cdot}6$.

A *tropical* or *civil* year is the time in which the sun moves from the vernal equinox to the vernal equinox again; and its mean length is 365·2422414 mean solar days, or $365^{d}\ 5^{h}\ 48^{m}\ 49^{s}{\cdot}7$.

The *anomalistic* year is the time in which the sun moves from its perigee (or nearest point to the earth) to its perigee again; and its length is 365·2595981 mean solar days, or $365^{d}\ 6^{h}\ 13^{m}\ 49^{s}{\cdot}3$.

The tropical year is shorter than the sun's actual orbital revolution, or the sidereal year, because the equinox moves slowly backwards [PRECESSION], and therefore the sun meets it again before it arrives at the point at which it met it last. The anomalistic year is longer than the sidereal year because the perigee moves forward and sun is not nearest to the earth until it has passed the longitude at which it was nearest to the earth before. The *tropical* year is *the* year, when no distinctive term is applied; for the passage of the sun from the southern to the northern side of the ecliptic is the positive phenomenon on which the seasons *depend*, though [Winter] it may not be correct to say that it is then that the succession of seasons *begins*.

The anomalistic year does not, and from the theory of gravitation most probably cannot, vary by any quantity which the human senses could appreciate; but the sidereal and tropical years vary very slowly in length. The reason is twofold. In the first place, the amount of the yearly precession of the equinoxes is slowly increasing; so that the part of the orbit by which the equinox moves backwards to meet the sun becomes greater, or the duration of the year less. In the second place, the gradual motion of the equinox, combined with that of the perigee, brings the part of the orbit which the sun is saved from performing by the recession of the equinox into different places with respect to the perigee in successive years; so that the excepted portion is in different years what would have been described in different times. The second consideration affects the sidereal year as well as the tropical; but since in both cases the effect is very small and slow, a few seconds in a thousand years, there is no occasion to do more than point it out in an article like the present. Laplace makes the tropical year to be 13 seconds shorter than it was in the time of Hipparchus.

The excess of the tropical year over 365 days has been given by different astronomers as follows:—

	h.	m.	s.
Euctemon and Meton . .	6	18	57
Hipparchus and Ptolemy .	5	55	12
Hindus	5	50	30
Albatenius	5	46	24
Walther	5	48	50
Tycho Brahé	5	48	45
Delambre	5	48	51·6
Laplace	5	48	49·7

Whether the present length of the tropical year can be said to be determined within a second, we cannot collect from the writings of astronomers. The method of determining this length is by carefully observing solstices or equinoxes (that is, times when the sun is in the solstices or equinoxes) at distant periods, and taking the mean year from the whole interval elapsed. Unless that interval were a whole revolution of the solar perigee with respect to the equinox, the real mean tropical year could not be determined, from observation alone, so well as it might be.

The civil year must, for convenience, begin with a day, and contain an exact number of days. But any exact number of days would have the disadvantage of the old Egyptian year [Sothiac Period], namely, that the seasons would be thrown to all parts of the year in succession. Those who lived in the intense heats of March (when that month is near the autumnal equinox) would read old poets who describe the spring as about to arrive in that month, or allude to the past winter, and that before the poets would have become properly antient: this alone would be worth avoiding. Of the mode of doing it we shall presently say more, but in the meanwhile we have to observe that it has always been the greater source of difficulty to combine the revolutions of the moon with those of the sun.

The Jewish, Christian, and Mohammedan religions all regulate their sacred anniversaries, more or less, by the moon. Various nations have constructed their years on the lunar revolution, though most of them have accommodated their years to the solar year by intercalated months. Now the time between two new moons, that is, the average time, is 29·5305887 days, or about 29½ days. If then months were made alternately of 29 and 30 days, twelve months would contain 354 days, and 11¼ days would be necessary to complete the Julian year of 365¼ days. This would amount to more than a month in three years. Taking the most exact values both of the lunation and the solar year, and applying the method in Fractions, Continued, it will be seen that the year contains, over and above twelve lunations, something less than 3 lunations in 8 years; more exactly, something more than 4 lunations
in 11 years; more exactly, something less than
in 19 years; more exactly still, something mor
lunations in 334 years, less than 130 in 353, mo
in 687, less than 1395 in 3788. Taking the J
the above figures should be changed into less
of 8, more than 7 out of 19, less than 171 out o
excess of 7 lunations in 19 years, which varies
from the truth, whether as to the real, Juli
Gregorian year, is the foundation of the cele
tonic Cycle, which, among the Greeks and all
derived knowledge from them, has always been
tion of the lunisolar calendar. It is now well
that the Metonic moon, and not that of the he
referee in the settlement of religious festivals
say, a moon moving uniformly at such a rate
235 lunations in 19 calendar years.

Owing to the alternate acceleration and re
the sun's motion in its orbit, the lengths of the
nomical seasons are different, as follows:—

From vernal equinox to summer solstice .
From summer solstice to autumnal equinox
From autumnal equinox to winter solstice .
From winter solstice to vernal equinox .

We shall now state the principal facts conn
the years of the nations who are most conn
history.

The Jews, from the time of their departure fr
began their year with the vernal equinox in al
reckoning, retaining the old beginning, which
autumnal equinox, in all civil affairs. In both
reckoned from the new moon near the equ
making twelve months in the year, each of 29
with an intercalary month once in three year
cured themselves from the necessity of any bu
sional alteration. They might have gradually a
beginning of the year to slide away from the ve
nox, but this their rites prevented them from d
the sacrifices required the offering of various sp
agricultural produce, dependent upon season, a
times of the year: the necessity of being pro
young lambs, for instance, at the Passover, ob
to keep this feast at one time of the solar year.
it at the full moon following the vernal equi
they managed their calendar in the first instan
appear; but as we know they once depended u
ing sight of the new moon to settle the begin
month, and only used the 29 or 30 days when
their object, we must infer that they were in th
making corrections frequently, and at short not
could be done, as remarked by the editor of
vérifier les Dates,' while they were in possessio
tine, and within reasonable distance of e
There is not any trace of astronomy in the
writings, nor reason to infer that they br
knowledge of it from Egypt. But during th
they acquired from the nations among whom
thrown, either a period of 84 years or knowled
struct one. Several of the Fathers mention
period, and state that it had long been used b
has the appearance of a Calippic Period of 7
but a day, with the period of 8 years added,
position that the making of three intercalary m
additional eight years would have an error of
kind from this contained in the Calippic period
is not the case, and 84 years is really not so
exact number of lunations as 76 years all but a
of the early Christians used this period, and th
tributed to the confusion on the subject of Ea
afterwards was corrected by the Council of Nic

The modern Jewish calendar is regulated by
nineteen years, and its lunar years contain vari
ments which refer to the religious ceremoni
present usages date from A.D. 338, according to
account. They have also a value of the length
tion $29^d\ 12^h\ 44^m\ 3^s$, which is within a tenth of a
the truth. This has been stated as of extraor
rectness by those who forget that the average
much more easily found than the year. Hipp
Ptolemy had $29^d\ 12^h\ 44^m\ 3\frac{1}{3}^s$; reject the fracti
so often done, and we have the Jewish value:
happens that Ptolemy and Hipparchus had got

an the fraction too much, this saving of trouble is lental correction. There is no accompanying value in's motion more correct than that implied in the ear. On the Jewish calendar, see the *Art de véri-* *Dates*, vol. ii., p. 113, and also the Hebrew work, d with a Latin translation, by Sebastian Munster, *rium Hebraicum*, Basle, 1527.

Iebrew months, as commonly spelt in English, are rs:—opposite to them are written the names of the months in which they severally most frequently ith their number of days:—

, or Abib	March,	30 days.
	April,	29 —
	May,	30 —
muz	June,	29 —
	July,	30 —
	August,	29 or 30 —
	September,	30 —
esvan, or Bul	October,	29 or 30 —
u	November,	29 or 30
t	December,	29 —
	January,	30 —
	February,	29 —
r (intercalary)	February,	29 —

e Egyptian year, see Sothiac Period.

velve months of the Athenian lunar year bear the names: but there is a slight difference of about the order in which they come, some putting ριων before Πυανεψιων, and some after it.

ιβαιων,	30 days	Γαμηλιων,	30 days
ιτνιων,	29 —	Ἀνθεστηριων,	29 —
μιων,	30 —	Ἐλαφηβολιων,	30 —
τηριων,	29 —	Μουνυχιων,	29 —
ιων,	30 —	Θαργηλιων,	30 —
ων,	29 —	Σκιροφοριων,	29 —

ntercalary month was a second Ποσειδεων of 30 is said that antiently there were thirty days in nth, but that Solon first established the alternation 29 days, and called the thirtieth day ἔνη καὶ νέα, new (moon). The shorter months were called οῖλοι), the longer months full (πλήρεις); and these ve been generally adopted by chronologers. The hich a month was intercalated was called ἐμβόλι- βολιμαῖος, and hence the word embolismic, which tly used in the same way.

onth was divided into three decads, the first two ys each, the third of ten or nine. The first day νία, the second was δευτέρα ἱσταμένου μηνός, and so eleventh was πρώτη μεσοῦντος μηνὸς, or πρώτη ἐπὶ d so on up to the last, which was εἰκάς. The was πρώτη ἐπ᾽ εἰκάδι and so on; the 30th was But the third decad was also reckoned by counting wards from the new moon thus: the 21st day was ἐνάτη φθίνοντος μηνὸς, according as there were ys in the decad. The last day, whether 29th or ἔνη καὶ νέα.

is some doubt whether originally the first of beon was the day of the new moon nearest to the olstice, or next after it: this must have depended de of intercalation. It is enough for most pur- now that the Attic year began near the summer (Clinton, *Fast. Hellen.*, Introduction.)

he intercalations, there is an old period mentioned ears (διετηρίς), with an intercalary month of 30 s was also called τριετηρίς, because the intercala- in every *third* year, including that of the former tion. This year was with respect to the sun more lays too long. There was also a tetra-eteris, but respectable period was the octa-eteris of Cleo- n which three months of 30 days each were inter- n 8 years, namely, in the third, fifth, and eighth. rage year of this period was wrong by 1½ hours pect to the sun, and 1½ days with respect to the The Metonic and Callippic periods followed (B.C. 330). The latter was but little used compared former, which intercalated 7 months in 19 years. ; Periods of Revolution.] It is not certain e years of intercalation were.

omplete Roman calendar, as it stood immediately e edict of Augustus, correcting the use which had de of the edict of Julius Cæsar, is as follows:—

—s months, Januarius, Februarius, Martius, Aprilis, Maius, Junius, Julius, Augustus, September October, November, December. The first of each month is its kalends, Kalendæ Januariæ, Februariæ, &c. The number of days in each month is well known by the old rhyme. The 13th of some months, the 15th of others, is called the day of the Ides (Idus): and the ninth day before the Ides inclusive is called the nones (Nonæ), and every day is reckoned by its position with respect to the next simply denominate day, be it Kalends, Nones, or Ides. Thus the third day before the Nones of January, the day of the Nones itself counting as one, is *ante diem tertium nonas Januarias*, a singular mode of speech, which does not appear to have been fully explained. It is generally rendered as if it were diem tertium ante Nonas Januarias, the third day before the Nones of January. These designations are usually written in a contracted form in the manuscripts, and these contractions are usually all that are to be found in chronological works. (See Gellius, iii. 2.)

	Januarius.	Februarius.	Martius.
1	Kal. Jan.	Kal. Feb.	Kal. Mart.
2	iv. Non. Jan.	iv. Non. Feb.	vi. ,,
3	iii. ,,	iii. ,,	v. ,,
4	Prid.Non.Jan.	Pridie Non. Feb.	iv. ,,
5	Non.Jan.	Non. Feb.	iii. ,,
6	viii. Id. Jan.	viii. ,,	Prid. Non. Mart.
7	vii. ,,	vii. ,,	Non. Mart.
8	vi. ,,	vi. ,,	viii. Id. Mart.
9	v. ,,	v. ,,	vii. ,,
10	iv. ,,	iv. ,,	vi. ,,
11	iii. ,,	iii. ,,	v. ,,
12	Pridie ,,	Prid. Id. Feb.	iv. ,,
13	Id. Jan.	Id. Feb.	iii. ,,
14	xix. Kal. Feb.	xvi. Kal. Mart.	Prid. Id. Mart.
15	xviii. ,,	xv. ,,	Id. Mart.
16	xvii. ,,	xiv. ,,	xvii. Kal. April.
17	xvi. ,,	xiii. ,,	xvi. ,,
18	xv. ,,	xii. ,,	xv. ,,
19	xiv. ,,	xi. ,,	xiv. ,,
20	xiii. ,,	x. ,,	xiii. ,,
21	xii. ,,	ix. ,,	xii. ,,
22	xi. ,,	viii. ,,	xi. ,,
23	x. ,,	vii. ,,	x. ,,
24	ix. ,,	vi. ,,	ix. ,,
25	viii. ,,	v. ,,	viii. ,,
26	vii. ,,	iv. ,,	vii. ,,
27	vi. ,,	iii. ,,	vi. ,,
28	v. ,,	Prid. Kal. Mart.	v. ,,
29	iv. ,,		iv. ,,
30	iii. ,,		iii. ,,
31	Prid.Kal.Feb.		Prid. Kal. April.

	Aprilis.	Maius.	Junius.
1	Kal. April.	Kal. Mai.	Kal. Jun.
2	iv. Non. April.	vi. Non. Mai.	iv. Non. Juni.
3	iii. ,,	v. ,,	iii. ,,
4	Prd.Non.Apr.	iv. ,,	Prid. Non. Jun.
5	Non.April.	iii. ,,	Non. Jun.
6	viii. ,,	Prid. Non. Mai.	viii. ,,
7	vii. ,,	Non. Mai.	vii. ,,
8	vi. ,,	viii. ,,	vi. ,,
9	v. ,,	vii. ,,	v. ,,
10	iv. ,,	vi. ,,	iv. ,,
11	iii. ,,	v. ,,	iii. ,,
12	Prid.Id.April.	iv. ,,	Prid. Id. Jun.
13	Id. April.	iii. ,,	Id. Jun.
14	xviii.Kal.Mai.	Prid. Id. Mai.	xviii. Kal. Jul.
15	xvii. ,,	Id. Mai.	xvii. ,,
16	xvi. ,,	xvii. Kal. Jun.	xvi. ,,
17	xv. ,,	xvi. ,,	xv. ,,
18	xiv. ,,	xv. ,,	xiv. ,,
19	xiii. ,,	xiv. ,,	xiii. ,,
20	xii. ,,	xiii. ,,	xii. ,,
21	xi. ,,	xii. ,,	xi. ,,
22	x. ,,	xi. ,,	x. ,,
23	ix. ,,	x. ,,	ix. ,,
24	viii. ,,	ix. ,,	viii. ,,
25	vii. ,,	viii. ,,	vii. ,,
26	vi. ,,	vii. ,,	vi. ,,
27	v. ,,	vi. ,,	v. ,,
28	iv. ,,	v. ,,	iv. ,,
29	iii. ,,	iv. ,,	iii. ,,
30	Prid.Kal.Mai.	iii. ,,	Prid. Kal. Jul.
31		Prid. Kal. Jun.	

	Julius.	**Augustus.**	**September.**
1	Kal. Jul.	Kal. Aug.	Kal. Sept.
2	vi. Non. Jul.	iv. Non. Aug.	iv. Non. Sept.
3	v. ,,	iii. ,,	iii. ,,
4	iv. ,,	Prid. Non. Aug.	Prid. Non. Sept.
5	iii. ,,	Non. Aug.	Non. Sept.
6	Prid.Non.Jul.	viii. Id. Aug.	viii. Id. Sept.
7	Non. Jul.	vii. ,,	vii. ,,
8	viii. Id. Jul.	vi. ,,	vi. ,,
9	vii. ,,	v. ,,	v. ,,
10	vi. ,,	iv. ,,	iv. ,,
11	v. ,,	iii. ,,	iii. ,,
12	iv. ,,	Prid. Id. Aug.	Prid. Id. Sept.
13	iii. ,,	Id. Aug.	Id. Sept.
14	Prid. Id. Jul.	xix. Kal. Sept.	xviii. Kal. Oct.
15	Id. Jul.	xviii. ,,	xvii. ,,
16	xvii.Kal.Aug.	xvii. ,,	xvi. ,,
17	xvi. ,,	xvi. ,,	xv. ,,
18	xv. ,,	xv. ,,	xiv. ,,
19	xiv. ,,	xiv. ,,	xiii. ,,
20	xiii. ,,	xiii. ,,	xii. ,,
21	xii. ,,	xii. ,,	xi. ,,
22	xi. ,,	xi. ,,	x. ,,
23	x. ,,	x. ,,	ix. ,,
24	ix. ,,	ix. ,,	viii. ,,
25	viii. ,,	viii. ,,	vii. ,,
26	vii. ,,	vii. ,,	vi. ,,
27	vi. ,,	vi. ,,	v. ,,
28	v. ,,	v. ,,	iv. ,,
29	iv. ,,	iv. ,,	iii. ,,
30	iii. ,,	iii. ,,	Prid. Kal. Oct.
31	Prid.Kal.Aug.	Prid. Kal. Sept.	

	October.	**November.**	**December.**
1	Kal. Oct.	Kal. Nov.	Kal. Dec.
2	vi. Non. Oct.	iv. Non. Nov.	iv. Non. Dec.
3	v. ,,	iii. ,,	iii. ,,
4	iv. ,,	Prid. Non. Nov.	Prid. Non. Dec.
5	iii. ,,	Non. Nov.	Non. Dec.
6	Prid.Non.Oct.	viii. Id. Nov.	viii. Id. Dec.
7	Non.Oct.	vii. ,,	vii. ,,
8	viii. Id. Oct.	vi. ,,	vi. ,,
9	vii. ,,	v. ,,	v. ,,
10	vi. ,,	iv. ,,	iv. ,,
11	v. ,,	iii. ,,	iii. ,,
12	iv. ,,	Prid. Id. Nov.	Prid. Id. Dec.
13	iii. ,,	Id. Nov.	Id. Dec.
14	Prid. Id. Oct.	xviii. Kal. Dec.	xix. Kal. Jan.
15	Id. Oct.	xvii. ,,	xviii. ,,
16	xvii.Kal.Nov.	xvi. ,,	xvii. ,,
17	xvi. ,,	xv. ,,	xvi. ,,
18	xv. ,,	xiv. ,,	xv. ,,
19	xiv. ,,	xiii. ,,	xiv. ,,
20	xiii. ,,	xii. ,,	xiii ,,
21	xii. ,,	xi. ,,	xii. ,,
22	xi. ,,	x. ,,	xi. ,,
23	x. ,,	ix. ,,	x. ,,
24	ix. ,,	viii. ,,	ix. ,,
25	viii. ,,	vii. ,,	viii. ,,
26	vii. ,,	vi. ,,	vii. ,,
27	vi. ,,	v. ,,	vi. ,,
28	v. ,,	iv. ,,	v. ,,
29	iv. ,,	iii. ,,	iv. ,,
30	iii. ,,	Prid. Kal. Dec.	iii. ,,
31	Prid.Kal.Nov,		Prid. Kal. Jan.

The intercalary year, when introduced by Cæsar, had the additional day bestowed upon it by doubling the sixth day before the kalends of March (whence the year was called *bissextile*) [Bissextile]: so that the month of February ended thus—

23	vii. Kal. Mart.
24	vi. Kal. Mart. poster.
25	vi. Kal. Mart. prior.
26	v. Kal. Mart.
27	iv. ,,
28	iii. ,,
29	Prid. Kal. Mart.

There was thus *ante diem sextum kalendas Martias posteriorem* and *ante diem sextum kalendas Martias priorem*. The general rules of this clumsy calendar are, that the ides are on the 15th of March, May, July, and October, and on *the 13th* of all the other months: that the nones are always
on the eighth day before the ides, according to
of counting: that the kalends are always on the
of the month: and that the intermediate days
bered as far as numbering is required, backwards
Kalends, Nones, or Ides, each of these reckonin
day in counting backwards from it.

The original Roman year is variously stated by
at twelve and ten months: the latter seems the
ported, and the old year wanted January and
and had Quinctilis and Sextilis in place of
August: these two months yielded their names t
the two emperors who reformed the calendar.
Tarquin introduced what was meant for a lun
355 days. The year is supposed to have been mo
lated to the solar year by the decemvirs: but
great deal of discussion upon all these points, wh
be quite out of place in anything but an historic
In the year 45 B.C. the correction made by Juli
with the assistance of Sosigenes, was introduced
ceding year having being lengthened into 44
order probably that the new æra might fall
moon following the shortest day. The pontific
who came after Julius Cæsar mistook the mean
correction: by a bissextile every *fourth* year the
was meant one every fourth year, counting the l
tile, according to their interpretation of Cæsar
which the fourth numbers beginning from 1 w
not 5, 9, 13, &c., but 4, 7, 10, &c. This was cor
Augustus, when Pontifex Maximus in B.C. 8, wh
that three bissextiles from that date should b
(being as many as had been then superadded t
calendar in years preceding), and that the mista
be avoided in future.

No further chronological difficulty occurred
third century, when disputes about the mode of
ing Easter-day began to perplex the Christian w
is commonly stated that the Council of Nice m
adjustment which lasted until the Gregorian ref
This is not correct: the council, according to Eus
others, only ordained that all Christians should ke
on one and the same day, and referred it to the
of Alexandria to settle what, agreeably to the
principles of the subject, that day should be in e
ticular year. By what follows, it appears that thi
adopted the Metonic cycle, and he certainly c
have done better, having no licence to make a fi
independent of the new moon.

The Gregorian reformation (so called; we will
to give reasons for our protest against the word
consequence of the desire that the seasons sho
main in the same months for ever. The Julian c
gave a year which is too long at the rate of 3 day
years nearly. At this rate, in 24,000 years midsumm
midwinter would have fallen in December and Ju
was not so much to avoid this, as to keep the
festivals in the same parts of the year, that is, in th
kinds of weather, that the correction was insisted o
advocates. The change had been discussed by ind
and even by councils during preceding centuries,
finally decided on by Gregory XIII., with the auth
the Council of Trent. In 1582 the reformation was
into effect: ten days were struck out of the rec
that which would have been the 5th of October
denominated the 15th, so that the days 5, 6, 7, 8, 9,
12, 13, 14 of October, 1582, never existed in It
Spain, which accepted the change as soon as
decreed. Some other countries, as France, which ac
it in the year 1582, but not so early, had to mak
changes accordingly. See Style for the times of a
in different countries.

There was one incorrectness about this part
change, but not of any detriment. The equinox
the time of the Nicene council, on the 21st of Mar
the suppression of ten days was meant to make the
vibrate between the 21st and 22nd. But in point
the Alphonsine tables, which were consulted, are
by a day in this matter, and eleven days should ha
suppressed. The consequence is [Periods of
p. 449], that the equinox vibrates between
21st of March.

Leaving out the parts of the Gr
relate to Easter, we proceed to
of intercalation. This is as f

livisible by 4 is leap-year, except only when
ends with 00, in which case it is not leap-year,
n the preceding figures are divisible by 4.
s not leap-year, but 1600 is. If we take the
value of the length of the year, 365·2422414
days, and apply the method in Fractions,
we shall see that the excess of the real year
of 365 days is something less than 1 day in
e than 7 in 29, less than 8 in 33*, more than
ınd less than 242 in 999. This last excess,
999 years, is so very correct, that it is most
ıt Gregory's advisers did not know it, for they
t case have adopted it and saddled our world
troublesome omission of intercalations for the
sterity of fifty thousand years hence. As it is,
1000 mean Gregorian years above as many
is 242·5 days: it would have been nearer the
been 242·242 days. Accordingly 1000 mean
ars are too long by about a quarter of a day;
tly, 3600 years give an error of a day. De-
osed that the Anni Domini 3600, 7200, 10,800,
ıot be leap-years, which they are to be in the
lendar. If the world should last till A.D. 3600,
correction will be called by Delambre's name:
ry should then have perished, still more will
resent article, so that there is no use in press-
.

ean years have been made to begin at such
ods, that the historical inquirer is frequently
e have mentioned those which relate to our
eriods of Revolution, p. 449. The 25th of
ıe 1st of January, the 1st of March, the 25th
d Easter, have all been in use.
to the common year as it now stands, there
hings which it will be useful to remember.
lly forbear to quote the verses which are so
use, but we will do it from a version of 1596,
tical work:—

Thirtie daies hath September,
Aprill, June, and November,
Februarie eight and twentie alone,
All the rest thirtie and one.

on year begins and ends on the same day of
ıp-year ends on the next day. Thus 1843,
ıp-year, ends on Sunday, as it began: had it
ır, it would have ended on Monday. Many
call the year 52 weeks are hardly aware that
and a day, or when leap-year, two days.
e day of the month without an almanac, it is
o know the first day in each month which
e name as the first day of the year, as in the
:—

ary, October, }
il, July, }
tember, December, } are of the same name.
;
uary, March, November, }
ust, }
,

e present year (1843) all the days just men-
ndays, the same as the first day of the year.
could be connected by some decent dog-
s that already quoted, any one who remem-
ıld only have to bear in mind the name in the
first day of the current year, and would thus
to start from in every month. In leap-year
means 3, &c. for every month after February.
ımedan year is one of twelve lunar months, of
ys alternately, the last month however having
tercalary years. To keep the months to the
cycle of thirty years is used, in which there
ercalated years, being

, 7, 10, 13, 16, 18, 21, 24, 26, 29,

This makes a very good lunar cycle: it sup-
days to be an exact number of lunations,
ithin about a hundredth of a day, giving an
in 2500 years. Of course the Mohammedan
its beginning retrograding through the dif-
mode given in Turkey, p. 405, does very well to determine the commencement, except that when the Christian year contains the commencements of two Mohammedan years, the rule will only give one: the other however may easily be inferred. When the comparison of dates is to be very close, no easy rule will be sufficient, and recourse must be had either to the list in the 'Art de vérifier les Dates,' or to the rule and supplementary tables in the 'Companion to the Almanac' for 1830. The year 1 of the Hegira begins from July 16, 622, and the year 1260 begins January 10, 1844. But from and after the year A.D. 1583 (991 of the Hegira) the 'Art de vérifier les Dates' gives two commencements for every year (the second twelve days later than the first), which are, it says, according to the old calendar and the new one: no mention is made of this distinction, that we can find, in the introduction to that work, nor in other common sources. Our 'Nautical Almanac' gives the commencements according to the new calendar.

The unwise attempt made by the French, during their first Revolution, to alter the names and dispositions of the years and months, might now be quietly consigned to oblivion, if it were not that many excellent works bear the revolutionary dates upon their title-pages, and political occurrences are frequently referred to them during the short period of their florescence. The year 1 of this period was made to begin September 22, 1792; each period of four years, or Franciad, had an Olympic or bissextile at its end. The three omitted leap-years of the Gregorian correction were found by the same rule as before, relatively to the years ending with 00: and the 4000th year was not to be leap-year. The year consisted of 12 months of 30 days each, with five sacred days at the end, dedicated to Virtue, Genius, Labour, Opinion, and Reward; the bissextile day being appropriated every fourth year to the renewal of the oath of liberty. Each month had three decads. The months were—

	Beginning		Beginning
Vendimiaire .	Sept. 22	Germinal .	March 21
Brumaire . .	Oct. 22	Floréal . .	April 20
Frimaire . .	Nov. 21	Prairial . .	May 20
Nivose . .	Dec. 21	Messidor .	June 19
Pluviose . .	Jan. 20	Fervidor or Thermidor } .	July 19
Ventose . .	Feb. 19	Fructidor .	Aug. 18

The sense of this nomenclature was exceeded by the wit of an English parody, in which the winter months were called Freezy, Wheezy, Breezy; we forget the rest.

The years were as follows:—

	Beginning		Beginning
An I. .	Sept. 22, 1792	An VIII. .	Sept. 22, 1799
„ II. .	„ 1793	„ IX. .	„ 1800
„ III. .	„ 1794	„ X. .	„ 1801
„ IV. .	„ 1795	„ XI. .	„ 1802
„ V. .	„ 1796	„ XII. .	„ 1803
„ VI. .	„ 1797	„ XIII. .	„ 1804
„ VII. .	„ 1798	„ XIV. .	„ 1805

But An XIV. did not live half its days; for on Jan. 1, 1806, the Gregorian calendar was resumed, and the republic, which had legislated for the 4000th year of its existence by name, wore its own livery just one day and a quarter for every one of those years.

YEAST, or FERMENT, a substance which is deposited in an insoluble state during the fermentation of wine, beer, and vegetable juices. This substance, as is well known, is employed to produce fermentation in saccharine solutions. According to Liebig, the insoluble part of yeast does not cause fermentation, for he states that if it be 'carefully washed with water, care being taken that it is always covered with water, the residue does not produce fermentation.'

Neither, according to the same authority, does the soluble part of yeast excite fermentation until it has been allowed to cool in contact with the air, and to remain some time exposed to its action; if in this state it be introduced into a solution of sugar, it produces brisk fermentation.

Yeast is a product of the decomposition of gluten, and when added to a solution of pure sugar, it gradually disappears; but when added to vegetable juices which contain gluten as well as sugar, it is reproduced by the decomposition of the gluten, in the same way as it was originally formed.

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* 8 days in 33 years
lter than the Gre-

According to Professor Graham, the action of yeast and all other ferments is destroyed by the temperature at which water boils, by alcohol, by acids, salts of mercury, sulphurous acid, chlorine, iodine, bromine, by aromatic substances, volatile oils, and particularly empyreumatic oils, smoke, and a decoction of coffee; these bodies in some cases combining with the ferments or effecting their decomposition.

YEDO. [JAPAN.]

YEKATERINOSLAW. [EKATERINOSLAW.]

YELL. [SHETLAND, ISLES OF.]

YELLOW. [CALICO PRINTING; DYEING.]

YELLOW FEVER, a disease of frequent occurrence on the eastern and western coasts of America, in the West Indies, in Africa, and in Europe on the southern shores of Spain. The prevalence of this disease in these countries, its great fatality, and the mortality it produces in navies and armies, have attracted much attention towards it both from governments and medical men. This disease has been described under other names, such as typhus icterodes, Bulam fever, bilious remitting fever, vomito negro, vomito prieto, endemial casus, mal de grain, &c. Although this disease has a very distinct history, and can be easily distinguished by the mass of symptoms it presents, yet it is difficult to give in a few words anything like a satisfactory definition. Dr. Gillkrest, one of the most recent writers on this subject, gives the following definition: a disease in which 'yellowness of the skin, partial or general, and towards the fatal termination, vomiting of a black or dark brown fluid, are frequent though by no means constant occurrences.' Such a definition would be of little use for distinguishing the disease, and perhaps after all it will be found that yellow fever is only a modification, under peculiar circumstances, of some primary form of disease in which all fevers originate. It is certain that this disease has many symptoms in common with other fevers, and that it assumes the types of the common, continued, remittent, and intermittent fevers.

It has only been within a comparatively recent period that this disease has attracted much exclusive attention, and on this account some writers regard this disease as one altogether of modern origin, and fix the date of its generation during the latter part of the eighteenth century. But although no accurate account of this disease as distinguished from other fevers exists, previous to its appearance in the island of Granada, in 1793, yet there can be no doubt that the records of the occurrence of destructive fevers in those districts in which the yellow fever now occurs, refer to the same disease.

The attack of yellow fever is mostly preceded by well-marked premonitory symptoms. For two or three days previous to the attack there is a depression of spirits and an unnatural inactivity without any sufficient accountable cause. There is sometimes nausea, with a creeping chilliness, and pains in the loins, back, arms, legs, and head. The eyes are suffused, dull, and heavy, and the sight is dim and sometimes double. There is often slight confusion of mind and a kind of drowsy restlessness. The appetite is bad, the taste is perverted, and the bowels are either confined or relaxed. The skin is in some cases permanently dry, or there may be sweating after slight flushes of heat. The pulse varies considerably; it may be small, quick, and irregular, or soft and full. Such symptoms do not however always occur, and sometimes the patient is seized immediately with a shivering, the indication of the near approach of the worst symptoms. Sometimes during this premonitory stage there may exist a yellowness of the eyes and of the skin, and also a vomiting of bilious matter.

The commencement of the febrile attack mostly takes place at night: after the shivering, a state of general excitement takes place, which sometimes increases to a very distressing and unmanageable extent. Pains occur in the head, in the eyeballs, in the back and loins, and cramps in the gastrocnemic muscles. The patient prefers the recumbent position and lies upon his back, but is in a state of great restlessness, frequently throwing his arms about, more especially above his head. The face is usually flushed, sometimes of a crimson hue, and occasionally swollen so as to appear bloated and heavy. The eye has a heavy drunken appearance, is injected, swollen, and moistened with tears; the pupil is generally permanently dilated, and the balls seem protruded as if they would start from their sockets. The skin is in most cases flushed, dry, and warmer than natural. The pulse is accelerated, soft, full, and compressible; in some cases however it is unusually slow, and under these circumstances the skin is unnaturally cool. The tongue is swollen and coated with a white mucous paste. Vomiting does not often occur in this stage. The bowels are frequently more or less constipated, but easily acted on. The intellectual functions are more or less deranged. These symptoms last for 12 or 13 hours, when the second stage may be said to commence. The general excitement now gives way to depression. The countenance becomes deeply expressive of anxiety. The congested state of the eye begins to yield, and in its place a slight yellow tinge is observed. This goes on increasing till it extends down the alæ of the nose and around the mouth. As the disease advances, in most cases the yellow tinge spreads itself over the whole skin, giving to the whole body, according to the complexion or temperament, various colours, from a pale lemon to deep orange or saffron colour. The pulse becomes slightly lessened in frequency. The coating on the tongue becomes yellow, and this organ towards its root and at the edges and tips has a clean and dry red appearance. The stomach now becomes irritable and painful on pressure. Food is immediately rejected. There is a distre[illegible] sensation of internal heat. The vomiting is sudden [illegible] not accompanied with any severe retching. The matt[illegible] vomited are generally ingesta and a clear fluid, and [illegible] sometimes is bile discharged. The alvine secretio[illegible] mostly natural. The urine is diminished in quantity, [illegible] very yellow. There is frequent sighing of a deep and [illegible] longed character. In malignant cases the breath [illegible] has an acid odour. The intellectual functions are [illegible] affected, and the patient is in a state of low [illegible] delirium or comatose. Sometimes petechiæ and [illegible] vesicles occur in this stage. In this state the patient [illegible] remain from two to seven days. The countenance [illegible] becomes more collapsed, the eye loses its full and [illegible] nent character, dark-coloured blotches and petechiæ [illegible] on the body, the pulse becomes small and thready, [illegible] tongue loses its coating and becomes bright red, [illegible] becomes urgent, and there is lastly the vomiting of a [illegible] and mucous-looking fluid which has been called the '[illegible] vomit,' and has in fact given the name sometimes [illegible] disease. This symptom however does not always [illegible] As death approaches the exhaustion becomes greater, [illegible] respiration is hurried and noisy, the surface and extre[illegible] become cold, and covered with a general clammy [illegible] tion. In some the last moments are marked with [illegible] pain and strong convulsions, whilst in others death [illegible] to come upon the patient unawares.

These general symptoms are by no means presented [illegible] every case, some having been constantly observed by [illegible] medical writer, whilst others have never witnessed the[illegible] all. Amongst the forms which this disease assumes, [illegible] are mentioned by some writers as pointing out impo[illegible] differences in the character of the disease: these are [illegible] inflammatory, adynamic, and malignant. The [illegible] *matory* occurs in full plethoric habits, and the wh[illegible] the symptoms indicate a greater amount of excitement [illegible] activity, and the disease proceeds to a fatal termi[illegible] sooner. The *adynamic* variety occurs in those who [illegible] deficient animal vigour. In this form of the disease [illegible] pulse is slow, the skin cold and clammy; no resis[illegible] appears to be made to the progress of the disease, and [illegible] patient sinks in the course of four or five days. The [illegible] *lignant* form is the worst of all. From the first the p[illegible] seems attacked with death. All the symptoms are [illegible] from the beginning, and no reaction is established. [illegible] sons seldom recover from this state, and many die d[illegible] the first twenty-four hours of the attack.

The nature and origin of the black matter which is [illegible] often vomited in cases of yellow fever has been the sub[illegible] of much investigation. The most correct view is prob[illegible] that of Dr. Fordyce, who considered that it was iden[illegible] with the incrustation of the tongue, gums, and lips [illegible] generally in violent fevers, and that probably this is [illegible] exudation thrown out from the surface of the stomach, [illegible] even from the duodenum and jejunum. When collected [illegible] and given to animals, it produced no bad effect upon [illegible] and an atmosphere impregnated with its exhalations [illegible] not appear to be injurious. Under the microscope [illegible] the appearance of minute scales of smoked mica, being

n or red colour. It is probably nothing more
obules of blood broken down, which have oozed
e surface of the mucous membrane, instead of
y secretion, and perhaps under the influence of
vomiting. It may frequently be mixed with
does not appear in the majority of cases to
haracter of bile at all.

lifficult to give a definition of yellow fever, so
lt to give any rules by which it may be distin-
individual cases from other diseases. Its oc-
wever generally in several individuals at the
soon leads to the development of the group of
which we have described, and by which it may
ished from allied diseases.

tality from this disease is always very consider-
usually much greater at the commencement of
iic than it is at subsequent periods. In some
ll the cases occurring for the first few days after
g out of the fever have proved fatal. Some-
ever the disease is very mild, and but few fatal
r. The mortality is generally greatest amongst
and robust, and this will perhaps account for its
nongst soldiers and seamen. 'According to
says Dr. Shapter, 'of 161 cases which oc-
New York, 5 were betwixt the ages of 1
betwixt 10 and 20; 40 betwixt 20 and 30;
30 and 40; 36 betwixt 40 and 50; 15 be-
nd 60; 6 betwixt 60 and 70; 2 betwixt 80
f this number 6 only were coloured persons, of
e were blacks and three mulattoes. Of the
iber 59 were females, the mortality amongst
mparison with men was as 1 to 30. From the
e it appears that two-thirds of the deaths oc-
ween the ages of 20 and 50; and that of the
nearly as many were under 20 as above 50;
more than three times as many between 10 and
een 1 and 10; and nearly twice as many be-
nd 60 as between 60 and 90. It is a little re-
nat very nearly the same numbers died between
20 and 30, 30 and 40, 40 and 50.' This fever
l to be peculiar to places between 40° N. lat.
and requires a climate in which the mean sum-
s not less than 75°, or according to some authors
arly all places within the above range of lati-
aving the above temperature, where the shores
by the sea, does the yellow fever appear occa-
a devastating pestilence decimating the popu-

bid appearances of the body after death do not
light on the nature of this disease. In the head
ater is found studded with dark-coloured spots;
rachnoid is frequently accumulated a yellowish
ne lesions in the chest are not remarkable. The
generally distended with air, its mucous sur-
asionally effused with blood, and its vessels
ly gorged with blood. The orifices of numerous
be seen, from which by slight pressure oozes a
appears to be the 'black vomit.' The small
participate in some measure in the lesions of
h. The liver is sometimes engorged with
sometimes it is hard and dry. The spleen is
eased in volume and softened.

reatment of yellow fever much difference of
s prevailed, according to the opinions of those
to treat the disease; and unfortunately that
lence does not at present exist on which we could
gard to the value of any particular course of
Under these circumstances the judicious prac-
l act on general principles, and treat whatever
before him according to the symptoms they
As is mostly the case in the treatment of fevers
heir course exhibit both active and low symp-
ery different plans of treatment have been re-
d; the one antiphlogistic, the other stimulant.
iscussing the respective merits of these plans of
it may be stated that both may be rendered
n different stages of the disease. In the ma-
ses the patient will bear blood-letting at the
ment of the disease, and this is the more earn-
had recourse to, as in most cases the stomach is
le to bear the introduction of medicines. Blood-
ould be carried to the extent of producing a
fect on the symptoms. As a general rule, this
remedy should not be had recourse to after the second day of the attack. The next remedy in importance is mercury. Some of the best writers on yellow fever, and those who have had the largest experience, consider mercury as their sheet-anchor in this disease. It should be administered in doses of sufficient quantity to affect speedily the mouth. Many practitioners who use this remedy do not employ blood-letting as an ordinary remedy, but only in those cases in which the inflammatory symptoms preponderate. In addition to these means, purgatives, emetics, antimonials, and cold affusion have had their advocates. These remedies are however all of them adapted more to particular states of the system than to the disease of yellow fever, and should be administered according as circumstances arise which may indicate their necessity. With regard to the tonic or stimulant system altogether, it may be stated that this practice is now almost entirely condemned by British and American practitioners. In cases where the disease assumes a remittent form, quinine may be administered with advantage; but the administration of bark, so much in vogue amongst the Spanish medical men, is now very generally condemned. Dr. Stevens particularly insists on the administration of saline medicines in yellow fever, to which there is no objection, provided the stomach will retain them, and they probably have a beneficial effect on the system according to his theory.

Of all the questions connected with yellow fever, perhaps that which regards its *cause* has been discussed with the most zeal and bitterness. We cannot here go into any details of this discussion, but the great point in dispute is the contagiousness of this disease. Many of the early writers on yellow fever concluded that it was contagious, and on this account persons who have been exposed to its influence are obliged to submit to the most rigid quarantine regulations. But during the last twenty years medical men attached to the various troops and hospitals where this disease has appeared have made many careful observations, and the result is an increasing conviction of the non-contagiousness of this disease. But whilst there is much evidence to prove that this disease is not communicable by any morbific matter that may be generated in the human system in a state of disease, there can be no doubt that it has in most cases a local origin. Many recent writers have supposed that the local cause of this disease was to be found in the temperature and other atmospheric phenomena in the district visited by the disease; but this cause is too general to account for the exceeding local character of the disease in many instances. Cases are recorded in which the inhabitants of particular parts of a town, the one side of a street, or even one room of a house, have been attacked, whilst all others have escaped. Although the existence of *malaria* generated by decomposing vegetable matter has not been demonstrated, yet the occurrence of yellow fever in particular localities can be so well explained on this supposition, that the theory of the malarious origin of this as well as other fevers must be looked upon not only as the best explanation of the phenomena that occur, but as leading to highly beneficial and important results in the treatment and prevention of this disease.

(*Library of Practical Medicine*, article 'Yellow Fever,' by Dr. Shapter; *Cyclopædia of Practical Medicine*, article 'Yellow Fever,' by Dr. Gillkrest; Bancroft, *An Essay on the disease called Yellow Fever*.)

YELLOWHAMMER, *Emberiza citrinella*, Linn.

Description.—Male.—Head, cheeks, front of the neck, belly, and lower tail-coverts bright yellow; on the breast and sides reddish spots, which on the sides have a black streak in their centre. Feathers of the top of the back blackish in the middle and inclined to rusty on the sides; those on the rump bright chestnut terminated with greyish; tail-feathers blackish, the two lateral ones with a conical white spot on the inner barbs. Iris deep brown, feet yellowish. In the *old male* the yellow is more extensive and less mingled with the olive spots seen on the head, cheeks, throat, and abdomen of the young, which have no yellow on the head before the moult, this last part being spotted with blackish like the rest of the plumage, the ground colour of which is yellowish white. Total length seven inches.

Female smaller than the male. Yellow of the head, throat, and neck more numerously marked with the brown and olive spots with which those parts are sprinkled.

the centre of the breast-feathers and of those of the sides and lower tail-coverts a longitudinal brown spot; yellow of the abdomen pale.

Varieties.—Some parts of the body sprinkled with white feathers. Entirely white, or yellowish-white. Wings and tail often pure white.

Geographical Distribution.—Denmark, Norway, Sweden, in short, throughout Europe to the Mediterranean, England, Wales, Scotland, and Ireland (resident), Orkney and Shetland (visitor).

Pennant quotes the *Bruant* of Belon (*L'Histoire de la Nature des Oyseaux*, p. 366) as this species, and the description seems to warrant the quotation. Belon considers the bird to be the Ανθος (Anthus) of Aristotle (*Hist. Anim.*, ix. 1), and remarks that the Greeks of his time did not call it by the antient appellation in their tongue, but by the Latin name *Florus*, 'car ils ont esté dominez par les Latins, dont ils ont retenu telle diction.' It is the *Bruant* of the French generally; *Serramolle* and *Zivolo di testa gialla* of the Italians; and, according to the *Portraits d'Oyseaux*, *Hortolano*, *Cia*, *Megliarina*, *Verzerot*, *Paierizo*, and *Spaiarda* of the same people. It appears to be the *Groning* and *Golspink* of the Swedes; *Goldammer*, *Ammering*, and *Goldammering* of the Germans; *Geel-Gerst* of the Netherlanders; *Yoit*, *Yellow Yoldrin*, *Yellow Yowley*, and *Yellow Yeldrock* of the modern British; and *Llinos felen* of the antient British.

M. Temminck states that a species closely resembling this in the tints of its plumage inhabits Japan; but that it is specifically characterized by a shorter and rounded tail, and by a small black mask which encircles the bill of the male. For this species M. Temminck proposes the name of *Emberiza personata*.

Habits, Food, &c. of Emberiza citrinella.—The food of the Yellowhammer consists of grain, seeds, and insects, and in winter it joins the flocks of greenfinches, chaffinches, and other congregators in the fields and farm-yards. In the summer the notes of the male, so familiar to every traveller, one repeated five or six times and two others, the last drawn out, ring almost incessantly from the road-side hedge. Sometimes the form of enunciating this strain is slightly changed; thus, the cow-boys, according to Mr. Main, hear in the Yellowhammer's song the following words:—

> 'A lit-tle bit of bread, but no cheese.'

The nest, which is ordinarily made on or very near the ground, sheltered by a bush, in the tangled grass of a hedge or ditch, is framed of moss, roots, and hair well interwoven. The bird breeds late. The four or five pale purplish white eggs are streaked or veined and speckled with dark reddish-brown, and the male takes his turn upon them. The brood is generally out and about early in June.

These birds are caught and fatted for the table with the *Ortolan* in Italy, whence probably one of the Italian names above noticed.

Yellowhammer.

'In Scotland,' says the author of 'The Darker Superstitions' of that country, 'the yellowhammer has been considered mystical from three drops of the blood of Satan in its body, but farther explanation is unknown.'

In the 'Portraits d'Oyseaux' the following quatrain is printed under the cut:—

> 'Non sans raison Bruant je suis nommé:
> Au vol et chant aussi semble je bruire,
> Le cheval veult moy et le miens destruire:
> Je suys aussi à luy nuyre animé.'

The last lines allude to the supposed enmity between the bird and the horse, which Belon thus states in his old French:—'Il a haine avec le cheval: lequel il dechasse de son pasturage de l'herbe, de laquelle il se nourrist aussi. Il fait quelque voix qui est comme celle du cheval: pourquoy volant contre le cheval, il l'espouente, et le fait fuir. Il n'a guere bonne veue: et par ce il est quelquefois tué du cheval, s'il le trouve au depourueu.'

YELLOW RIVER, called by the Chinese *Hoang-ho*, is one of the largest rivers in Asia, and the second in magnitude in the Chinese empire. It drains the northern provinces of China Proper, a small portion of Mongolia, and the greatest part of Tangut. The Hoang-ho originates in the high snow-covered mountains which fill up the greatest part of the southern districts of the last-mentioned country [TANGUT, vol. xxiv., p, 32], at a distance of 12 miles from its mouth in a straight line. But as there is perhaps no river on the globe which changes so frequently the direction of its course, and makes such large bends, its course is computed by Ritter to exceed 2480 miles, amounting nearly to double the distance between its source and mouth. The countries drained by the Hoang-ho cover an area of 74,000 square miles, equal to that of the basin of the Yang-tse-kiang, and not inferior to the countries of Western Europe lying west of a line drawn from the most northern recess of the Adriatic to the embouchure of the river Oder in the Baltic.

The sources of the Hoang-ho have never been visited by any European, and are imperfectly known even in China. The antient Chinese geographers, like those of Europe in the seventeenth century, could not comprehend that a large river could be lost in a lake which had no communication with the sea. They therefore imagined that the Tarim River, which is lost in Lake Lop Nor [THIAN SHAN NANLU, vol. xxiv., p. 364], constituted the upper course of the Hoang-ho, and that it was connected with the true sources of this river by a subterraneous channel. Where these true sources were situated was not exactly known until the emperor Kublai, of the Yuen or Mongol dynasty, towards the end of the thirteenth century, sent some persons to discover and to explore the country surrounding them. According to the report made by these persons the sources of the Hoang-ho are found in a depression between the ranges of the Bayan Khara Mountains on the south and the Kuen-luen range on the north. In this depression more than 100 springs are stated to rise from a level plain about 40 miles in circumference. The great number of springs has converted the plain into a swamp, and seen from an eminence the springs resemble the stars of the sky. Hence this tract is called by the Mongols, Hotun Nor, or Star Lake, and by the Chinese Sing-su-hai, or 'the sea overspread with stars.' The water brought up by these springs unites at a short distance in two lakes, called Ala-nor by the Mongols. This Ala-nor is therefore to be considered as the true source of the Hoang-ho.

Upper Course.—The Ala-nor lies in 35° 20′ N. lat. and between 96° and 97° E. long. The river issuing from the lake on the east is called Tshi-ping-ho (the river with the red banks), and after having been joined by three tributaries it falls into the Alpine lake Oling-hai, from which it issues under the name of Hoang-ho. Its course being opposed by the immense rocky masses of the Kuen-luen, the river runs for more than 30 miles southward, w resumes its eastern course and continues in that di for about 160 miles. To avoid the high mountains Bayan Khara range, which stand in its way, the turns with a bold sweep to the west, as if it w to its sources, and flows in that direction al surrounding on three sides the eastern Kuen-luen Mountains. But the wide masses of the same system oppose its e west, and it turns by degrees to th it leaves the mountain region on arriving in Proper at the town of Lant-tsheou, having run from its last turning to this place about 520 miles. Its upper e lies entirely in Tangut, and extends to about 700 On both of its banks the mountains rise with ep and frequently precipitous acclivity beyond the line, and the valley in which the river runs is very w, in many places so much so that there remains not l wide enough for a road. No towns are found in egion, and the few inhabitants are savage tribes, on the produce of their herds, which consist mostly of and yacks. They gather also the true rhubarb-root, grows on the upper part of the mountains near the covered with eternal snow.

ddle Course.—Below Lant-tsheou the Hoang-ho turns sharp bend northward, and flows in that direction, some deviation to the eastward, through five degrees tude. Its course in this direction probably does not hort of 430 miles. When the river has passed 41° it meets the range of the In-shan Mountains, by its course is turned to the east. After flowing near lat. about 180 miles eastward, the mountains bordern China Proper on the north oppose its progress in lirection, and it turns to the south and runs through nountain-region a space of about 520 miles (seven es of latitude) until it enters the great plain of ern China at the mouth of the river Hoai-ho or Weï- Its middle course amounts to about 1130 miles.

ere the Hoang-ho issues from the narrow valleys which pid current has scooped out in the snow-covered masses of Tangut, and at the place where it begins w in a wider valley, about 100 miles above Lantu, the fortress Tsy-tshy-kuan is built. The valley extends from this place to Lant-tsheou and hence and north-east to the mouth of the Thian-shui 30′ N. lat.) is compared by Pater Martini, a native of with the valley of the Inn River at Innspruck, which that the river has left behind the more elevated of the mountain-region, but is still traversing the part of it. In this part of its course, especially above tsheou, the volume of its waters is greatly increased by al large affluents, among which the Huang-tshu, or ang-ho, originating in the Nanshan, flows to it from orth-west, and appears to have a course of more than iles.

the mouth of the Thian-shui the mountains on the of the river disappear, and are replaced by a hilly , in which tracts of fertile and cultivated land are nixed with sandy hills. Proceeding farther north xtent of the fertile grounds decreases until, opposite own of Ning-hia [Tangut, vol. xxiv., p. 31], it is ced by the Steppe of the Ordos, a desert whose surs mostly covered with sand-hills, destitute of wood, early of vegetation, but in the numerous depressions en them are extensive meadows and pasture-grounds, nixed with tracts covered with thick bushes, the of numerous wild animals. Few and limited tracts is country are cultivated, but the Tshoros Mongols their numerous herds occupy nearly the whole of the sula surrounded by the most northern bend of the g-ho. On the west of the river, in the vicinity of the of Ning-hia, is a mountain-range called Holang Shan, however does not rise to a great elevation, probably more than from 3000 to 4000 feet above the surface e river, and is stated not to exceed 3 or 4 miles in . Its eastern declivity is overgrown with forests. tract of country between the Holang Shan and the is several miles in width, and well cultivated, its soil, h sandy, being rendered fertile by numerous canals are fed by the waters of the river. But this fertility ases in proceeding northward, and disappears entirely the river passes 40° N. lat. In these parts Ritter s the greatest elevation of the Gobi, or Great Desert, the river at its most northern course runs in a valley ly depressed below the surface of that extensive table- but it does not appear that it has a bottom along its nor that any tract contiguous to it is cultivated. The of the Gobi being crowned by uninterrupted rocky es which are known by the name of In-shan, the river ed to run eastward until it arrives at the numerhich traverse [illegible] China east of the [illegible] ins of Mongolia. [Mongolia, vol. xv., p. 328.] It is certainly remarkable that in a course of more than 500 miles from the mouth of the Thian-shui to the place where the Hoang-ho bends towards the south, not a single river above the size of a rivulet increases its volume of water, and this fact more than any other indicates the extraordinary nature of the country which extends along this part of its course.

Where the Hoang-ho flows southward its course is very imperfectly known, as it has been seen by the Jesuits only at a few places, where they were obliged to pass it. Below the mouth of the river Targhuen (40° 30′ N. lat.) its width amounts to about 800 feet, and farther down, at Paote-tsheou, it is from 1200 to 1400 feet across, and so rapid, that the imperial court required three days to pass, though great preparations had been previously made for that purpose. It is observed that at this part the current can only be stemmed by vessels when they have a strong wind in their favour, and that it cannot be used as a regular means of water-communication. Farther down, at Lung-men (the throat of dragon), the bed of the river was originally narrowed by projecting high rocks, and also at some other places, but the rocks have been removed by art and the bed of the river thus widened. This proves that the lowest part of its middle course is used as a navigable channel. In these parts, but the place is not more exactly indicated, are cataracts or rapids, which by the Jesuits are compared to those of the Nile. On both sides of the river high ranges lie in such a direction that they traverse the bed of the river obliquely, and hence it is presumed that its course in this region forms short and abrupt bends in the form of a zigzag, but the maps do not indicate them clearly. The number of rivers which fall into the Hoang-ho is very great, but most of them of moderate size, except the Fen-ho, which joins it below Lung-men, and the Lu-ho, whose mouth is at no great distance above that of the Weï-ho or Hoai-ho. These two rivers run about 250 miles. The country on both sides of the river is covered with a succession of mountain-ranges and valleys. The mountains rise to a great elevation, but not above the snow-line, and contain many metallic ores and other minerals, among which coals are named. The valleys are generally very wide and well cultivated, producing every kind of grain which does not require a great degree of heat, for this region experiences severe cold in winter.

Lower Course.—The lower course of the Hoang-ho begins at the sharp bend where at the confluence of the Weï-ho it turns suddenly eastward and enters the great plain of Northern China. The general course of the river is to the east up to its mouth, a distance exceeding 650 miles. It is, as it were, the continuation of its affluent the Weï-ho, which also runs in that direction, and joins the river where it begins to flow eastward. The Weï-ho is the largest and most important of the affluents of the Hoang-ho. Its course probably does not fall short of 400 miles. It rises in the extensive mountain-masses which lie on the boundary-line of China Proper, between 34° and 36° N. lat. and 102° and 103° E. long., and are considered as the northern part of the Yun-liag Mountains, and its farther branches are found where the Pe-ling or Northern range is detached from the great mountain-mass and extends eastward. For about one-half of its course the Weï-ho flows through a narrow valley between steep and high mountains, and we know nothing more of it; at Pao-ki it enters a large valley, which widens considerably in proceeding farther east; but at the place where the river joins the Hoang-ho it is shut in by two mountain-ridges, one advancing from the north-east into the sharp bend of the Hoang-ho, and the other being an offset of the Pe-ling Mountains, and approaching close to the water's edge. The mountain-pass thus formed by these two ridges and traversed by the Hoang-ho is called Thung-kuan, and is famous in the history of China. The valley of the Weï-ho must be of great extent, and of uncommon fertility, as the largest of its towns, Si-ngan-foo, more than once has been the capital of the empire; and even many centuries after the court had left it, this place was compared by the Jesuits with Peking in size. From this town downwards the river certainly is navigable, but we do not know how far upward its navigability extends. The great road leading from Peking to the southern provinces, especially to Su-tchu-an and Yun-nan, lies through the lower part of this valley; and from Paoki it leads southward over the Pe-ling range by a mountain road, which, for the difficulties it presents, and the art and labour with which they have been overcome, does not appear to be inferior to the road over the Simplon in Switzerland. This road leads to Mian-kian, on the Han-kiang, and thence over a less mountainous region to Tshung-tu-foo.

After the Hoang-ho has left the pass of Thung-kian, it enters the great plain of Northern China; but not immediately the low land, as for more than 150 miles its course lies through a hilly country, which extends eastward to the mouth of the Lu-ho. Along the river however is a low tract, which grows wider in proceeding eastward; and its soil, which is formed of alluvium, is very fertile and well cultivated. The hills also, having generally not very steep declivities, have been subjected to cultivation by means of terraces. Having been joined by the Lu-ho, which river runs in the same direction as the Hoang-ho about 200 miles, the great river passes into the lowlands. At this place, according to historical records, the Hoang-ho in former times divided into two branches, of which the northern ran to the north-east and north, and fell into the Gulf of Petcheli. This arm seems to have been the principal branch, and to have been very much navigated; but at some later period it became unfit for navigation, like the Pelusian arm of the Nile. We do not know when nor under what circumstances this happened. It is however certain that on the northern side of the river, between the mouth of the Lu-ho and the town of Kai-fong-foo, morasses occur, which are so extensive that they can only be traversed in several days. In these swampy grounds originates a river, called Weï-ho, which runs northward, and whose waters in the lower part of its course are used to feed the Great Canal. It is very probable that this Weï-ho is the antient channel of the northern branch of the Hoang-ho.

At present the Hoang-ho runs in one channel eastward, and near the town of Kai-fong-foo it borders on a very low and flat country, which is exposed to occasional overflowings, which in China are more feared than war, plague, and famine. As the adjacent country is very low, it was at an early period considered necessary to protect it against the inundations by dikes, built of quarried granite, of great strength. These dikes extend about 100 miles along the southern banks of the river. This had the effect, which has also been experienced in the Po and the Rhine, of raising the bed of the river, so that even when the river is low, its surface is considerably above the adjacent plain. This plain, whose soil is exclusively formed by alluvial detritus, is of extraordinary fertility, and covered with almost innumerable villages and towns. When therefore the river, being unusually swollen, breaks through the dikes, the loss of life and property is immense; and as the country subject to such inundations, according to the opinion of Barrow, is equal in area to the island of Great Britain, the truth of the assertion made by the emperor Khien-long to Lord Macartney, that the Hoang-ho gave him more trouble than all the other cares of government, may be understood in its full force. Besides the regular expenses for maintaining the dikes in repair, which annually amount to more than a million of pounds sterling, government is always anxious to contrive some means of averting the calamities of inundations. The emperors Khangi and Khien-long especially have done much towards that object. In the reign of the last-mentioned monarch a large canal was made for the purpose of avoiding the too great accumulation of water in the Hoang-ho. This new canal begins at Y-fong-hien, in the province of Honan, and extends in a south-eastern direction to an arm of Lake Hung-tseu-hu (hu signifies lake). This canal is nearly 100 miles long, and it is stated that it had the effect of lowering the general surface of the river by about 70 feet. Large tracts of land which formerly were always under water have been laid dry and rendered fit for cultivation.

About 70 miles above its mouth the Hoang-ho receives a great supply of water by the channel by which Lake Hung-tseu-hu discharges its waters. This lake receives not only the waters brought from the Hoang-ho by the New Canal, but also those of the river Hoai-ho. The numerous rivers which unite with the Hoai-ho drain the extensive country which extends between the Hoang-ho and Yang-tse-kiang, and most of them rise in the most eastern offset of the Pe-ling range, which is known by the name of Mu-ling, and divides the provinc from Hupe. The two largest branches are calle and Huai-ho, and when the first named, which far from the banks of the Lu-ho, is considered as cipal branch, the whole course of the river ex miles. The country drained by this river is fla pears to be less fertile than other portions of plain. A short distance below the place where th of Lake Hung-tseu-hu unites with the Hoang-h two entrances of the Great Canal, which are quays, built of large square pieces of granite an and are nearly a mile wide. The Chinese gate the canal consider the passage of the gerous, on account of the great rapidity of th which frequently carries the barges far below th entrance. We have no account at all respe course of the Hoang-ho between the canal an bouchure in the Hoang-hai or Yellow Sea.

(Du Halde's *Description Géographique, H Chronologique, &c. de l'Empire de la Chine*; *Authentic Account of Lord Macartney's E China*; Barrow's *Travels in China*; Ellis, *Jour Proceedings of the late Embassy to China by herst*; Abel's *Narrative of a Journey in the I China*; Klaproth's *Mémoires relatifs à l'Asie*; *Erdkunde von Asien*, vol. i. and iii.)

YELLOWSTONE RIVER. [MISSISSIPPI R

YEMEN. [ARABIA.]

YENESEI. [ALTAI; SIBERIA.]

YENISEISK. [SIBERIA.]

YENITE (*Ilvaite, Lievrite*) occurs massive lized. Primary form a right rhombic prism parallel to the long diagonal; the lateral prism usually longitudinally striated. Fractu uneven, or imperfectly conchoidal. Hardness Brittle. Colour black, with a shade of brown streak the same. Lustre imperfectly metallic. Specific gravity 3·994.

Massive Varieties—Amorphous, structure colum pact. Before the blowpipe on charcoal it melts without effervescence into an opaque black glass magnetic; by glass of borax a yellowish gree opaque glass is obtained. When heated in muria a gelatinous mass of silica remains.

Found chiefly in the Island of Elba at Rio la and Cape Calamita, in crystals of considerable siz been discovered also at Kupperberg in Silesia, at in Norway, in Siberia, and North America.

This substance, which is a double silicate of li iron, has been several times analyzed; the results greatly differ: the annexed are those obtained meyer:—

Silica	29·278
Lime	13·779
Protoxide of iron	52·542
Protoxide of manganese	1·587
Alumina	0·614
Water	1·268
	99·068

YEO, river. [SOMERSETSHIRE.]

YEOMAN, YEOMANRY CAVALRY. O rious derivations attributed to the word yeo man, young man; jemand, any one; gemein, goodman—perhaps 'gemein' or 'common' is probable. A yeoman is at the head of the class gentlemen; he is in legal understanding a legalis homo, who may dispend of his own fre yearly. In an antient statute (20 Ric. II., c. 2, ('Vadlez appellez yomen') are prohibited, i with all other persons under the rank of an es wearing any lord's livery unless they form lord's household; and Fortescue (c. 29), who w what more than half a century after the passi Act, says that there are yeomen (valecti) who out of their patrimony 600 skutes a year, a according to some computations, to 130*l*. The man is used in inferior offices about the palace; is a body guard called the yeomen of the ki established by Henry VII., and by some writers the first approach towards a standing army, wh the king upon state occasions. It consists o in the costume of the sixteenth century, and nded by a captain and other officers. The vulgar f beef-eaters, by which they are known, is a cor- of buffetiers, from their having been stationed in nquets at the buffet or sideboard.

g the long war consequent on the French revolu- l whilst this country was threatened with invasion, as embodied in almost every county a mounted der the name of Yeomanry Cavalry. It was to the same regulations, when on service, as the and consisted of volunteers, of whom a large pro- were gentlemen or wealthy farmers; they were l and in most respects equipped at their own ex- but they received pay whilst in actual service, and s some small allowance made by the crown towards mental expenses, such as the permanent pay of missioned officers. They were commanded by the tenant of the county, who granted commissions to ltern officers.

irst act for embodying corps of volunteers was in the spring of 1794 (34 Geo. III., c. 31). It hat all persons who may during the war then oluntarily enrol themselves under officers holding ions for that purpose from the king or from the nts of counties, shall be entitled to receive the pay l be subject to the same discipline by courts mar- posed of volunteer officers, as troops of the line, if called upon by the king in case of actual invasion rance of invasion they shall march out of their own or assemble within it to repel such invasion; or hall march at the command of the king or of the nt or the sheriff of the county to suppress riots or within it or the adjacent counties. The Act ts volunteers from the militia; it gives power to rates to billet the non-commissioned officers and ers on tavern keepers; and grants to commissioned s a right to half-pay, and to non-commissioned s the benefit of Chelsea Hospital if they are disabled on actual service.

he year 1798 another Act was passed (38 Geo. III.,), to facilitate the training of volunteer corps of ry, who are called in the title to the Act, though not body, 'yeomanry cavalry.' It authorizes the billet- f the privates when called out to be trained, and it pts from taxation the horses used in the service. the short peace in 1802 the provisions of the pre- g Acts were renewed (42 Geo. III., c. 66), and the ence of the volunteer corps of cavalry (called by this for the first time 'yeomanry cavalry') was revived or nued, without reference, as in the previous statutes, to hen existing war.

late years, although many of these yeomanry nents still exist, they are rather maintained for the ose of amusement and good fellowship, than for any tical service; the necessary awkwardness of the men horses in military evolutions, and their want of that per and self-control which distinguish British troops of line, make it dangerous to employ them for the quell- of disturbances, and this the more because they are ably themselves strongly excited by the local questions of which the disturbances arise. Thus in the year , when a vast meeting was held at Manchester, it was ersed by the yeomanry of that district with great, and, ost men deemed, needless carnage.

ccording to a Parliamentary Return, there were, in , 338 troops of yeomanry cavalry, including 1155 rs and 18,120 men, at a cost of about 100,000*l.* a to the nation. In 1838 the number of troops was ced to 251, and the privates to 13,594. Between the 1816 and 1838 the average annual expense of main- ng the yeomanry corps was 128,000*l.*; the greatest being in the years 1820, 1821, and 1822, when the al average exceeded 192,000*l.* [Militia.]

OVIL. [Somersetshire.]

SO. [Japan.]

TLAND. [Shetland.]

W. [Taxus.]

ZD. [Persia, xviii., 475.]

GA (from the Sanscrit radical, *yuj*, 'to join') means mplete abstraction from all worldly objects, by which indu ascetics hope to attain final emancipation from er migrations, and union with the universal spirit *mâtma*). It chiefly consists in a continual meditation on the sacred monosyllable *Om* (the mystic name of the deity), profound contemplation of the divine excellence, and various acts of self-denial. The horrible tortures which the *Yogis* commit on themselves are well known, and it is needless to repeat them here. It may however be necessary to mention that the *Yoga* is often practised for the purpose of obtaining the eight magical properties of power, viz.:—shrinking into a minute form to which everything is pervious (*An'imâ*); or enlarging to a gigantic body (*Mahimâ*); or assuming levity (*Laghimâ*), rising along a sunbeam to the solar orb; or possessing unlimited reach of organs (*Prâpti*), as touching the moon with the tip of a finger; or unbearable weight (*Garimâ*, for instance, sinking into the earth as easily as in water); dominion over all beings (*Is'atwam*); faculty of changing the course of nature (*Vas'itwam*); ability to accomplish everything desired (*Prâkâmyam*). Consequently a *Yogî*, imagined to have acquired such faculties, is to vulgar apprehension a sorcerer, and is so represented in many a drama and popular tale. In the Purân'as and other works, Yoga very often means magic, or the art of deluding.

Yoga is also the name of a branch of the Sânkhya school of philosophy, for an account of which see Sanscrit Language and Literature.

YONNE, a department of central France, bounded on the north-east by the department of Aube, on the east by the department of Côte d'Or, on the south by the department of Nièvre, on the west by that of Loiret, and on the north-west by that of Seine et Marne. The department lies between 47° 20′ and 48° 24′ N. lat., and between 2° 55′ and 4° 20′ E. long. The form of the department is irregular; its greatest dimension or length is from the bank of the Yonne at Villeneuve-la-Guiard, above Montereau-fault-Yonne, in the north-west, to the junction of the three departments of Yonne, Nièvre, and Côte d'Or in the south-east, 82 miles; the greatest breadth at right angles to the length is from the border of the department of Aube near Neuvy to the junction of the three departments of Yonne, Nièvre, and Loiret, 53 miles. The area of the department is estimated at 2821 square miles, being considerably larger than the average of the French departments, and larger than any English county except Yorkshire. The population in 1826 was 342,116; in 1831, 352,487; and in 1836, 355,237, showing an increase in the last five years of 2750, or about 0·8 per cent., and giving 126 inhabitants to a square mile. In amount of population it is considerably below the average of the departments, and in density of population still farther below the average. Auxerre, the capital, is 88 miles in a direct line south-east from the barriers of Paris, or 100 miles by the road through Melun, Montereau-fault-Yonne, Pont-sur-Yonne, Sens, and Joigny.

The department has no mountains; but it has in many parts an undulating surface; the highest ground is toward the south-western corner, where the low hills which separate the basin of the Loire from that of the Seine cross the department. The country about Avallon is comprehended in the granitic district of Morvan; the rest of the department south-east of a line drawn from Cosne on the Loire, by Auxerre, toward Troyes, is occupied by the oolitic and other formations which intervene between the cretaceous and the new red-sandstone groups, and the part of the department which is north-west of such line is occupied by the cretaceous formations which surround the chalk-basin of Paris. Iron-ore is obtained; freestone, sandstone, and stone suitable for lithography are quarried; and gun-flints, and red and yellow ochre, are procured. A mine of lead and silver was worked in the middle ages near Avallon: the working was resumed in the last century, but was soon abandoned.

The department belongs almost entirely to the basin of the Seine. Some parts along the western border are drained by the Loing; and by the Ouanne, the Clery, the Bez, and the Lunain, all of them small affluents of the Loing; the central and eastern parts are drained by the Yonne; by the Cure, the Serein. the Armançon, the Tholon, the Vrin, and the Vannes, feeders of the Yonne; and by the Voisin (with its affluent the Cousin), and the Armance, feeders respectively of the Cure and the Armançon.

The Loing and its feeder the Ouanne rise in the south-west part of the department, and have a north-western course into the adjacent department of Loiret, in which their junction takes place. The other feeders of the Loing have only their sources and the upper part of their course in this department.

The Yonne rises in the department of Nièvre, near Château-Chinon; and flows north-north-west by Château-Chinon, Morceaux, Tannay, and Clamécy, into the department of Yonne. Its course through this department is on the whole still north-north-west: it passes Coulanges, Châtel-le-Censoy, Mailly-le-Château, Cravant (just above which it receives the Cure on the right bank), Auxerre, Joigny (between these towns it receives the Serein and the Armançon, both on the right bank); and just below Joigny it receives the Tholon and Vrin, both on the left bank), St. Julien, Villeneuve-le-Roy, Sens (near which it receives the Vannes on the right bank, Pont-sur-Yonne, and Villeneuve-la-Guiard. Below Villeneuve-la-Guiard it quits the department and enters that of Seine et Marne, through which it flows a short distance west-north-west to Montereau-fault-Yonne, where it unites with the Seine. Its whole course may be estimated at about 150 miles, namely, about 56 in the department of Nièvre, about 88 in that of Yonne, and 6 in that of Seine et Marne. The river is employed for floating timber from near its source: at Clamécy the timber is formed into trains or rafts, and floated down to Auxerre. At Auxerre the navigation commences, and extends for about 60 miles, the greater part of it in this department. The official statement gives the navigation of the river in this department at 64 miles.

The Cure rises in the department of Nièvre, and flows north-north-west into the department of Yonne, and by St. More and Vermanton into the river Yonne: its whole course may be estimated at above 50 miles, about half of which is in this department. It is used for floating timber. The Voisin, which joins the Cure, and its feeder the Cousin, both rise in the department of Côte d'Or, and flow north-west; the length of the Voisin is about 30 miles, and of the Cousin about 14. The Serein rises in the department of Côte d'Or, and flows north-north-west into the department of Yonne, where its course is at first in the same direction, but afterwards it bends more towards the west: it passes Montréal, L'Isle, Noyers, Chablis, Ligny-le-Châtel, and Seigneley, and falls into the Yonne. Its whole course is more than 80 miles, about two-thirds of it in this department.

The Armançon rises in the department of Côte d'Or, and flows north-north-west by Semur into the department of Yonne, through which it flows north-west by Nuits, Ravières, Ancy-le-Franc, Tanlay, Tonnerre, Epineuil, and Dannemoine; then westward by St. Florentin and Briénon into the Yonne. Its whole course may be estimated at about 92 miles, about 36 in the department of Côte d'Or, and 56 in that of Yonne. The Armance belongs chiefly to the department of Aube: its length is about 27 miles, only 6 or 7 of which are in the department of Yonne. Both the Armançon and its feeders, including the Armance, are used for floating timber; below the junction of the Armance the timber is formed into rafts or trains. The Tholon is 17 miles long, the Vrin 17 miles, and the Vannes about 28: the last rises in the department of Aube, and flows westward, passing Villeneuve-l'Archevêque, Foissy, and Chigy; it is used, as well as the Vrin, for floating timber.

M. Millin (*Voyage dans les Dép. du Midi de la France*, ch. xii.) thus describes the manner of sending timber down these streams:—'One is particularly pleased to see pass with the rapidity of a bird's flight those long and narrow rafts called "trains," which convey to Paris a considerable part of the wood necessary for the consumption of that great city. This wood is cut in the forest, made into logs for the fire, or squared for timber. The wood for this last purpose is conveyed in carriages to the bank of the river and put into boats. The logs are marked with the proprietor's mark, taken to the little streams which flow into the Yonne, and thrown indiscriminately in. Persons are appointed along the banks of these streams to watch that the logs pursue their course. The Cure, the Amançon, and the Vannes are the rivers which bring down this floating wood. At their outfall the logs are stopped, and the persons employed distinguish by the mark those which belong to each proprietor. The logs, tied together with twigs, are placed on hollow vessels or floats ranged at intervals, and form "trains," each guided by three men, to Paris. These bold pilots skilfully follow the windings of the banks, avoid the shoals, with which they are well acquainted, exhibit their quicksightedness and all their skill in sh ing the bridges, through which they pass as quick as li ning: the head of the train is scarcely seen, when in instant it is already far off. As soon as the train ar at the wharfs at Paris, men plunge into the water up to middle, pull it to pieces, and pile the logs in the w yard. However, a sudden rising of the waters or a frost sometimes occasions terrible disasters: sometimes in a forgetful moment the frail construction is allow get out of its course, the train strikes against the pa bridge, breaks, and the water is covered with the w which are picked up by a crowd of people, but with proprietor being able to recover more than a very s part.'

There are two navigable canals in the department, na from the provinces through which they pass. The C de Bourgogne connects the river system of the Seine that of the Rhône. It commences in the Yonne, and up the valley of the Armançon chiefly on the ri north-east bank of that river, then up the valle Brenne, a feeder of the Armançon, and, crossing which separate the basin of the Seine from the Rhône, follows the valley of the Ouche till it ter the Saône at St. Jean-de-Losne. The summit-l Pouilly in the department of Côte d'Or, so that of the canal which is in this department officially stated at 91,638 mètres (about 57 mil side of the descent from the summit-level to this descent is of 311 mètres (about 1020 effected by 115 locks. This canal was proje IV., but was not commenced till 1775; and i which we have no certain information) has bee pleted only within a very few years. The Canal du Ni nais, called also Canal de Coloncelle, commences in the Loire at Decize, in the department of Nièvre, 21 m above Nevers, and passes up the valley of the Aron cluding part of the course of that river in its line; at the head of the valley the summit-level (nearly 2¼ miles long) is carried by a tunnel, nearly half a mile long, under the mountain of Coloncelle. From the summit-level the canal descends to the commencement of the navigation of the Yonne at Auxerre, a considerable part of the course of the river above Auxerre being comprehended in it. The part of the canal which belongs to this department, including all the incorporated part of the course of the Yonne, is officially stated at 33 miles. What progress has been made in the works of this canal we have no means of knowing. The descent from the summit-level towards the Loire will be effected by 28 locks; that towards the Yonne by [illegible] locks.

The number of Routes Royales, or government roads, on January 1, 1837, was six, having an aggregate length of 326 miles, of which 272 miles were in good repair, 34 miles in bad repair, and 20 miles unfinished. The principal roads are those from Paris to Lyon by Auxerre and by Dijon, both of which are of the first class. The road by Auxerre, which is the principal, enters the department on the north-east side near Villeneuve-la-Guiard, and follows the valley of the Yonne, passing by Pont-sur-Yonne, where it crosses the Yonne from the left bank to the right: then by Sens, Villeneuve-le-Roy, Joigny, where it recrosses the Yonne to the left bank, Auxerre, where it crosses the Yonne a third time, and by Vermanton into the department of Côte d'Or. It formerly passed through Avallon, but a short cut has been made, by which that town is avoided. The road through Dijon branches off to the left from the road by Auxerre at Joigny, and follows the valley of the Armançon, passing through Briénon, St. Florentin, Dannemoine, E neuil, Tonnerre, Ancy-le-Franc, and Nuits, into the department of Côte d'Or.

Roads lead from Auxerre west-south-west by To St. Fargeau to Bonny on the Loire, in the department Nièvre; south to Clamécy, Nevers, and Moulins; north-north-east by St. Florentin and Neuvy to Troyes Châlons-sur-Marne. A road leads from Sens eastwar Foissy and Villeneuve-l'Archevêque to Troyes; Tonnerre eastward by Tanlay to Châtillon-sur-Seine; from Avallon westward by Vezelay to Clamécy.

The departmental roads had, on January 1, 183 aggregate length of 335 miles, 213 miles in good rep miles out of repair, and 108 miles unfinished. The by-r and lanes were reported at the same time to have a le

8,000 miles, a statement apparently too high to be ct.

Its means of communication this department was by Dupin, in 1827, to be on the whole considerably the average of France; but its pre-eminence was in its means of water-communication than in its n which, in proportion to its area, it was rather below rage.

area of the department comprehends in round num-out 1,800,000 acres; of which about five-eighths, 1,100,000 to 1,150,000 acres are under the plough. oduce in wheat is considerably below the average of ; maize is not grown at all, and buckwheat is grown tle; but in other kinds of grain, oats, rye, maslin, t and rye mixed, and especially in barley, the de-nt far exceeds the average. The cultivation of s is less than the average of the departments. On le the production in grain is greater than the con-n of the department, and above 1000 quarters of 1700 quarters of bread-corn are exported to other ents.

rass lands amount to nearly 80.000 acres, the com-nd other open pastures to 45,000. The department w the average in the quantity of horned cattle bred, pecially in the number of sheep. In the number of it is also below the average, but not so far below as number either of horned cattle or sheep.

vineyards comprehend above 90,000 acres, and in tent of these and in the quantity of wine produced epartment very far exceeds the average; wine is in he staple production of the department. The growth, portion to the number of inhabitants, was estimated ceed the average of the departments in the proportion ree to one. A great quantity is sent to Paris and to departments lower down the Seine. The wines are n by the general designation of 'vins de Basse Bour-e,' or 'Lower Burgundy wines.' Some of them are in repute: the red wines of Dannemoine or Danemoine, erre, and Auxerre are of the first class; and those of e, Clairion, Boivin, Migrenne, Judas, Pied-de-Rat, ir, Quétard, Epineuil, Irancy, and Coulanges-la-Vi-e, of the second class. Of the white wines those of nerre and Chablis are of the first class; and those of y, Maligny, Poinchy, Chiché, Fiey, and Fontenay, all Chablis, are of the second class. Besides these there great quantity of wine of somewhat inferior character.

he orchards and gardens occupy nearly 15,000 acres, the woodlands above 360,000 acres. In the extent of dland the department far exceeds the average, and exportation of timber and firewood, and the manufac-and exportation of charcoal, are important branches ndustry. A considerable part of the supply of Paris in se articles comes from this department: and the de-nd for the iron-works and glass-houses of the depart-nt is supplied. The iron-works were, in 1834, only five number; they comprehended four furnaces for making -iron and ten forges for the manufacture of wrought-n. Charcoal was used simultaneously or alternately h other fuel, as coal, coke, turf, or wood.

The department is divided into five arrondissements as lows:—

rondisse-ments.		Area in Sq. M.	Population in 1831.	1836.	Can-tons.	Com-munes.
uxerre	Central	767	111,980	112,109	12	131
vallon	S.	379	46,966	46,149	5	70
oigny	N.E., Cen-tral, & W.	752	86,872	90,553	9	108
ens	N.	464	60,342	61,036	6	90
onnerre	E.	459	46,327	45,390	5	82
	Total	2821	352,487	355,237	37	481

In the arrondissement of Auxerre are the following wns:—Auxerre, population in 1826, 12,348; in 1831, ,439 (of whom 10,989 were in the town itself); in 1836, ,575, on the Yonne [AUXERRE]; Irancy, Cravant, St. ix or St. Brix or St. Bris, population 1710 for the town, 1948 for the commune, Mailly-le-Château and Cou- nges-sur-Yonne, on the Yonne; Vermanton, population 86 for the town, or 2830 for the whole commune, Chablis, pulation 2532 for the town, or 2555 for the whole com-ne, Ligny-le-Châtel and Seigneley, on or near the rein; St. Florentin, population 2136 for the town, or 42 for the whole commune, on the Armance; Coulanges-la-Vineuse, Charentenay, Toucy, Ouanne, and St. Sauveur, in that part of the arrondissement which lies west of the Yonne. Irancy is known for the wines produced in the neighbourhood. Cravant has some historical interest as the scene of a severe battle in 1423, during the attempt of the English under Henry V. and VI. to conquer France. The lordship of St. Brix or St. Prix belonged to Louvois, the well known minister of Louis XIV., and he and his descendants attempted in vain to establish manufactures in the place. Wine of second quality grows in the bottom in which the town stands. At Coulanges-sur-Yonne trade is carried on in wood and wine: there are three yearly fairs. At Vermanton trade is carried on in firewood and wine, and there are eleven yearly fairs. Chablis has trade in the excellent white wine produced in its vineyards: there are seven fairs in the year. Near Chablis are the traces of a Roman road from Autissiodorum, now Auxerre, to Andomatunum or Lingones, now Langres. Ligny-le-Châtel and Seigneley have productive vineyards, and at Seignelay some trade in wool and some manufactures of woollen yarn and coarse woollen cloth, blankets, and serge, are carried on: there are seven yearly fairs. At St. Florentin, an ill laid out but on the whole handsome town, are several tanyards; trade is carried on in corn, hemp, firewood, and charcoal: there are seven yearly fairs. The town stands on a hill: the fine lofty Gothic church has some antient stained glass of great beauty, and there are an antient public fountain of Gothic design and two pleasant public walks. The Canal de Bourgogne is carried over the Armance, near this town, by a beautiful aqueduct bridge. The Normans were defeated near St. Florentin, A.D. 888, by Richard, duke of Bourgogne, surnamed Le Justicier. St. Florentin was besieged in vain by the Imperialists in 1633. Coulanges-la-Vineuse is celebrated for its wine, from which its distinctive epithet is derived. Toucy has productive vineyards round it, and some manufactures of woollen yarn and coarse linsey-wolsey and of leather are carried on: there is a large weekly cattle-market. St. Sauveur, distinguished from other places so called by the designation of St. Sauveur-en-Puisaye, is in the narrow valley of the Loing, on the right bank of that river, near its source. The townsmen carry on trade in wood and wine: there are seven yearly fairs. On the banks of the Cure, near the south-eastern border of this arrondissement, are the grottos of Arcy, which have been popularly reputed to be above a mile long; but those acquainted with the locality do not estimate them at much more than half a mile or five furlongs, and they are perhaps not so long as that. They comprehend a succession of caverns communicating by narrow passages so low that they can only be traversed by creeping on the ground. They are roofed by stalactites of various forms, and in one of them is a pool of unknown depth.

In the arrondissement of Avallon are the following towns:—Avallon, population in 1826, 5261; in 1831, 5089 for the town, or 5569 for the whole commune; in 1836, 5309, near the Voisin [AVALLON]; Vézelay and St. More, on or near the Cure; Châtel-le-Censoy on the Yonne; Montréal and L'Isle, on the Serein; and Joux-la-Ville, in the country between the Cure and the Serein. Vézelay is an old and ill-built town, antiently fortified; it is on a hill not far from the left bank of the Cure, and is surrounded by vineyards, which produce tolerably good wine. The church is a singularly constructed building; it consists of two parts: the first part, into which the three outer doors open, is about 70 feet long, and is called 'l'église des Catéchumènes,' 'the Catechumens' church;' the second part, with which the first part communicates by three other doors, is called 'la grande église,' 'the great church,' and is about 213 feet long: one of the doors, termed by Malte Brun 'the middle door,' apparently the middle of the three communicating between the two parts of the church, is ornamented with rich sculpture, including among other figures an antient zodiac. The choir of the church is very fine, and is 70 feet high. Vézelay is rich in historical recollections. At a council held here A.D. 1145, the second crusade was preached by St. Bernard, and Louis VII. of France and many of his nobles took the cross. In the third crusade, Philippe Auguste, of France, and Richard Cœur-de-Lion, of England, united their forces at Vézelay, to the number of 100,000 warriors. It was occupied for some time by the Huguenots in the religious wars of the sixteenth century: Theodore Beza was born in the town.

The townsmen carry on trade in corn and wood: there are twelve yearly fairs. There are mineral-waters and brine-springs near the town. Châtel-le-Censoy has some iron-works. Montréal had antiently a castle, which was for some time the residence of Queen Brunehaut, and, as it is said, of François or Francis I. The neighbourhood produces some tolerably good wine. There are five fairs in the year. Joux-la-Ville has four yearly fairs for corn, wine, cattle, and staves.

In the arrondissement of Joigny are the following towns:—Joigny, population in 1826, 5263; in 1831, 4700 for the town, or 5537 for the whole commune; in 1836, 5494, on the Yonne; St. Julien and Villeneuve-le-Roy, population 3784 for the town, or 4966 for the whole commune, on the Yonne; Briénon, population 2464 for the town, or 2566 for the whole commune, near the Armançon; St. Fargeau, population 1519 for the town, or 2132 for the whole commune, and Bleneau, on the Loing; St. Benoist and Charny, on the Ouanne; Tonnerre, on a small affluent of the same river; and Dixmont and Cerisiers, in the country on the right bank of the Yonne. Joigny was in the Latin of the middle ages called Joviniacum; and its origin and name are said by some to be derived from Jovinus, a commander of the Roman forces in Gaul in the reigns of Julian, Jovian, and Valentinian I. It had a strong castle in the middle ages, and was the capital of a county. The town stands on the slope of a hill, rising from the right bank of the Yonne, over which there is a handsome stone bridge; along the bank of the river on each side of the bridge extends a broad and elevated quay, fronting which is a handsome cavalry barrack. The town is surrounded by an antient wall, and is entered by six gates; the streets are very steep, narrow, and winding, and are lined for the most part with wretched houses, among which are mingled a few of better construction. In the upper part of the town is a fine château or castle, the windows and terraces of which command a beautiful prospect. Near it is the church, the fine vaulted roof of which, although mutilated, is worthy of notice. The town has two faubourgs or suburbs: one at the foot of the bridge, on the opposite side of the Yonne. The town has some subordinate judicial and fiscal offices, two hospitals, a communal school, a large market-place, and a theatre. The townsmen trade in oak-bark, wood, charcoal, casks, hoops, wine, which is produced in the neighbourhood of good quality, brandy, and vinegar; there are brandy-distilleries, tan-yards, and tile-yards; whiting is made. There are four yearly fairs for corn, cattle, charcoal, casks, and hoops. St. Julien, distinguished as St. Julien-du-Sault, on the left bank of the Yonne, has manufactures of polished steel articles and jewellery, and of coarse woollen cloth; there are some tan-yards and a bark or tan mill. There are four yearly fairs for kitchen and household utensils. The wine of the neighbourhood of St. Julien is in good repute. Villeneuve-le-Roy, or Villeneuve-sur-Yonne, is on the right bank of the river, over which there is an old stone bridge. The principal street of the town is straight and handsome, with a gate and an avenue of trees at each end; the church is near the centre of the main street, and has an elegant front, with a handsome door on each side. Coarse woollen cloth and leather, and a confection of grapes, which is well esteemed at Paris, are made; and trade is carried on in wine, wood, and charcoal. There are four yearly fairs. Briénon, or Brinon, sometimes distinguished by the epithet 'l'Archevêque,' is a well laid out, well-built, handsome town. The townsmen manufacture woollen yarn, coarse woollen cloths, and leather, and carry on considerable trade in fire-wood, which is floated down the river Armançon, and then by the Yonne and the Seine to Paris, charcoal, corn, and linen; there are six yearly fairs. At St. Fargeau and Bleneau trade in wood is carried on. St. Fargeau has seven yearly fairs. Bleneau was the scene of a battle between Condé and Turenne in the troubles of minority of Louis XIV. Dixmont has two fairs in the year, for cattle, wool, and hemp.

In the arrondissement of Sens are the following towns:—Sens, population in 1826, 8685; in 1831, 9267 for the town, or 9279 for the whole commune, and, in 1836, 9095, on the Yonne [SENS]; Pont-sur-Yonne, and Villeneuve-la-Guiard, population 1794, on the Yonne; Cheroy, on the Lunain; Soucy, La Chapelle-sur-Oreuse, Sargines or Sergines, Voisines, and Thorigny, in the country on the right bank of the Yonne; and Villeneuve-l'Archevêque, population 1550 for the town, or 1991 for the whole commune; Foissy, Chigy, and Les Siéges, on or near the Vannes. Pont-sur-Yonne is on the left bank of the river, over which there is a handsome bridge. The town suffered severely in 1816 from a waterspout, which destroyed [illegible] persons and did great damage to houses and property. There is a handsome public walk. The townsmen manufacture tiles, leather, and coarse woollen cloth; and carry on trade in the wine of the district, corn, and cattle; there are three yearly fairs. There is a paper-mill at Villeneuve-la-Guiard, and there are three yearly fairs. Thorigny is on the slope of a hill, near the source of a small stream, the Oreuse, which flows into the Yonne. Villeneuve-l'Archevêque has four yearly fairs; a considerable trade in wool, hemp, and woollen stuffs; manufactures of coarse woollen cloth, a tan-yard, and tan and fulling mills. Les Siéges is in a small valley, on a stream which joins the Vannes and is used for floating wood.

In the arrondissement of Tonnerre are the following towns:—Tonnerre, population in 1826, 3650; in 1831, 3773 for the town, or 4242 for the whole commune; in 1836, 4271; Tanlay, Ancy-le-Franc, Nuits, Ravières, Dannemoine, and Epineuil, on the Amançon; Cruzy, in the country east of that river; Neuvy-Sautour near the Armance, and Noyers on the Serein. Tonnerre is on the slope of a hill on the left bank of the Armançon, over which there is a stone bridge, and in a district which produces excellent wine. The Canal de Bourgogne passes near the town, which is well laid out and well built, with houses of stone. The parish church is in a commanding situation, and there is an antient hospital, founded in the latter part of the thirteenth century by a princess of the ducal house of Bourgogne. The church of the hospital is remarkable for its size, and for the bold architecture of its vaulted roof, which is not supported by pillars. There are a communal college, a theatre, and a fine public walk. There are a saw-mill, tan-mills, tan-yards, curriers' shops, and corn-mills; paper-hangings and agricultural implements are manufactured; and trade is carried on in corn, wine, wood, and earthenware: there are [illegible] yearly fairs. There are some administrative and fiscal government offices, and a subordinate court of justice. Courses of instruction are given in geometry and practical mechanics. In one of the suburbs is a spring of water so copious that it turns several mills almost close to its source. Tonnerre was nearly destroyed in the wars of the English in France under Edward III., and in the civil wars of the Bourguignons and the Armagnacs. It was also injured by a great fire in A.D. 1656. It was the birth-place of the Chevalier d'Eon de Beaumont, who, after distinguishing himself as a diplomatist and a soldier, was obliged, by an order of the French king, for some mysterious reason, to assume the garb of a female. His sex was the subject of much mystery till his death. At Ta some trade is carried on in iron goods and other articles, and there are three yearly fairs. In a castle formerly existing in this town, belonging to the Coligny family, chieftains of the Huguenot party, members of that family are said to have concerted their alliance with the Pr Condé. Ancy-le-Franc has considerable iron-works; in the neighbourhood are a glass-house, a pottery, and a saw-mill moved by water. Ravières is on the slope and at the foot of a hill on the right bank of the Armançon, near the Canal de Bourgogne; there is a paper-mill, trade is carried on in corn and wine, and there are six yearly fairs. Noyers is in a valley inclosed by hills covered with vineyards. It has an hospital. The townsmen manufacture serge, coarse linen, striped linens, cottons, and woollen horsecloths, hosiery, bleached wax, wax and tallow candles, leather, and combs; and trade in corn, wine, and wool. There are eight yearly fairs. Noyers suffered considerably in the wars of the English in France under Edward III., and in the religious wars of the sixteenth century.

The population, when not otherwise described, is that of the whole commune, and from the census of 1831.

The department forms the archiepiscopal diocese of S and Auxerre; the suffragans of the archbishop are the bishops of Troyes, Nevers, and Moulins. The department is in the jurisdiction of the Cour Royale and of the Académie Universitaire of Paris, and is included in the eighteenth military division, the head-quarters of which are at Dij It returns five members to the Chamber of Deputies.

t of education it is above the average of France. Of
ung men enrolled in the military census of 1828-9.
every 100 could read and write; the average of
being little more than 39 in every 100.

e earliest historical period the greater part of the
ent was included in the territories of the Senones
nes (Ἕνονες, Ptolemy; Strabo has Σένονες): the
part about Tonnerre belonged to the Lingones or
(Λιγκάσιοι and Λίγγονες, Strabo), the southern part
vallon to the Aedui, or Hedui (Ἐδοῦοι or Αἰδουιοί,
Αἰδοῦοι, Ptolemy). These were Celtic nations, and
uded under the Romans in the province of Gallia
nsis. On the subdivision of that province the Lin-
d Aedui were included in Lugdunensis Prima; the
in Lugdunensis Quarta, or Senonia. A portion of
tory of the Senones, probably coincident with
se of Auxerre as it existed before the Revolution,
rated from the territory of the Senones and con-
distinct district, with Autissiodurum or Autissio-
Auxerre) for its capital. Of towns mentioned by
uthorities the following were within the limits of
rtment:—Agedincum or Agendicum (Ἀγήδικον,
), afterwards called Senones, now Sens; Ban-
mentioned in the 'Peutinger Table,' the exact
of which is not determined; and Eburobriga or
ica, mentioned both in the 'Antonine Itinerary'
he 'Peutinger Table,' probably at or near St. Flo-
all in the territory of the Senones. Autissiodorum
ssiodurum, now Auxerre, and Chora, mentioned by
nus Marcellinus, and by Jonas (a monk of the
h century), in his Life of St. Columbanus, on the
f the Cure, which Jonas calls Chora fluvius; in the
ry of Autissiodorum:—and Aballo, mentioned in the
ine Itinerary' and the 'Peutinger Table,' in the
y of the Ædui, now Avallon or Avalon. There is
to believe, from an inscription on a stone in the
t walls of Auxerre, that the antient name of the
was Icaunus, or, as D'Anville conjectures, Icaunia.
'Life of St. Germanus of Auxerre,' written towards
se of the fifth century by the priest Constantius, the
s called Icauna; the modern name is derived from

er the monarchy the south-western border of the de-
nt, about St. Sauveur, in the arrondissement of
re, and about Vézelay, in that of Avalon, was included
military government of Le Nivernais or Nivernois, St.
r being in Le Douziois, and Vézelay in Les Vallées
e, subdivisions of that government. The western
ncluding a small portion of the arrondissement of
, was in the district of La Puisaye in Le Gatinois,
military government of L'Orléanois. The rest of the
ment was comprehended in the various subdivisions
province or military government of Bourgogne or
ndy and L'Isle de France (Isle of France): the ar-
ement of Auxerre was chiefly in L'Auxerrois, or
of Auxerre, in Bourgogne; that of Avallon chiefly
Avallonnois, which formed part of the district of
ois in Bourgogne; that of Tonnerre partly in the
of Noyers, in L'Auxois in Bourgogne; partly in Le
is in the Isle de France; the arrondissements of
nd Joigny chiefly, and that of Auxerre partly, were
Le Senonois.

lte Brun, *Géographie Universelle*; Vaysse de Vil-
Itinéraire Descriptif de la France; Dupin, *Forces
tives de la France*; *Dictionnaire Géographique
rsel*; Brué, *Map of France*; D'Anville, *Notice de
enne Gaule*; *Statistique de la France*, printed by
ench government.)

RK, HOUSE OF. Otho, afterwards Otho IV., em-
of Germany, son of Henry V., surnamed the Lion,
f Bavaria, by Maud, eldest daughter of Henry II. of
d, is said to have been created earl of York by his
King Richard I. But, with this exception (if it
), the peerage distinguished by the title of York has
been a dukedom, and has never been conferred
on a son, brother, or uncle of the reigning king.
st duke of York was Edmund Plantagenet, sur-
De Langley, the fifth and youngest son of King
d III., who, having been made earl of Cambridge by
her in 1362 on reaching his majority, was after-
created duke of York in 1385 by his nephew Richard
om him sprung the line known in our history as
use of York, in which the right of succession to the throne eventually came to reside, so far as it depended upon descent or birth. The right came into this line by the marriage of Richard earl of Cambridge, second son of the first duke, to Anne Mortimer, daughter of Roger Mortimer, earl of March, who, by virtue of her descent from Lionel, duke of Clarence, third son of Edward III., whose great-granddaughter she was, inherited or conveyed to her issue, after the death of her brother Edmund Mortimer, earl of March, in 1424, the true representation of Edward III. after the failure of the line of that king's eldest son on the death of Richard II. in 1399. The reigning king Henry VI. and his two immediate predecessors, Henry IV. and Henry V., were descended only from John of Gaunt, duke of Lancaster, the fourth son of Edward III. The son of the earl of Cambridge and of Anne Mortimer was Richard Plantagenet, who became the third duke of York, on the death without issue of his uncle Edward, the second duke, slain at Agincourt in 1415. To him therefore fell the true title by descent to the throne after the death of his brother. He was slain at the battle of Wakefield, in December, 1460; on which the title of duke of York came to his eldest son Edward, who ascended the throne as Edward IV. in March the following year. After the death of Edward V. and his brother, some time in 1483, the representation of Edward IV. rested in his eldest daughter Elizabeth, who married Henry VII., and became by him the mother of Henry VIII., and also, through her eldest daughter Margaret, who married James IV. of Scotland, the ancestress of James I., who, in virtue of that descent, succeeded to the throne of England, on the failure of the line of Henry VIII., in 1603. The present royal family is descended from Elizabeth, the eldest daughter of James I., the line of his son Charles (with the exception only of Mary and Anne, the two daughters of James II., neither of whom left any issue) having been expelled from the throne at the Revolution of 1688.

Since the time of Edward IV. the title of duke of York has been borne by Richard Plantagenet, the second son of that king, upon whom it was conferred in 1474, and who was murdered, along with his elder brother Edward V., in 1483; by Henry Tudor, second son of Henry VII., who was created duke of York in 1491, and who became prince of Wales on the death of his elder brother Arthur in 1503, and ascended the throne as Henry VIII. in 1509; by Charles Stuart, second son of James I., upon whom it was conferred in 1604, and who became duke of Cornwall on the death of his elder brother Henry in 1612, was created prince of Wales in 1616, and ascended the throne as Charles I. in 1625; by James Stuart, second son of Charles I., upon whom it was conferred in 1643, and who ascended the throne as James II. in 1685; by Ernest Augustus, fifth brother of King George I., who was created duke of York and Albany in 1716, and died without issue in 1728; by Edward Augustus, next brother of George III., who was created duke of York and Albany in 1760, and died without issue in 1767; and by Frederick, next brother of George IV., who was created duke of York and Albany in 1784, and died without issue in 1827.

YORK, the capital of the most extensive county in England, and a place of distinction from the earliest period of authentic British history, is situated on the banks of the Ouse (or Ure), which flows through the midst of it, and receiving in its course nearly all the waters of Yorkshire, forms, in conjunction with the Trent, the æstuary of the Humber. According to the 'Trigonometrical Survey,' by Mudge, the latitude of the Minster, which stands in the north-west corner of the city, is 53° 57′ 48″ N., and the longitude 1° 4′ 31″ W., or 4^{m} 18¼^{s} of time.

York was originally a town of the Brigantes, a people of Celtic origin, inhabiting the country extending northward from the Mersey and the Humber to the Firth of Solway and the Tyne, and described by Tacitus as the most numerous of the British tribes. Like other antient British towns, no doubt it was nothing more than a collection of huts surrounded by a trench and the trunks of the trees which had been cut down to clear a sufficient space in the forest. Its British appellation was, most probably, Eburac or Eborac, a name of Celtic origin, denoting a town or fortified place on the banks of a river, or near the confluence of waters. It was converted into a Roman station by Agricola or one of his generals during the second campaign of that illustrious commander in Britain, about A.D. 79, when he marched through and subdued the whole country of the Brigantes; its original Celtic appellation being retained in the Latinized form of Eburacum or Eboracum. It appears to have very soon become the principal Roman station of the north, and even of the whole province of Britain. Whether it was a colonia or a municipium has been a subject of dispute. In an antient inscription it is called colonia; in the work which bears the name of Richard of Cirencester, a municipium. It was the head-quarters of the sixth legion from the time of its arrival in Britain in the reign of Hadrian, till the departure of the Romans from the island. The ninth legion, which came over with the emperor Claudius, had previously been stationed here, and, of course, continued here after its incorporation with the sixth. From the time of Septimius Severus, if not earlier, it was the residence of the emperors when they visited the province, and, in their absence, of the imperial legates. Here the emperors Septimius Severus and Constantius Chlorus died; and here, according to common belief, Constantine the Great was born. But this belief rests upon very insufficient evidence. For its pre-eminence among the Roman stations in Britain, Eboracum was indebted, it is probable, to its situation on the banks of a navigable river, in the midst of a remarkably extensive and very fertile plain, in the heart of the large district which lay between that part of the province of which the Romans had almost undisturbed possession, and that which they never could subdue, with the fierce hordes of which they were compelled to wage unceasing and doubtful warfare. Similar circumstances contributed to maintain the distinction which York enjoyed during many successive centuries.

One of the angle towers and a portion of the wall of Eboracum attached to it, are to this day remaining in an extraordinary state of preservation. In a recent removal of a considerable part of the more modern wall and rampart, a much larger portion of the Roman wall, connected with the same angle-tower, but in another direction, with remains of two wall-towers, and the foundations of one of the gates of the station, were found buried within the ramparts; and excavations at various times and in different parts of the present city have discovered so many indubitable remains of the fortifications of Eboracum, on three of its sides, that the conclusion appears to be fully warranted that this important station was of a rectangular form, corresponding very nearly with the plan of a Polybian camp, occupying a space of about 650 yards, by about 550, inclosed by a wall and a rampart mound on the inner side of the wall, and a fosse without; with four angle towers, and a series of minor towers or turrets, and having four gates or principal entrances, from which proceeded military roads to the neighbouring stations mentioned in the 'Itinerary' of Antonine. Indications of extensive suburbs, especially on the south-west and north-west exist in the numerous and interesting remains of funereal monuments, coffins, urns, tombs, baths, temples, and villas which from time to time, and especially in late years, have been brought to light. Numberless tiles, bearing the impress of the sixth and ninth legions, fragments of Samian ware, inscriptions, and coins from the age of Julius Cæsar to that of Constantine and his family, concur with the notices of ancient geographers and historians to identify the situation of modern York with that of antient Eboracum.

The interval between the final departure of the Romans from Britain and the arrival of the Saxons in the southern parts of the island, which had long been harassed by their fleets, was very short; but more than a century appears to have elapsed before the foundation of any Saxon kingdom north of the Humber was laid. During this long period we have no authentic account of the state of York. The inhabitants were no doubt chiefly descendants of the antient Brigantes, who, retaining their antient language, though their ancestors, as Tacitus tells us, had been taught 'to affect Roman eloquence,' restored the original name of the city, with a very slight variation, and the addition of a British term indicating the increased dignity and strength of the place. For it is most probable that it was during this period, and not, as is generally supposed, prior to the invasion of the Romans, that the city received the appellation of Caer Ebrauch. Though it lost the pre-eminence it had so long maintained, as the different Anglo-Saxon kingdoms rose and flourished, yet it was unquestionably the chief city of the north; an important
bulwark against the incursions of the Picts, fro
there is reason to believe that it suffered gre
certain relic of this period is known to have bee
time discovered here; but it is not improbable t
of the remains generally regarded as Roman m
to this period.

In that authentic and valuable record the
Chronicle,' no mention of an Anglo-Saxon king
of the Humber occurs till the year 547, when Id
head of a body of Angles, took possession of B
Bernicia, one of the two great divisions of th
between the Humber and the Forth, and lying
the Tees. Thirteen years afterwards, the othe
between the Tees and the Humber, called Deify
was seized by Aella, another Anglian chief. T
kingdoms were soon united, and generally co
form one kingdom under the name of North
which York was certainly the capital. By
Beda and other Anglo-Saxon writers the Roma
the city is retained. On some Anglo-Danish coi
ruptly called Ebraici. In the Saxon Chronicle a
Saxon records, it appears generally in the form
wic. During the Anglo-Saxon and Danish pe
even to the end of the reign of Henry III.,
occurs on coins struck at York. The ortho
varied, but in every form its relation to the origi
Eburac may be easily traced; as may also the
from one of its forms, Eurewic, to the present n

The historical notices of York from the fou
the kingdom of Northumbria to the Norman Co
indeed scanty, but they are sufficient to show th
tinued to be a place of considerable importanc
the principal royal residence. At York, Edwin
not only king of Northumbria, but the fifth
held his court. Here, 'under the lofty walls
says Alcuin, he was baptized by Paulinus; a
erected the first metropolitan church. Here m
kings of Northumbria were consecrated and
many were buried here; and some, abdicating
finished their lives in the peaceful retreat of th
the church. The first Danish invader found i
to employ a considerable force in order to ma
master of this bulwark of the north. Athelsta
united Northumbria to his dominions, deemed it
demolish the castle of York. Edgar the fifth so
of England held, in the year 966, the Witten
this city. Siward the Dane, who was earl of N
land in the reign of Edward the Confessor, bui
at York, dedicated to the royal Danish saint Ol
preparatory to his intended foundation of a
and, dying at York, was buried in that churc
was dining in the palace at York, after th
Stamford-bridge, surrounded with his thanes
received the news of the landing of William, d
mandy, on the coast; and having hastened the
him, within twenty days after his departure
field of Hastings.

Very few Saxon or Danish relics have been
at York. An interesting portion of the Sa
erected by Paulinus, or by Albert, has bee
brought to light beneath the choir of the pre
dral; and fragments of crosses, or commemora
and some coffins, both of stone and wood, belon
Saxon period, have occasionally been found.
Danish coins have at various times been disint
a large hoard of stycas, a coin peculiar to No
amounting to more than 5000, has been lately d
all probably struck at York, the only place in
Saxon kingdom of Northumbria at which a min
to have been established. The dean and cha
possession of a large and beautifully carved iv
Danish relic, presented to the church by Ulphus
chief and friend of Canute, when he endowed
his lands.

Although William was crowned in London
archbishop of York, the claims of the Conquer
a long while strenuously resisted in the north.
Saxon nobles espoused the cause of Edgar, t
Harold. As soon as affairs in the south wou
William took possession of York, built or re
castles in it, and strongly garrisoned them with
soldiers. Notwithstanding this, Edgar Atheling
at York, and was acknowledged king. The citi

a powerful body of English and Scotch, and a
le number of Danish auxiliaries, besieged the
tered them, and put the garrisons to the sword.
e siege a great part of the city was destroyed by
k soon felt the destructive vengeance of the Con-
ho, as William of Malmesbury says, 'regarding
as the only nest of sedition in the kingdom,
the ground,' and reduced the whole country
mbria to a vast wilderness. In the reign of
David, king of Scotland, formed the design of
rk, and for this purpose appeared before it with
army. But his design was frustrated by the
e of the Standard, in the year 1138. His grand-
lm IV., was summoned to York by Henry II.,
did homage to the English king for Lothian;
171 William, the successor of Malcolm, did
t York to Henry for 'broad Scotland' (as
erts, on the authority of H. Knyghton), and in
dmission offered and deposited upon the altar
er, in the cathedral church, his breastplate,
saddle. The reign of Richard was ushered in
l massacre of the Jews. It began in London, ap-
y accident; the example of violence and cruelty
in the metropolis was soon followed in other
l especially in York; where, it has been com-
less than a thousand or fifteen hundred of this
ce perished by the unbridled fury of the popu-
their own or each other's hands, in the ruins of
n which many of them had been allowed [illegible] take
to which in despair they had set fire. In the
King John the northern barons laid siege to
retired on receiving from the citizens 1000
the year 1230 Henry III. kept his Christmas
lly at York, with Alexander II. of Scotland, the
ate, and a large concourse of nobility. But
reater magnificence was that festival observed
his city in 1251, when he gave his daughter
marriage to Alexander III. in the presence of
s of the realm, and a great assembly of the
Scotland and of France. The attempt of Ed-
subjugate Scotland had considerable influence
e of York during the latter part of his reign.
1298 a parliament was summoned to meet at
in the following spring the whole English army
d there, preparatory to their march into Scot-
Courts of King's Bench and Exchequer were
sion removed to York, where they appear to
ed seven years. Edward II., in his vain at-
rry on his father's plans in regard to Scotland,
his head-quarters, which partook of the mis-
he king. In 1327 an army of 50,000 men as-
York, under Edward III., on its march to the
Scotland; whence it returned unsuccessful and
In this year the king kept his Christmas at
on the 24th of January was married in the
urch to Philippa of Hainault. Three months
defeated the French on the plains of Crecy,
e was reaping the fruits of that memorable vic-
rous queen was taking the field, with forces
ected together at York, against the Scotch,
vaded England under the conduct of David
battle of Nevill's Cross put her in possession
h king, whom she received as a prisoner at
ence conveyed to the Tower of London.
mmade Richard II. held a parliament at York,
thither for a few months the Courts of Chan-
g's Bench. He is recorded to have taken his
his side, and given it to be borne before Wil-
y as first lord-mayor of York. The city, hav-
from him several immunities and privileges,
hered to him in his adversity, and consequently
erely from the vengeance of his successor
The neighbourhood of York was the scene of
bloody conflicts in the War of the Roses; and
es of the city exhibited the barbarous spec-
eads of Lancastrians and Yorkists alternately,
y was victorious. The citizens were favourable
of Edward, who was honourably received by
way to the north, whither Henry VI. and his
tired after the battle of Towton: and on his re-
battle of Hexham, he was crowned again with
ity, with the royal cap called 'Abacot,' which
nd in the spoils of his rival. Yet after Henry, by a change of fortune, had recovered the kingly power, Edward could not obtain admittance into York till he had made a solemn declaration that he returned from his short exile not to fight against the king, or in any way to molest him. In 1478 he again visited York, where he was most sumptuously entertained. (Davies, *Extracts from the Municipal Records, &c.*) Richard III., who while duke of Gloucester resided much at his favourite castle of Middleham, making, it is probable, frequent visits to York, and endearing himself to the citizens by his affability and the interest he took in their welfare, visited the city with his queen soon after his coronation at Westminster, 'in order,' as it is said, 'for a second coronation at York.' The citizens received him with great pomp and triumph, and a splendid ceremony took place in the Minster: not a second coronation of Richard, but 'the admission of his youthful son to the honourable degree of knighthood, and his personal investiture with the dignity of Prince of Wales.' (Davies, *Extracts, &c.*, App.) Henry VII. came twice to York for the purpose of suppressing insurrections in the north; after which the history of the city has no particular connection with the events of his reign. The dissolution of the monasteries by Henry VIII. occasioned many insurrections in the north; the most formidable of which was that styled 'The Pilgrimage of Grace.' The insurgents made themselves masters of York, and compelled the archbishop to take the oath and join their party. When this and other disturbances of the same nature had ceased, the king visited York, where he remained twelve days, and received the submission of other northern cities. He had previously, in the year 1537, established at York a permanent council for the government of the northern counties; the president of which, with the title of Lord President of the North, had his palace on the site and built of the materials of the suppressed abbey of St. Mary. This court continued till the year 1641. The palace of the lord president was greatly enlarged by James I., who was twice at York, and intended the palace to be a royal residence. In the events which distinguished the unhappy reign of his son York bore a considerable share. The first visit of Charles I. to York was on his peaceable progress to Scotland in 1633; his second, six years afterwards, on his hostile expedition against the Scotch. In the month of August, A.D. 1640, unwilling to call a parliament, he summoned the lords spiritual and temporal to meet him, as the great council of the nation, at York: in the following month they assembled in the deanery, and continued their sittings more than three weeks. The year 1642 opened with the civil war, and in March the king fixed his head-quarters at York, where he was joined by many of the Yorkshire gentry, and several of the peers from London. After a stay of five months he removed to Nottingham, having appointed the earl of Cumberland lord-lieutenant-general of his forces in Yorkshire. The earl came to York with an army of 6000 horse and foot; but soon resigned his commission to the earl of Newcastle. In the beginning of the next year the queen, having landed at Bridlington, proceeded to York, and continued there some time 'with great advantage to the king's cause.' In the month of April, 1644, Sir Thomas Fairfax, commanding the parliamentary forces, joined by the Scotch, invested York, which had been strongly fortified and held out for the king. Several batteries were erected against the city: the suburbs, then very extensive, were set on fire; one of the gates was nearly demolished, and a tower of the abbey of St. Mary, which had been preserved for the use of the Council of the North, and in which the chartularies of many of the northern monasteries had been deposited, was blown up, and many important records destroyed. The fate of the city was decided by the battle of Marston Moor; and York was compelled to open its gates to the parliamentarians. Cromwell was at York soon after the battle; and six years afterwards spent one day in the city on his way to Scotland. Charles II., in the last year of his reign, offended at the citizens for not having paid proper attention to his brother James, duke of York, on his second visit to them, took the government of it out of the hands of the lord-mayor, and deprived the city of its charter, which however it was one of the first acts of James after his accession to renew. From this period till the rebellion in 1745, nothing of a public nature occurred deserving of particular notice. Many who had taken a part in that rebellion were tried and executed at York; and the noble

gates were again defiled by a spectacle worthy only of an age of the grossest barbarism.

Among the interesting relics of Eboracum, or of York under the Romans, are remains or memorials of Roman temples; but although the Britons, as well as the Romans, had undoubtedly embraced the Christian faith long before the departure of the latter, no trace of any sacred Christian edifice of Roman or of British times has been discovered. That churches had been built in many parts of the empire previous to the establishment of Christianity by Constantine is attested by Eusebius; and there is no reason to suppose that a station so important as that of Eboracum would be destitute of them. Whatever edifices of this nature may have existed at York before or after the departure of the Romans, they were most probably destroyed by the Saxons, who when they founded the kingdoms of the Octarchy were universally pagans. Such they continued to be till about the end of the sixth century, when Ethelbert, the Saxon king of Kent, was converted to the Christian faith by the preaching of the monk Augustine. Edwin, the fifth Saxon king of Northumbria, and a native, it is said, of York, had married Ethelburga, the daughter of Ethelbert, and, through her influence and the zeal of Paulinus, a companion of Augustine, became a convert, and with Coiffi, the heathen priest, and a considerable number of the nobles of his kingdom, was baptized by Paulinus on Easter-day, in the year 627, at York, in the church of St. Peter, which, says Beda, he had hastily constructed of wood while he was a catechumen, and preparing to receive baptism. Soon afterwards, by the advice and with the aid of Paulinus, to whom he had given York as his episcopal see, the king made preparations for building a larger and a nobler church, in the midst of which the oratory that he had previously constructed, and in which he had been baptized, might be inclosed. He laid the foundation and began to raise the edifice; but before the walls were completed he was slain. The work was finished by his successor Oswald; but when he had also fallen, and Paulinus (who during the life of Edwin had received the pallium from Rome, and been elevated to the rank of archbishop of York) had been compelled to retire with Ethelburga into Kent, the church was wholly neglected, and fell into ruins. From this sad state the celebrated bishop St. Wilfrid, about the end of the seventh century, restored it, adding greatly to its splendour by the assistance of artists whom he had brought with him from the Continent. About fifty years after this, in the year 741, this edifice was destroyed or greatly injured by fire. In the episcopate of the celebrated Albert, who was elected to the see of York in the year 767, a new church was begun, finished, and dedicated; from the description of which, by Alcuin, the learned pupil and friend of Albert, in his poem 'De Pontiff. et Sanct. Eccles. Ebor.,' we are warranted in concluding that it was one of the most magnificent of the Anglo-Saxon churches. A small but very interesting portion of this church, comprising a part of the earlier church built by Edwin, has been recently brought to light during the excavation of the present choir, after the calamitous fire in February, 1829. Attached to the church was an episcopal monastery, in the school of which Archbishop Egbert, the predecessor of Albert, taught, and which he enriched with a noble library collected by him with great labour and expense. This celebrated library is supposed to have perished in the conflagration that destroyed a great part of the city and the cathedral in the beginning of the reign of William the Conqueror.

Archbishop Thomas, who was appointed to the see by William, in the year 1070, finding the church 'thus despoiled, rebuilt it,' according to the testimony of his friend Hugo the Precentor, 'from the foundation, and adorned and enriched it with books and clergy.' From remains of the crypt, discovered in the recent excavation and preserved beneath the floor of the present choir, a good idea may be formed of the grandeur and beauty by which the entire edifice must have been distinguished. It appears to have been greatly injured, in part perhaps destroyed by fire in the year 1137; after which it is commonly believed to have been rebuilt by Archbishop Roger. But there is sufficient evidence to show that it did not then require to be rebuilt; and that the work of Roger was confined to repairs, alterations, and additions. It cannot be ascertained what was the state of the fabric in the beginning of the thirteenth century, when Walter Gr
ceeded to the archbishopric; it is certain howev
the present south transept was begun by him ab
year 1220, and it was probably finished during h
copate, about the year 1241. The rebuilding of th
transept, it is thought, was begun by the same prel
not completed till several years after his death. Th
no documents in existence relating to the building
chapter-house, but it is conjectured with great pr
that the foundation-stone of this beautiful and u
structure was laid in the year 1284, but that the
not finished before the year 1340. The present
begun in the year 1291, in the episcopate of Jo
main, but not finished till the year 1360, in the
of Thoresby, by whom the present choir was b
not completed before the year 1472. About tha
central or lantern tower was finished; and ve
afterwards the upper story of the north-west
south-western tower having been finished prob
thirty years earlier.

This magnificent cathedral is cruciform, m
length from base to base of buttresses east and
519 feet, and from base to base of the tr
feet. The internal length east and west is
the transepts 222 ft. 6 in. The church consist
with side aisles, two transepts with side aisles,
side aisles, a Lady-Chapel, a large central tow
towers, and a chapter-house with its vestibule.
attached to the south side. The internal heigh
is 93 feet, of the choir 101 feet, of the centr
ternally about 198 feet, internally 182 ft. 6 in.
of the western towers is about 201 feet to the top
pinnacles, 178 ft. 3 in. to the top of the battlement.
chapter-house is a noble room of an octagonal form,
angular diameter being 60 ft. 6 in., and the height of the
central base from the floor 62 ft. 2 in. The roof is
supported by any pillar.

It is a remarkable circumstance in the history of th
magnificent church, that two of the principal portions of
it have within the space of twelve years been destroyed by
fire: the middle aisle of the choir by the fanatic incendiary Jonathan Martin, in the year 1829; and the
western bell-tower with its fine peal of bells and the
middle aisle of the nave, through carelessness in 1840.
both occasions the grand central tower prevented the
flames from spreading to the transepts.

The palace of the archbishop was antiently on the
side of the cathedral. Archbishop Roger is said to have
rebuilt it in the latter end of the twelfth century, and
small portion of his work is still remaining, as is the chapel
of the palace, of a later date. This elegant building, having
been long an unsightly ruin, was repaired in the time of
Dean Markham, and is now used as the library of the d
and chapter. Near it is the new deanery, the old residence of the dean, which was on the south side of the
Minster, having lately been taken down. A house for the
residence of the canons residentiary has also been lately
erected on the north side of the Minster on the site of part
of the antient archiepiscopal palace.

The monastic institution appears to have been introduced
into Britain by Augustine at the end of the sixth century,
when a monastery was established at Canterbury by h
royal convert. About fifty years afterwards several monasteries were founded in the kingdom of Northumbria;
but no establishment of regular monks is known to have
existed at York prior to the Norman conquest. Shortly
before that event Siward, the Danish earl of Northumberland, laid the foundation of a monastery near the walls of
York; but the building did not advance beyond the erection of the church; and the foundation was laid anew, an
a great part of the monastery completed, by William Ru
the original dedication to St. Olave being changed to th
of 'The Blessed Virgin Mary.' About the end of t
thirteenth century the church and a great part of the m
nastery were rebuilt; but several portions of the orig
structure still remain. During the government of t
third abbot, Gaufridus, A.D. 1131, thirteen of the mon
desirous of adopting the Cistercian rule, seceded, a
founded the abbey of Fountains near Ripon. Will
Thornton, the last abbot, surrendered to the king, Nov.
1540, when there were in the monastery fifty monks,
cluding the abbot, prior, and sub-prior, and one novi
The clear value was reckoned to be 1650*l.* 0*s.* 7½*d.* T

Iary enjoyed the dignity of the mitre, and
to parliament. The monastery was situated
f the Ouse, adjoining the city walls on the
a close of about fifteen acres, surrounded
towers. At the dissolution it was retained
but it shared the fate of most of the reli-
n England at that period: it was doomed
; and the remains of this noble religious
bear striking marks of the furious zeal with
ruction was accomplished. On the site and
ials a palace for the residence of the lord-
e north was erected. In later times grants
de of the stones for various public uses in
ighbourhood, and many were at one period
converted into lime on the spot. In the
site of the greater part of the monastic
ranted by the crown to the Yorkshire Phi-
ety, then recently established, on which to
n and form a botanical garden. On that
ole of the ground was carefully excavated,
s of the monastery traced, and plans and
iting the interesting result were published
f Antiquaries in London. Some beautiful
antient buildings which had been long
ught to light; and many exquisite speci-
lptured ornaments of the monastery and
form an attractive portion of the collections
f the society; and the ruins of the church
vived the ravages of time and of ruthless
bine with several other objects of anti-
to give a singularly beautiful and attractive
e gardens of the society. The monks of
. Mary were of the order of St. Benedict.
ler belonged the priory of the Holy Trinity
cell to St. Martin's in Tours, founded in
Conqueror. The gateway and a part of
of later date, are remaining. There was
ne nunnery at Clementthorp, just without
Dominican Friars, the Franciscans, the
nd the Carmelites, had each a monastery
the Gilbertines had a priory. There were
xteen hospitals in the city and the imme-
hood, of which the oldest and most con-
at dedicated originally to St. Peter, and
h enlarged, to St. Leonard, said to have
y Athelstan. Interesting remains of this
us house are still in existence.

f Henry V. there were upwards of forty
standing and fifteen chapels. Two only
emain, and twenty-three of the churches.
re architecturally interesting; as that of
Lawrence, St. Margaret, and St. Mary
Younger; and several contain sadly muti-
stained and painted glass.

arish churches, there are several places of
ing to Dissenters. The Roman Catholics
besides that of the nunnery. One chapel,
year 1692, belongs to the English Presby-
esleyan Methodists have four chapels;
nd the Primitive Methodists have each one
dependents have three; and the Friends
us meeting-house.

erned by a mayor as early as the time of
the names of persons serving the office of
ecords belonging to the reign of Henry III.
ferred on the mayor the additional title of
at officer still assumes; and in 1397 two
y royal authority, substituted for three
York became a city and county of itself.
ing of the late Municipal Reform Act, the
York consisted of a lord mayor, twelve
heriffs, the 'Twenty-four,' a body composed
ad served the office of sheriff, seventy-two
lmen, a recorder, two city counsel, a town-
roners. By the late act the city is divided
stead of four, as it had been previously, at
ral centuries; for according to 'Domesday
onquest it was divided into six wards, be-
f the archbishop. Each ward now chooses
(two of whom retire annually), and these
dermen, who serve six years. The sheriff
ayor are elected annually by the aldermen
lors.

Till the passing of this act the jurisdiction of the corporation was not restricted within the proper bounds of the city, but extended to the Ainsty, which was originally a hundred or wapentake of the West Riding, bounded by the river Ouse, the Wharf, and the Nidd, and a line from the town of Thorp-Arch on the Wharf to Cattal Bridge on the Nidd. The city of York appears to have laid claim to this extensive jurisdiction in the reign of Edward I. as having been granted by a charter of King John; but their claim was disputed: it was finally confirmed by a charter of Henry VI. By the late act the Ainsty is separated from the jurisdiction of York, and annexed partly to the West and partly to the East Riding of the county.

It is impossible to form any conjecture as to the extent of the population of York during the early periods of its existence. It appears from Domesday-Book that in the time of Edward the Confessor the city was divided into seven wards; one of these belonged to the archbishop, and one was destroyed for the castles. In the remaining five wards there were 1418 houses, and in the ward of the archbishop 200. Supposing, with Drake, that in the ward destroyed for the castles there were as many houses as to make the whole number 2000, and allowing five inhabitants to each house, the population at the Conquest would amount to 10,000. Drake supposes further that the suburbs contained an equal number of persons, and thus reckons the whole population at 20,000. But it appears that when the survey was made between the sixteenth and twentieth years of the Conqueror's reign, a great devastation of the houses had taken place, and the population must have been proportionably diminished. If the number of inhabitants may be supposed to bear any proportion to the number of churches, the population had greatly increased again in the time of Stephen, when thirty-nine of the churches are said to have been destroyed by fire; and it must have been considerable in the reign of Richard II., since, according to the chroniclers of the times, no less than 11,000 inhabitants were destroyed in 1390 by pestilence. In the various vicissitudes experienced by the city, the number of its inhabitants must have varied. In the beginning of the present century, when it had lost its importance as the metropolis of the northern counties, the population amounted to no more than 16,000. Since that time it has been nearly doubled; the census in 1841 giving 28,883, of which number there were 13,423 males and 15,460 females. But in this census one parish and part of another without the walls, forming in reality a part of York, though belonging to the North Riding, are excluded. Including these, the return is 29,500.

York from its foundation has never ceased to have the appearance of a fortified city; and although its fortifications have never been permanently accommodated to the art of war as practised in later ages, it made a good defence against the parliamentary forces in the time of the civil war. The walls of the Roman station Eboracum were wholly on the north bank of the Ouse. What changes they underwent in the succeeding British, Saxon, and Danish times, cannot be ascertained; nor is there any historical evidence relating to the enlargement of them to their present extent. In the time of the Conqueror they inclosed two castles; one, as it is thought, on each side of the river; but this is very doubtful. In the architecture of the walls, which have been so often repaired and even rebuilt, there is nothing characteristic of any particular age; but the archway of the gates appears to belong to the Norman period. The barbicans, which were probably added in the reign of Edward III., have been, without any good reason, removed from three of the gates. The walls, since they were extended, have never entirely surrounded the city, there being a space, on the eastern side, of nearly 500 yards, which till recently must have been a complete morass. The extent of the walls is about two miles and a half: a very considerable portion of them is accessible to the public, which, having lately been put into a state of complete repair, forms a very pleasant and interesting walk. There are four principal gates, or bars, as they are usually called, and five postern gates. Two new entrances through the ramparts have recently been formed; one of them exclusively for the railway to the station, which ought not to have been erected within the walls; another entrance, which had been closed since the time of Henry VII., has been re-opened. The castle has long since been converted into the county prison and the courts of justice for the county; but some portions of the old work, besides the noble keep, are still remaining. The felons' gaol is an entirely new building, consisting of four radiating double wards, with eight airing courts, the governor's house being in the centre. The keep, known by the name of Clifford's Tower, the Cliffords having been the antient wardens of the castle, is generally supposed to have been built by the Conqueror, but the architecture indicates a somewhat later age.

That York was not a strong military station only, but also a place of trade even in the times of the Romans, is by no means improbable; its situation being as convenient for commerce as for war. Alcuin, in the eighth century, calls it 'a common emporium of land and sea;' and says that it was then visited by vessels from the most distant lands. In the tenth century several merchant vessels on their voyage to London from York were captured and plundered by the pirates of the Isle of Thanet. William of Malmesbury, who flourished in the twelfth century, speaks of York as being in his time a great and metropolitan city, to which trading vessels came from Germany and Ireland. York had its merchant-guilds as far back as the reign of Stephen; and a charter of John confirms to the guild of merchants at York all the privileges which they and their *houses* had before enjoyed. By a statute of Edward III. it is directed that the staple of wool, leather, woolfels, and lead, should be at York and nine other places named; and when, in the reign of his successor, the staple for the export trade for the whole kingdom was fixed at Calais, the merchants of York had a considerable share in this staple; some of them were mayors of the staple of Calais, and one of them is named as having been the treasurer. York was long famous for its manufacture of woollen goods. In the days of Henry II. and Henry III. the weavers of York paid a considerable 'farm' for their privileges; and the manufacture was flourishing in the reign of Henry VIII. But this branch of trade has long ceased to flourish here, and York is not now the seat of any extensive manufacture. It has however been long celebrated for the making of leathern gloves, shoes, combs, and other articles of horn. During a long period these were considered as the staple trades of the city, but they are so no longer; yet York, in proportion to its population, is the seat of respectable and steadily increasing trade, divided into various branches. It has one extensive flax-mill; many hands are employed in the manufacture of linens; and York bed-ticking supports a high character in distant places. The confectionery of York is much celebrated, and a few large wholesale establishments have connections through a great portion of the kingdom. An extensive business is carried on by several druggists. The wholesale tea and coffee business is a very important and increasing branch of the trade of York: within the last half-century the roasting of coffee was under the exclusive control of the Board of Excise, and London, Bristol, Liverpool, and York were selected as the only places in England for the establishment of public roasting offices. The merchants of York took advantage of this privilege: the tea and coffee trade was extensively cultivated, distant connections were formed, and though the Excise restrictions no longer exist, the trade that was widely formed during their continuance has become a distinct and important part of the traffic carried on in York. A considerable wholesale trade is also carried on by the curriers of York; and large quantities of corn, and of flour ground here by steam-power, are sent into the West Riding of Yorkshire. The traffic upon the Ouse, though much reduced by the railways and other causes, is still very considerable. Trading vessels of from 110 to 150 tons burthen regularly pass between York and London. Although York has ceased to be the winter residence of the nobility and gentry of the county, it is not only frequently resorted to by them on occasions of public entertainment or business, but it is still the permanent abode of many persons of independent income, a circumstance which exerts a very favourable steady influence on the character and respectability of its internal trade.

There are several fairs annually held at York for cattle and horses; one for cattle is held every fortnight. There also large markets for wool and leather during stated seasons. The chief weekly market for the supply of the city is held on every Saturday.

Fifty years ago every street in York afforded some interesting specimens of the domestic architecture of the sixteenth and seventeenth centuries; but these have a entirely disappeared, the overhanging and often r ornamented fronts having given place to plain un mented and generally mean-looking brick-work, w few handsome houses indeed of the earlier part of th century interspersed. York possesses very few p buildings besides churches that are deserving of parti notice. The guild-hall is a fine Gothic building e in the year 1446: 96 feet in length, and 43 feet in w consisting of three aisles: the roof, which is pannelle adorned with knots exhibiting coats of arms and grot figures, is supported by two rows of octagonal oak p five in each row. The assembly-room, considered c the finest in the kingdom, was built after a design Palladio, by Richard, earl of Burlington; the found being laid in 1730, and the building finished in 173 museum of the Yorkshire Philosophical Society is a b tiful structure of the Doric order, designed by W. Wi Esq. The Collegiate School is an elegant and just mired building in the Tudor style, by a young art great promise, the late John Harper, Esq.

In the eighth century the Episcopal school of York the resort of students from France and Germany. In school Alcuin was trained, who became the frien Charlemagne, tutor to his family, and founder of se at Tours and other places in France, from which proce some of the most remarkable scholars of those times. the seventeenth century an attempt was made, u tunately without success, to establish a university at Y A college for the education of English Presbyte dissenters, removed from Manchester to York in the y 1803, has lately been re-established in the place from wh it came. There are and have long been many schools York, both public and private. St. Peter's School, und the management of the dean and chapter, was founded b Queen Mary in 1557, and endowed with the lands of the suppressed hospital of St. Mary. A small school had pre viously been established by Archbishop Holgate. Th Blue-coat School for boys, founded in 1705, is supported chiefly by annual subscriptions; in connection with wh is the Grey-coat School for girls, who are there trai for domestic service. The number of the boys about of the girls about 50. The Roman Catholics have a sch for the higher classes of females, and also a charity sch The York Collegiate School is of recent date, on the pr prietary scheme. The Yorkshire School for the Blind also a recent institution, founded as a memorial of the la Mr. Wilberforce. There are also national schools and Sunday-schools, and several supported by private endo ments. The Report of the Select Committee on the Educa tion of the Poorer Classes states the numbers receiv education in the city of York, in 1836, to be—

Scholars of the working classes, at day and dame schools . . .	1494
Scholars at better schools . .	2097
Attending Sunday-schools in connection with the established church . .	1708
Attending Sunday-schools in connection with Dissenters . . .	1635

The Report of the Manchester Statistical Society, in the autumn of 1836, says that 19·97 per cent. of the popula of York received instruction.

In the year 1794 a public subscription library was esta-blished in York. It is the property of about 350 memb and contains about 17,000 volumes, in various branches literature and science.

The dean and chapter of the cathedral possess an exte sive and very valuable library, founded by Archbish Mathews, which has been lately opened to the public und necessary restrictions.

The Yorkshire Philosophical Society was established the year 1822, having for its general object the promo of science in the district for which it was instituted; more particular object being to elucidate the geolog Yorkshire. Its museum embraces all the department natural history, and is rich in antiquarian relics of var periods, discovered in York and the neighbourhood.

A more humble, but a very useful institution, establi in the year 1827, is the York Institute of Popular Sci and Literature.

The Medical Institutions of York are, the Co Hospital, founded in the year 1740, the first north of Trent; the Dispensary; the York Lunatic Asylum;

for members of the Society of Friends, the influ-
which on other establishments for the reception
of the insane has been most highly beneficial;
Eye Infirmary.

able establishments are very numerous in York.
cipal of these are, Ingram's Hospital for 10 poor
Wilson's, for 10 poor women; the Old Maids'
founded by Mary Wandesford, spinster, for 10
entlewomen; Middleton's Hospital for 20 widows
en; and Lady Hewley's Hospital for 10 poor aged

revailing characteristic of the climate of York is
an accurate observer to be humidity, although
tity of rain is small. The mean temperature, on
ge of ten years, is 47·82° of Fahrenheit; the mean
the barometer, on the same average, is 29·90°,
quantity of rain, on the same average, 24·114

tio of mortality in York is one in 53 persons.
's *Eboracum*; Wellbeloved's *Eburacum, or York*
Romans; Davies's *Extracts from the Municipal*
f the City of York; Browne's *History of the Edi-*
Metropolitan Church of St. Peter, York.)

, Canada. [TORONTO.]

, NEW. [NEW YORK.]

E, P. [HARDWICKE.]

E, CHARLES, second son of the first Lord
ke, was born 30th December, 1722. He was
at Ben'et (now called Corpus Christi) College,
ge, on the 13th of June, 1739, and called to the
53. He was a member of Lincoln's Inn. While
ridge he assisted his elder brother Philip, the
ord Hardwicke, and some other friends, in the
ion of 'Athenian Letters, or the epistolary Cor-
nce of an Agent of the King of Persia residing at
uring the Peloponnesian War.' The idea of the
taken from Barthelemi's 'Travels of Anacharsis.'
pies were printed in 1741; a reprint of 100 copies
ght out in 1782; and in 1798 the second earl of
ke published it with an explanatory memoir. The
thors are therein said to have composed the Let-
preparatory trial of their strength, and as the best
of imprinting some subjects of their academical
their memories. The letters to which the initial
nded were the composition of Charles Yorke. In
, 1744-45, he published 'Some Considerations on
of Forfeiture for High Treason, occasioned by a
the late Act for making it treason to correspond
Pretender's sons or any of their agents.' The 'late
he act 17 Geo. II., c. 29. A 'Short Review' of
work was published in 1746, by Thomas Gordon.
and corrected editions of the 'Considerations'
lished in 1746 and 1748. These two latter editions
n an appendix, remarks on the operation of the
ne, c. 21, on the law of forfeiture in Scotland.
bears marks of its author's youth, but indicates
ble talent for defining technical words and
and for stating a legal argument. In 1747 Charles
d his elder brother, who was in that year elected
the county of Cambridge, in the representation of
gh of Ryegate. He married, on the 19th of May,
herine Freeman, daughter of a country gentle-
Hertfordshire, by whom he had one son, Philip,
s the third Earl Hardwicke. After her death he
(30th December, 1762) Agneta Johnston, also
of a Hertfordshire landowner, by whom he had
ldren.

aily influence or his own abilities Charles Yorke
solicitor-general and then attorney-general. The
ce he resigned in 1764, on account of some dis-
with the ministry, but was induced to resume it in
1770 he accepted the seals, at the urgent request
g, upon the resignation of Lord Camden, but died
(it was believed, by the rupture of some internal
n the 20th of January, while the patent for
ge was making out, under the title of Baron

aphia Britannica (Appendix); *Annual Register*
; Burke's *Dictionary of the Peerage and Baronet-*
Preface to the *Athenian Letters*, edition of 1798;
Note, by Dr. Birch, in his presentation copy of the
ations on the Law of Forfeiture, now in the library
tish Museum.)

YORKSHIRE, a maritime county in the northern part of England, and by far the largest of the English counties, is bounded on the north-east and east by the North Sea; on the south by the æstuary of the Humber, and the counties of Lincoln, Nottingham, and Derby; on the south-west by a small part of Cheshire; on the west by Lancashire; on the north-west by Westmoreland; and on the north by Durham and the mouth of the river Tees. Its form is irregular, but the greatest length across the county in a straight line is from the projecting point called Spurn Head, on the south-east, to the junction of the counties of Westmoreland and Durham, on the north-west, a distance of about 124 miles. In the opposite direction, from the junction of Lancashire and Cheshire on the south-west to the port of Whitby on the north-east coast, the breadth is about 90 miles. From Flamborough Head on the east coast to the corresponding point on the western boundary, which approaches within 10 miles of the west coast of Lancashire, the length of the county is about 100 miles; and its extent from the extreme south point, at the junction of the counties of Derby and Nottingham, to Tod Point, at the mouth of the Tees, in a direction nearly due north, is about 92 miles. The county is comprehended between 53° 18′ and 54° 40′ N. lat., and between about 9′ E. and 2° 36′ W. long. from the meridian of Greenwich. Yorkshire is divided into three Ridings, which are called, from their respective positions, the North, West, and East Ridings, and the Liberty or Ainsty of the city of York, and in the Population Returns and many other statistical documents these divisions are treated as distinct counties. The parish of Craike, near Easingwould, though geographically forming part of the North Riding of Yorkshire, belongs to Durham [DURHAM, vol. ix., p. 207], and is therefore omitted in the following statement of the areas and population of the great divisions of Yorkshire. The population is here given from the Census of 1831 for the sake of comparison with other counties, those in the preceding volumes of the work being, necessarily, taken from the Return of that year. The population in 1841 is given in a subsequent page, under the head of *Statistics*. The areas given in the Population Returns for 1831, from which the following figures are taken, somewhat exceed the aggregates of the areas assigned to the several parishes, but no attempt is made in the Returns to reconcile the apparent discrepancy:—

	Area in square miles.	Area in acres.	Population in 1831.
North Riding .	2,055	1,315,200	190,756
West Riding .	2,576	1,648,640	976,350
East Riding .	1,119	716,160	168,891
City and Ainsty of the City of York	86	55,040	35,362
Whole county	5,836	3,735,040	1,371,359

The gross area of the county is more than one-tenth that of England and Wales, and more than one-ninth that of England alone; and the area of the West Riding alone exceeds that of any other English county, excepting Lincolnshire and Devonshire, while that of the North Riding is nearly equal to Norfolk, the fourth of the English counties in superficial extent. The area of the whole county of York is greater than the united areas of Lincolnshire, Devonshire, and Hertfordshire; and it considerably exceeds the aggregate areas of the ten smallest English counties. According to the returns of 1831 the population of Yorkshire averaged nearly 235 persons to a square mile, which is rather below the average of all England, but greatly above that of the three counties which approach nearest to it in superficial extent. York, the capital city, is in about 53° 56′ N. lat. and 1° 3′ W. long. It is not much more than 170 miles north-north-west from London in a straight line, but about 199 miles by the main road from London to Edinburgh, and about 202 miles from the latter city. By the London and Birmingham, Midland Counties, North Midland, and York and North Midland railways, the distance from London to York is about 220 miles.

Boundaries and Coast-line.—The coast of Yorkshire is generally high, and consists in many places of precipitous cliffs. The south-eastern side of the æstuary of the river Tees, which separates Yorkshire from Durham, forms the most northern portion of the coast-line of the county. This æstuary terminates at Tod Point, about 54° 37′ N. lat., and from that point to Whitby, a distance of about 24 miles measured in a straight line, the coast, which consists of cliffs abounding in fossils, runs in a very irregular line towards the south-east, without presenting any place of importance. One of the cliffs, about seven miles north-west of Whitby, is marked by Greenough as having once taken fire, and continued to burn for two years. At Whitby, which is situated at the mouth of the river Esk, is a harbour which, though exposed to gales from the east, has been so much improved as to be capable of carrying on a considerable trade. A few miles south-east of Whitby the coast-line turns rather more to the south, and is indented slightly by the dangerous bay called Robin Hood's Bay, towards the southern extremity of which, not far from the coast, is a hill popularly called Robin Hood's Butts. From this point the coast proceeds south-south-east to Scarborough, where an elevated promontory which projects abruptly towards the east, with an arm towards the south, forms a semicircular harbour, which is much used for shelter from the easterly gales that are common along the Yorkshire coast, and which forms the only port of any consequence between Whitby and the mouth of the Humber. The distance between Scarborough and Whitby, in a straight line, is about 17 miles; and from Scarborough Bay, south of the harbour, the coast-line again inclines more to the east, to the prominent point which is variously called Filey Point, Filey Head, and Filey Bridge, near the boundary-line between the North and East Ridings. Immediately south of Filey Point is Filey Bay, from which the coast runs in a nearly straight line by Speeton Cliff to Flamborough Head, which forms the extremity of a range of chalk cliffs, of brilliant whiteness, about six miles long, and rising in many places to an elevation of 300 feet. At the base of these cliffs are some extensive caverns, and near the extremity of the promontory, on a site about 250 feet above the level of the sea, is a lighthouse which was erected by the Trinity House corporation in 1806, and which has a revolving light of sufficient intensity to be seen from a distance of 30 miles at sea. In thirty-six years preceding the erection of this important lighthouse, there were no less than 174 wrecks in the immediate vicinity, but its establishment has almost put an end to such casualties. The eligibility of the spot for the establishment of a beacon would seem to have been observed long before a regular lighthouse was placed there, as the name of the village of Flamborough is supposed to be derived from the practice of placing a light or flame at that point in early times. From Flamborough Head, which is 18 or 19 miles in a direct line from Scarborough, and about 55 miles from the mouth of the Tees, measured in like manner, the coast-line turns westward, and then sweeping round to the south, forms the capacious bay called Bridlington Bay, upon the coast of which the sea has made such encroachments as to gradually sweep away the villages of Auburn, Hartburn, and Hyde. In this bay there is a small but sheltered harbour, defended by two batteries, at Bridlington Quay, which is about a mile south-east of the town of Bridlington. From Bridlington Quay to the sharp-pointed promontory which terminates in the Spurn Head or Point, and which forms the northern boundary of the æstuary of the Humber, the coast-line is unbroken by any important inlet or projection, and is mostly very low and exposed to the inroads of the sea. Greenough marks the sites of two churches, those of Owthorne and Kilnsey, in the south-eastern part of this portion of coast, the ruins of which are partially washed away by the sea. At Spurn Head, which is about 40 miles south by east from Flamborough Head, and which consists of a long low promontory turning towards the south-west, partly across the æstuary of the Humber, and terminates in what may be called an island, two lighthouses have been erected. In consequence of the very low level of the land in the vicinity of this promontory, which is the Ocellum Promontorium of Ptolemy, the Humber formerly made considerable encroachments upon it; but of late it has receded so much as to leave extensive tracts of marsh land. One of these, a few miles westward of the Spurn Head, began to appear as an island about the commencement of the reign of Charles I., and, increasing from year to year, it was at length embanked and converted into pasture. In the Population Returns of 1841 this tract of land, which, though now only separated by a ditch from the mainland, retains the name of Sunk Island, is stated to contain 5550 acres and 264 inhabitants. The northern part of the coast-line of Yorkshire is rocky, and from the mouth of the Tees to Scarborough the cliffs, which are always washed by the sea at high-water, and in some parts at low-water also, are generally from 70 to 150 feet high, and often rise abruptly and overhang the beach. In many places they are still higher, and at Stoupe Brow, or, as it is more commonly called, Stow Brow, on the south side of Robin Hood's Bay, and about seven miles south of Whitby, they rise to the height of 893 feet above the sea. In the vicinity of the elevated promontory of Flamborough Head there are also cliffs of the height of 100 feet, and in some places as much as 150 feet.

From Spurn Head westward to the confluence of the Ouse and the Trent, a distance in a right line of about 35 miles, the southern boundary of the county is formed by the Humber; and although the line is very irregular, its general course is westward, inclining a little to the north. From this point to the junction of the counties of York, Derby, and Nottingham, a further distance of about 35 miles, the general direction of the boundary is to the south-west; and the northern portion of this line is formed by the Old Don river, while the remaining part, which passes near Bawtry and Tickhill, is for the most part unmarked by any natural feature. Along the boundary of Derbyshire and the small part of Cheshire which separates that county from Lancashire, the line of separation, which is occasionally marked by some unimportant stream, has a general direction to the north-west, and passes a little south of Sheffield, and across the elevated and mountainous district called the Peak of Derbyshire. [*Derbyshire*, vol. viii., p. 416.] From the north-western extremity of this portion of the boundary, which is between 35 and 40 miles from end to end, the line runs nearly due north for more than 25 miles, and then, after turning westward for a few miles, joins the Ribble about 4 miles above Clitheroe. Pursuing the course of that river to Mitton, towards the south-west, it again suddenly turns north-west along the course of its feeder, the little river Hodder; and then, touching upon Bleasdale Moor, takes an irregular course to the north to near Sedbergh. For a short distance the county is separated from Westmoreland by the river Lune, which the boundary-line leaves about 5 miles above Sedbergh. It then turns to the east, and again, by a very circuitous line, to the north, to the junction of the counties of York, Westmoreland, and Durham, where it joins the river Tees, at a point about 50 miles west by north from Tod Point, the northern extremity of the Yorkshire coast-line. The Tees, flowing by Barnard Castle, Yarm, and Stockton, forms the northern boundary of the county from this point to the sea.

The boundary of the North Riding is coincident with that of the county on the north-east, north, and part of the west; but leaving the latter at a point about 22 miles south of the junction of Westmoreland and Durham, and 7 or 8 miles east by north of Sedbergh, the former pursues an irregular conrse east by south to the river Ure, or Yore, at a point 2 or 3 miles below Masham, and then follows the course of that stream to Ripon, where it turns off towards the east. It rejoins the river above Boroughbridge and Aldborough, and follows its course as far as York, where, and for some miles higher up, the river is called the Ouse. It then turns east, and afterwards north-east, to the Derwent, which it joins at Stamford Bridge, and ascending the course of that river by New Malton, to one of its sources near the coast, reaches the sea a little north-west of Filey Head. The line which divides the West Riding from the Ainsty and the East Riding commences at Nun Monkton, at the junction of the Ouse and the Nidd, and runs south-west to near Wetherby, partly along the course of the latter river. It then joins the river Wharfe, and runs along its course to the south-east as far as Cawood, where both the river and the boundary-line join the Ouse, which proceeds in the same direction by Selby to the boundary of the county at the point where the Ouse and Trent unite to form the Humber. The Ainsty of the city of York, which by the Reform Act is united with the North Riding, is bounded on the north-east by the Ouse from York to the river Nidd, on the north-west and south-west by the boundary of the West Riding, and on the east by the river Ouse from Cawood to York; and its eastern boundary, with the boundaries of the North and West Ridings, the south-eastern portion of the coast-line, and the north shore of the Humber, form the boundaries of the East Riding.

iption of the Surface, &c.—The most striking
n the conformation of the surface of this county
eat valley drained by the Ouse and its tributaries,
retches from near the Tees, in the northern part
unty, to the æstuary of the Humber in the south,
general direction from north to south-south-east,
ning the northern slope of the most extensive
England, that of the Ouse and Trent. The high
the eastern boundary of this valley, extending
Tees to the Humber, forms, as has been previously
bold coast-line, from which, in the northern part
unty, the surface rises, in some parts very suddenly,
t elevation. In the description of this valley and
laries, in the 'Physical and Political Geography of
itain,' in the 'Library of Useful Knowledge,' it is
that south of the æstuary of the Tees we find the
ement of the high lands, which in some places
wards to a distance of from 20 to 30 miles from
t, in Barnaby Moor, which has an elevation of
in the trigonometrical station of Burleigh Moor,
ittle farther south, in the Guisborough Hills.
gh lands run down to the sea-coast at Huntcliff,
by the Easington Heights, about midway between
and Whitby, where is a trigonometrical station at
tion of 681 feet, to Rocliff, or Rockliff, a little
uth. A small depression in the high moors,
to the sea at Whitby, carries off the drainage of
valley of the Esk, which runs between the Guis-
Hills and the elevated Egton Moors, which lie
it. These form part of a series of barren eleva-
ch extend from the bold and lofty coast south of
within about 5 miles of Northallerton, a distance
30 miles from the coast. The whole tract of the
loorlands, extending about 30 miles from east to
15 miles from north to south, is a wild and moun-
istrict, intersected by numerous picturesque and
lleys, and forming an escarpment towards the
ch sweeps round towards the south and east from
ty of Northallerton to Malton on the Derwent,
line tolerably parallel, in its general direction,
of the coast. North of Northallerton, where the
xtremity of the highlands turns eastward, it over-
vale of Cleveland, which slopes down to the Tees.
the height in many places of upwards of 1000
general aspect of this district, which is some-
ed the North York Moors, is bleak and dreary,
as it is almost entirely destitute of trees. On
us roads which intersect the district extensive
y wastes present themselves, with no boundary
orizon; but towards the northern and western
nts of the moorlands there are some very beautiful
The steepest side of the elevations is generally
th and west, and the most gradual slope on the
mong the most elevated points of this moun-
gion are the trigonometrical stations of Botton
85 feet), Loosehoe Hill (1404 feet), and Black
n, on the western escarpment (1246 feet). An-
arkable summit, which is celebrated as a land-
as commanding a most extensive and beautiful
e mountain called Roseberry Topping, the height
is given by Greenough as 1102 feet (but by some
orities as 1022 feet), near the road from Guis-
to Stokesley, on the northern escarpment of the
s. The southern portion of the ridge of hills
ms the western extremity of this hilly district, and
n boundary of the Ouse valley, is sometimes called
dian Hills, and immediately east of this range is the
ich, from the river running through it, bears the
yedale. Still farther eastward are the East and
rishes, which form, with Ryedale, an extensive
en towards the south by some isolated elevations,
gradually to the high lands in the north, between
n Moorlands and the valley of the Derwent.
ley of the Derwent, which descends from near
ast, in the neighbourhood of Scarborough, and,
towards the south-west, falls into the valley of
separates the Eastern Moorlands from the York-
lds, which form the continuation of the high
he east side of the valley of the Ouse. One por-
his range extends from the neighbourhood of
n the Derwent, to the Humber, near Hessle, a
west of Hull, following a course very nearly
vith the coast-line, and terminating to the south in an escarpment which seems to push the river a little out of its direct course, and which commands most beautiful and diversified views, embracing the great æstuary of the Humber and the opposite shores of Lincolnshire, as well as the low lands of Yorkshire on each side of the range. Upon this portion of the Wolds are the elevated points of Wilton Beacon, about twelve miles east by north from York, with an elevation of 809 feet, and Hunsley Beacon, farther south, with an elevation of 531 feet. The other division of the Wolds extends from the vicinity of Malton in an easterly direction to Flamborough Head, forming the southern side of the Derwent valley. The ascent of the Wolds, excepting on their eastern side, is generally steep, but they seldom rise to an elevation exceeding 600 feet, and they are broken and divided by many deep winding valleys. Although their southern extremity presents the finest prospects, there are many points on the range from which beautiful views may be obtained of the vale of York, the low grounds between the Wolds and Spurn Head, and the valley of the Derwent, beyond which the Eastern Moorlands rise in the background. Flamborough Head, which forms the most prominent point on the coast, is not the most elevated of the cliffs which mark the eastern extremity of the Wolds. Their highest point is at Bempton Cliff, a few miles farther north, which rises to an elevation of 436 feet. Speeton Cliff, about midway between Flamborough Head and Filey Point, is the extreme northern limit of the great chalk formation which stretches, almost without interruption, across the island to the south-west coast, at Sidmouth in Devonshire. On the eastern side the chalk Wolds terminate in a line which, commencing near Bridlington, and running south-west for a short distance, curves round to the south, and, passing near Driffield and Beverley, reaches the Humber between Hessle and Hull. The portion of the county which lies between this range on the north and west, the ocean on the east, and the Humber on the south and south-west, forms the low district of Holderness, the highest point of which, at Dimlington Heights, on the coast, is less than 150 feet above high-water.

Notwithstanding its generally low level, the peninsular district of Holderness is agreeably diversified in surface, especially towards the sea-coast, within a short distance of which, close to the town of Hornsea, is the largest lake of the county, called Hornsea Mere, about a mile and three-quarters long, and three-quarters of a mile broad at the widest part. The western side of Holderness is distinguished by a fenny district known by the provincial name of 'The Cars,' which extends nearly 20 miles from north to south, with an average breadth of about four miles. As noticed in a previous column, considerable portions of land have been reclaimed from the Humber, and a large district lying eastward of the little river Hull, which flows through the district by Beverley, aud falls into the Humber at the place to which it has given its name, has been drained under an act of parliament obtained in 1762. This level, which is called the Holderness Drainage, extends about 11 miles from north to south, and comprises 11,211 acres, and before it was drained the land was of very little value, because much of it was under water for one half of the year. Thirty years later an act was passed for the Beverley and Barmston Drainage, which includes a similar district on the opposite side of the Hull, extending from the sea-coast at Barmston, a little south of Bridlington, very nearly to the town of Hull, a distance of about 24 miles. This drainage has two outfalls, about 2000 acres in the northern part draining into the sea, and the remainder of the level, amounting to about 10,000 acres, into the river Hull. The Keyingham Drainage, which lies farther south, in the promontory which terminates at Spurn Head, was formed under an Act passed in 1722, but altered and extended, so as to embrace about 5500 acres, by another Act obtained in 1802. In addition to the great extent of fertile land added to the county by these drainages, the high prices of agricultural produce in this country have led to a great extension of cultivation on the Wolds, which, until about the close of the eighteenth century, were little better than a large rabbit-warren. The valley of the Derwent, and its tributary the Hartford, or Hertford, has also been increased in value by the formation, under an Act of 1800, of the Hertford and Derwent Drainage, comprising more than 10,500 acres, of which about 4500 belong to the East and the remainder to the North

Riding. Under the provisions of the same Act, Spalding Moor and Walling Fen, which lie to the west of the southern extremity of the Wolds, between them and the Ouse and Humber, were drained and inclosed.

On the western side of the great valley of the Ouse lie the Western Moorlands of Yorkshire, the general elevation of which is much greater than that of the Eastern Moorlands. These form part of the irregular tract of high land called the Pennine Chain, which, extending southward to the Derbyshire and Staffordshire hills, forms the most mountainous district in England. The highest point of the Pennine Chain is at Cross Fell, a few miles north-west of the north-western angle of the county, where it joins Westmoreland and Durham, and approaches within three or four miles of Cumberland; and from a little south of this point, which has an elevation of 2901 feet,* is a ridge nearly coincident with the county boundary, with a steep escarpment towards the eastern side of the valley of the Eden, the abrupt elevation of which forms a contrast to the long and gradually sloping arms sent off on the east side into Yorkshire and Durham. South of this point the Cumbrian Mountains join the western side of the great Pennine range, the high lands of which, in its further progress towards the south, sometimes spread out into extensive moors, sometimes present rounded mountain-tops, and in other places consist of a confused heap of rocky mountains, interspersed with numerous narrow valleys, which afford scenery of the most romantic and picturesque character. This portion of the range, which occupies the north-western extremity of the West Riding, forms the western portion of the wild district of Craven, and comprises, among its more elevated summits, those of Wharnside or Whernside, near the junction of the counties of York, Westmoreland, and Lancaster, with an elevation which Greenough gives as 2384 feet, according to the Ordnance Survey, or 2461 feet, according to W. Allen, Esq.; Ingleborough, a little farther south, 2361 feet, according to the Ordnance Survey, or, according to Mr. Allen, as quoted by Greenough (who gives the elevation as that of Ingleborough Hill and Simon Fell), 2412 feet; Penyghent, Penygant, or Pennigant, rather more to the east, about 2270 feet; a second mountain, distinguished as the Great Wharnside, near Kettlewell, and still more to the east, 2263 feet; Bow Fell, near Sedbergh, a few miles north of the first-mentioned Wharnside, which would appear by Greenough's statement, apparently from the Ordnance Survey, to be 2911 feet high, an elevation considerably greater than that of any other mountain in this part of the county; but we find no other authority for the statement, and the Ordnance Survey of that part is not yet published; and Cam Fell, between the two Wharnsides, which, according to the same authority, is 2245 feet high. Farther south, a little to the south-east of Skipton, is Rommel's or Rumble's Moor, with an elevation of 1318 feet. The valleys of this district, the most extensive of which are Nidderdale or Netherdale, the valley of the river Nidd, Wharfedale, and Airedale, are so well wooded, cultivated, and studded with villages, as to present a beautiful appearance from the adjacent heights; and the picturesque character of the district, the roads of which afford some of the finest scenery in the country, is heightened by numerous small lakes, one of the principal of which is Malham Water, or Malham Tarn, 6 or 7 miles east by north of the town of Settle, which is about a mile in diameter, and is situated upon the summit of an elevated moor. Another small lake belonging to this mountain region, though lying in the North Riding, is that called the Simmer or Summer Lake, near Askrigg, in Wensleydale, which, together with the valley of the Swale and several others of minor extent, breaks up that part of the Western Moorlands which belongs to the North Riding. Though the general direction of the great range of mountains which occupies the western side of the county, and which is sometimes styled 'the back-bone of England,' is from north to south, it does not consist of a single ridge, but rather of several ranges which, though very irregular in their disposition, mostly form small angles with the main direction of the mountain-range, thereby forming numerous long and narrow valleys, with a general direction from north to south. This hilly district forms a kind of natural boundary between Yorkshire
and Lancashire, and presents great difficulties
of communication, especially by canals o
These difficulties however have not deterre
from the construction of both, though they ha
the execution of some extraordinary and o
From a point a little south of Todmorden,
Calder finds its way along a narrow and tort
to the latitude of Manchester, a distance of ab
there is a well-defined ridge running south
while, from Holme Moss and the adjacent
southern part of this distance, the high land l
to the east, as far as Wakefield and Barnsley,
rivers Don and Calder. A turnpike-road fro
field crosses Holme Moss, at a greater elevati
than any other road in England so far south;
not informed what the actual elevation is.
gives the elevation of the hill as 1859 feet. Fro
of the county southward to this point, the h
which gradually subsides on the eastern side i
plain of the vale of York, has become narrow
rower; but south of the parallel of Manchest
again spreads out into the extensive mounta
traversed by numerous ridges and valleys, wh
monly called the Peak, or the Derbyshire
This part of the range extends a few miles int
terminating to the east near Sheffield. Betwe
and Penistone is an extensive ridge called Bra
about 1246 feet high; and near the county l
few miles west of Sheffield, is the summit c
Seat, which, according to the Map of Englan
by the Society for the Diffusion of Useful Kno
an elevation of 584 yards, or 1752 feet. Thi
must be distinguished from another of the san
Derbyshire, a few miles farther west.

The valley of the Ouse, or the Vale of York,
and western boundaries of which have been
commences very near the river Tees, on t
boundary of the county, the basin of that rive
parated from that of the Wiske, one of the aff
Ouse, by a narrow ridge of small elevation; a
ing the centre of the county, it extends sout
opposite boundary. Taking only that part o
valley which belongs exclusively to the Ouse a
taries, and measuring from York as a centre
southward for about 25 miles, to the conflu
Ouse and Trent; eastward to the High Wolds
point of which is about 12 miles distant; w
about 15 miles, towards Wetherby and Kna
and northward about 35 miles, to Northallert
the most extensive uninterrupted plain in Eng
the tributary valley of the Aire, which stretch
about as far as Halifax, the breadth of this va
50 miles; while the Don, which joins the
Snaith, drains a continuation of the valley
south-west to the very extremity of the coun
30 and 40 miles from the confluence of th
Trent, and about 45 miles in a direct line from
northern part of this valley has a gentle slope
south, with the level surface broken by s
swells; but south of the city of York the s
into a perfect flat, and is in several parts marsh
along the course of the Ouse, and in the spa
between that river on the north-east and an im
drawn from Doncaster to Sherburn or Tadc
west. The monotony of the level is only br
sandy hills, seldom rising to an elevation of m
feet above the level of the sea, and which are
cipally near the course of the Don, in the vicini
Thorne, and Doncaster; and, owing to the e
flatness of the country, the rivers Ouse, Aire, a
frequently altered their course. That portion
which lies immediately about the lower part
and between it and the Wolds which separat
from the Holderness district, is called 'The l
though fertile and pretty thickly inhabited, i
flat. Farther south, towards Sheffield, and on
side of the valley, the surface is diversified
which gradually rise towards the mountair
The Ainsty forms a part of the vale of York, a
the other portions of that valley in genera
being flat towards the river Ouse, and havin
lating surface towards the Western Moorland
posite boundary.

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* 'Geography of Great Britain,' in the 'Library of Useful Knowledge,' p. 16. If this be correct, Greenough's statement of the elevation of Bow Fell, subsequently referred to, must be erroneous. Greenough does not give the height of Cross Fell.

ogy.—In this great county, which stretches from ern to nearly the western coast of England, a great ion of the stratified rocks of the British series may ntageously observed: the exhibitions of igneous d mineral veins are of an interesting character; erficial' deposits are extensive and remarkable; s of antient organic life is extremely large. The physical features of the county are very obviously nt on its geological structure, and the modifica- which they are subject by the action of the sea lern atmospheric agencies, are various and in-

ugh the city of York a line be drawn to the north- st and south-south-east, it will pass along the a wide continuous vale, rarely elevated more than lred feet above the sea. Were the general level nd altered by a depression quite within the limits nown instances, this vale would be a sea-channel, by the cliffs of an island on the east, and more sing lands on the west. The district on the west ssume a mountainous character along nearly all ern border of Yorkshire; the eastern region is t mountainous in its northern portion, and in the rises into a curved range of hills, 'the Wolds,' the flat district of Holderness and the vale of g.

elevated western district is based on Palæozoic he central vale and the larger part of the eastern are formed on the Mesozoic strata; while in ness and in other limited tracts are tertiary and deposits which may be referred to the Cainozoic

e condensed descriptions which follow, the deposits ged in the order of their relative position in the

CAINOZOIC DEPOSITS.

Alluvial.

ands.—The great rivers of Yorkshire which con- e in the Humber, flow in all their lower parts vast breadths of fine sediments, left by the rivers dations of the sea, and a great portion of this sur- still below the level of spring-tides, and only de- from floods by banks.

e valley of the Aire, at Ferrybridge, hazel branches etrified, and nuts with the kernels changed to cal- stone, were found in considerable numbers. (*Phil.* 828.)

or Turf Moors, at no higher level than the silt st noted, occupy extensive areas (Thorne Waste tfield Chace), and in some situations deposits of ure occur under 20 or more feet of silt. Trees in able abundance lie in these deposits, and have ted to show traces of the axe and marks of fire. Pryme, in *Phil. Trans.*)

ch peat, on Thorne Waste, skeletons of the fallow cur, and in one remarkable case the bones were have lost their earthy phosphates and carbonates, the action of sulphuric acid to have been subse- converted to leather by the action of tannin on aining gelatine. (*Reports of the British Associa-* 31.)

Marls.—Under the peaty tracts of Holderness, re of remarkably small extent, lie marls often filled custrine shells; and amongst them rarely the re- of the Irish elk (*Cervus giganteus*) have been

Raised Beaches.

helly gravels and sands of some tracts near Ridg- Holderness, may possibly deserve this name, but e certainly applicable to some shelly sand-beds on s near Filey, from which several marine shells of species have been extracted.

Diluvial Deposits.

mulations of local gravel are common in the valleys parts of Yorkshire, but over great breadths of the of Holderness, in some of the oolitic and chalk d in many of the valleys in these formations—over rt of the area of the central vale of York—in the country between the Swale and the Tees, and in few situations in the valley of the Calder, occur ce of stones of various sizes and qualities, which en *drifted* from great distances, even from beyond the limits of the county, especially from the north or north-west. Of these stones some are of a size to arrest attention, and of such a peculiar nature as to be easily referred to the original situation from which they were drifted. Such in particular are the 'erratic blocks' of porphyritic granite, which lie near the surface in many situations in the northern and eastern parts of Yorkshire, on areas which converge to the north-west, and finally terminate in the porphyritic granite fells of Shap in Westmoreland. From that point they were certainly removed across ridges of hills, and great breadths and valleys, as far as Flamborough Head and Scarborough; but whether by force of water, when the land was at a lower level, or was rising out of the sea, or by icebergs floating on water, or by glaciers moving across the land, or by a combination of these, is still a problem for discussion. A great proportion of small drifted stones lies in a great body of clay which is not stratified, and incloses stones of all sizes, without any arrangement of size, gravity, or mineral quality. Bones of the elephant, hippopotamus, horse, ox, &c., occur in these gravelly and argillaceous deposits, but not frequently, except in valleys where the materials may have been displaced and subjected to fluviatile action. (*Vale of York*; Middleton, *On the Wolds*, &c.)

Ossiferous Deposits.—At Hessle cliff, flinty gravel, stratified *under* diluvial clay, contains elephantoid and other remains: at Beilbecks, near Market Weighton, marls which have some drifted gravel below and other gravel above, contain elephant, rhinoceros, felis, urus, and many bones of other animals, with 13 species of land and fresh-water shells of existing species. Few of the numerous *caverns* in Yorkshire, which occur in the great limestone districts of the North Riding, have been explored for bones. The Cave of Kirkdale has been rendered famous by Dr. Buckland's description (*Reliquiæ Diluvianæ*), which enumerates more than twenty vertebrated animals among the reliquiæ.

Tertiary.

On the sea-coast, immediately north of Bridlington Quay, green and ferruginous sands enter into the composition of the cliff, and, under favourable conditions of the tide, have been explored with success, and have yielded a considerable number of shells of tertiary date, perhaps of the age of the crag of Suffolk, in which some of the species certainly occur.

MESOZOIC STRATA.

Cretaceous System.

Chalk (500 feet thick).—It constitutes the Wold Hills. This is usually a harder rock than that of the South of England, and the nodular flints which it contains are scattered through a great part of its thickness. The lower parts assume in places a greyer and softer aspect. Fossils occur in the upper part, especially sponges, marsupites, and echinodermata, but mollusca and conchifera are less plentiful than in the South of England. The lowest band of the chalk is red, as in Lincolnshire. The chalk is unconformed to all the strata below, resting on each of them in succession in different parts of the Wold edge, as far as the lower beds of the lias.

Speeton Clay (150 feet thick?).—This blue argillaceous deposit lies under the chalk, but does not graduate into it. It appears on the coast at Speeton, and inland at Knapton and other points. The organic remains are numerous, different from those in the chalk, and also different from those in the strata below. They appear to have analogies to the golt of the South of England, and also to the Kimmeridge clay; the former analogies perhaps predominate. Some of the shells occur in the 'Neocomian' formations of France, which are supposed to be nearly equivalent to our lower greensand.

Oolitic System.

Kimmeridge Clay.—This occurs along the north side of the vale of Pickering, and under the escarpment of the Wolds near Cave. It is not clearly seen in contact with the Speeton clay above, into which it perhaps gradually passes. It contains Ostrea deltoidea.

Upper Calcareous Grit (60 feet thick).—This is seen on the hills above Waas Bank, and near Pickering. It contains a few fossils.

Coralline Oolite (60 feet thick).—This rock forms generally the uppermost stratum of the ranges of tabular hills which extend from Scarborough to the Hambleton hills, and then turn southward to Walton and [illegible] oolitic grains are of various sizes, some beds being coarse pisolite. A few bands of chert nodules occur in it, and crystallizations of calc-spar and quartz, and deposits of calcedony, lie in the cavities left by the decomposition of organic remains. It is not generally durable in buildings. In this rock is situated Kirkdale Cave. Several rivers sink into it, and reappear after long subterranean passages. The organic remains are extremely numerous; the coral bands being local, but characteristic.

Lower Calcareous Grit (80 feet thick).—It forms the edges of the tabular hills above mentioned, and occasionally broad and very poor heath surfaces. Though called calcareous, it has little of carbonate of lime in its composition, and some of the shells which it contains are silicified. Locally it is a good building-stone. The fossils are very numerous, and almost exactly like those of the same rocks in Oxfordshire. Ammonites vertebralis is common.

Oxford Clay, or grey earth of Scarborough Castle Hill (150 feet thick).—It appears in the steep slope of the escarpments of the tabular hills, under the 'Nab Ends,' and on the breast of the sea-cliffs south of Scarborough. The fossils which it yields are more like those of the calcareous grit than those of the Oxford clay of the South of England.

Kelloways Rock, or *Hackness Rock* (90 feet thick).—It lies at the base of the tabular hills, and at the foot of the sea-cliffs south of Scarborough. It is more ferruginous than the calcareous grit; is in places somewhat oolitic; and everywhere rich in fossils, such as Ammonites calloviensis, A. sublævis, Gryphæa dilatata, and other shells characteristic of the same rock in Wiltshire, where it is much thinner and of less importance. The Hackness rock has proved a fair building-stone in the museums at York and Scarborough.

Cornbrash (10 feet thick).—This impure calcareous rock is separated from the sandy Kelloways stone by a thin band of clay containing crustacea. It is very rich in fossils, and is nearly continuous from Scarborough to the vicinity of Malton.

Below the cornbrash, the oolitic series of Yorkshire is very much unlike that of the South of England. In that is little sandstone, in this little limestone; the clays of the South are shales in the North; and with the shales and sandstones are fossil plants, coal-beds, and ironstone layers, very much like those of the older coal-fields. To these strata it is not desirable to apply always the same names as those which belong to (perhaps) contemporaneous beds in the South, but we shall indicate the probable analogies.

Upper Sandstone, Shale, and Coal (nearly the equivalent of the Hinton sands and Forest marble of Somersetshire) 200 feet thick.—This series of sandstones (conglomeritic, or fine-grained, or laminated), shales, coal, and ironstone courses, may be studied about Scarborough, and in the cliffs to the northward. The coal is thin and of small value.

Grey Limestone (equivalent of part of the oolite of Lincolnshire), 30 feet thick.—It occurs at the White Nab, south of Scarborough, at Cloughton, Staintondale, and other points north of Scarborough and west of Whitby, always in an impure, rarely at all oolitic state. But as we turn south along the foot of the Hambleton Hills, it becomes oolitic, and, as the upper and lower sandstones diminish, it thickens and acquires more of the usual oolitic aspect. It is in places very ferruginous. The organic remains are numerous. They agree partly with those of the cornbrash, and partly with those of a lower zone, to be mentioned below.

Lower Sandstone, Shale, and Coal, 500 feet thick.—The coal in this great mass of arenaceous and argillaceous deposits is thick enough to be worked on the moors west of Whitby and north of Helmsley, and on the sea-coast at Haiburn Wyke. Over it is a bed of sandstone, in which stems of equiseta stand erect, and below is a bed of shale. This series of rocks ascends to the highest parts of the Cleveland Hills, 1300 to near 1500 feet above the sea.

Ferruginous Beds (inferior oolite and sand of Somersetshire), 60 feet thick.—These appear in the Peak Hill at Robin Hood's Bay, at Kettleness north of Whitby, and in various places round the base of the Cleveland and Hambleton hills, as Osmotherley and Craike Castle. In the Peak Hill the slightly calcareous and irony beds are very
fossiliferous, and the species of fossils generall
those of Dundry Hill near Bristol. The trans
these beds to the lias formation below is very
gradual, the base of the one and the top of
being softened by intervening pale micaceous

Upper Lias Shale, called also alum shale, fro
the principal seat of the manufacture near Whi
house, and Guisborough :—200 feet thick in the
Whitby, and in the Cleveland hills it gradually
thickness in going to the South of England, till
and at Lyme Regis it can hardly be said to ex
In these strata lie most of the Saurian remains
of the fishes, and in general a large proportio
ammonites, belemnites, and other shells for
Whitby coast is famous. It yields coniferous w
changed to jet.

Marlstone.—A series of sandy, ferruginous, an
calcareous beds, which divides the lias shales
parts, and is very rich in fossils, receives this n
Robin Hood's Bay, Staithes, and the head of Bils
very conspicuous. Thickness 150 feet. These
strata which contain ophiuræ rather frequen
Staithes.

Lower Lias Shale (500 feet thick).—It forms th
the lofty cliffs to the west of Staithes, and supports
moorlands of the carbonaceous sandstones and
continues to the south under the Wolds. In its
are bands of gryphites, especially where its
proaches the Humber. Hardly any true lias
rock occurs in Yorkshire farther north than
and Market Weighton. The ammonites and
of this series much resemble those of the Lyme
Somersetshire lias, and it contains coniferous w
times changed to jet.

New Red Formation.

Red Marls with Gypsum.—These marly clays, w
occurrences of gypsum (Pocklington, Holme), form
band on the eastern side of the vale of York, at the
foot of the oolitic and chalky hills, but, being much
by gravel drifted against these hills, are less kno
thickness and properties than any other of the
strata. They may be several hundred feet thic
contain no fossils.

Red Sandstone.—This is found on the western
vale of York, in an irregularly undulating tract of
especially about Ripon and Boroughbridge. It h
with it a considerable mass of white or yellow s
dug near Boroughbridge. Its thickness is unk
contains no fossils.

PALÆOZOIC STRATA.

Magnesian Limestone Formation.

Brotherton Limestone (45 feet thick).—This
grey limestone, much laminated with clay, and
void of magnesia: a few shells occur in the lowe
is of vast importance in agriculture, the stone
dreds of acres having been excavated and burn
which is of especial value on the peat and silt la
levels of Yorkshire. It ranges from the vall
Wharfe near Tadcaster in a nearly straight coun
ground to near Tickhill.

Red Clay and Gypsum (50 feet thick).—Th
known in the vicinity of Fairburn and Brotherto
been cut through on the York and North Mid
way. It separates the nearly pure limestone of
from the magnesian limestone of Weldon, a
continuous belt of rather wet land. No organi

. *Magnesian Limestone* (150 or 200 feet t
composition of this important rock is usually
carbonate of magnesia and carbonate of lime.
the mixture is atomic. It is generally granul
grains are often crystalline. Colour usually ye
the quality excellent for the mason, but of unc
bility. Huddleston and Roche Abbey stone a
in request. Tadcaster yields abundance of
good. Spar veins and cavities are common.
of carbonate and sulphate of copper, oxide o
phate of barytes, and sulphate of strontian o
rock. In the vicinity of Garforth the lower
laminated somewhat like the marl-slate of th
Durham, and yields productæ and other foss
mytili, nautili, spiral shells, and a few corals
limestone near Ferrybridge. The springs

the magnesian limestone often contain carbonate of but seldom much magnesia. The course of the sian limestone is in a range of low tabular hills from sham, by Knaresborough, Pontefract, Broadsworth, ne Abbey. These hills are finely escarped to the slope gently to the east. The soil is not in gene- especially for grass, but it is applicable to various n.

Red Sandstone, or Pontefract Rock.—In places 0 feet thick, and consists of red, purplish, and sands and clays, with stems and other parts Near Pontefract it is usually a mass of yel- ds, of the greatest excellence for the use of the nder in the construction of his moulds. This is which accompanies it along a great part of its hich is a narrow belt, on the west side of the n terrace. Between this and the strata beneath nconformity is observed, in the direction of the the strata, the magnesian formation resting on stone grit, or mountain limestone indifferently.

Carboniferous System.

ormation.—From beneath the southern part early straight edge of the magnesian deposits ndstones, shales, ironstones, and coal of the West f Yorkshire, and fill an enormous area in the the Aire, Calder, Went, Dearn, Dove, and Dun. radford, Halifax, Huddersfield, Penistone, and are all situated near the curved lower edge of strata, while Aberford, Kippax, Pontefract, Elm- isborough, and Laughton le Morthen are near its eastern boundary. The whole of this large area re miles) yields coal; the whole series of strata is above 4000 feet thick; and of the coal which lies series there are about 20 workable beds, yielding 40 feet of coal, generally of good quality. Ironstones cellent quality accompany the lower parts of this deposit, and the circumstances of the country permit attainment of these advantages.

this great coal-field the most useful classifications founded on the nature and accompaniments of the of coal. The most complete general view yet made is that given by Dr. Wm. Smith, in his valuable ogical Map' of the County founded on the succes- of grit rocks and shales containing coal and iron-

following is the classification of Dr. Smith, pro- in 1821:—

Pontefract rock.	
Shales and coal beds. Ackworth rock. Shales and coal. Chevet rock. Shales and coal.	The upper part of the coal series contains thin beds of swift burning coal, which leaves white ashes.
g. Red rock. *h.* Shales and coal. *i.* Bradgate rock.	The midway part thick beds of hard coal, good for furnaces.
k. Shales and coal (the shell ironstone). *l.* Wortley rock. *m.* Shales and coal.	The lower part, excellent bituminous coal, as at Silkstone, Flockton, &c., accompanied with cannel coal and ironstone.
n. Flagstone and other rock. *o.* Shales and coal.	On the extremity of the coal-field a thin coal extends north-west to some of the moors.

he Pontefract rock is here ranked by Dr. Smith among coal-measures.

elow is the millstone-grit series.

he Ackworth rock yields soft freestone, and grindstone rs at Ackworth, Kirby, Mexborough, and Denaby.

he Chevet rock is of limited range and little value.

he red rock, often a coarse gritstone, occurs at Woolley e, Newmiller Dam, &c.

he Bradgate rock yields freestone and grindstone.

he Wortley rock is in thin beds.

he flagstone is evenly laminated, micaceous, and yields paving and roofing flags.

eds of coal are worked in the west of Yorkshire as as 18 inches (near Halifax and Penistone), and one as as 8, 9, or 10 feet (Barnsley), but the average is from 6 feet. The finest coal of Bradford (called the ter bed'), and some of the finest Silkstone coal, may with all but the very choicest Newcastle and Durham coal: the furnace coals of the middle series are excellent; the upper swifter-burning coal is in general of less value. There is no anthracite bed in the district, and very little cannel coal. The dip is generally to the east-south-east, and very moderate. There are some very great and many small dislocations, sometimes accompanied by pyritous and sparry veins, and even by galena. Over several beds the large stems of lepidodendra and sigillariæ stand vertical: under some coals the stigmaria spreads in much abundance, especially in the beds below the flagstone, which have a rock floor called 'ganister,' or 'galliard.' The shelly ironstones of Tankersley Park, &c. are much esteemed in the furnaces, from the lime which the shells yield.

A detailed geological map of the coal district of Yorkshire was begun by Mr. E. S. George, of Leeds, and, since his death, Mr. Thorp and the other members of the West Riding Geological Society have been actively engaged in researches for a complete history of the coal formation.

There is a small detached coal-field in the line of a fault south of Ingleton.

The organic remains of the Yorkshire coal-field consist of fishes (Coilacanthus, Holoptychius, Megalichthys, Palæoniscus, &c.), and many shells, the most numerous and diffused being Unionidæ of various species, such as are common in coal-fields; but the most remarkable group of fossils is that which lies in a very thin band in the part of the series below the flagstone rock, and consists of goniatites, orthoceratites, aviculæ, and other marine genera, such as occur in the mountain limestone strata far below. The fish remains form thin beds (as in Lancashire) over the Middleton coal, near Leeds. The plants are variously distributed in the shales, sandstones, and ironstones.

The Millstone Grit, a series of coarse and fine and laminated sandstones and shales, with poor ironstones and coals, generally thin and bad in quality, surrounds the true coal-field on all the west and north, from Sheffield, by Huddersfield, Keighley, and Otley, to Harwood. It spreads to the boundary of the county, constituting the mountainous border against Lancashire, and occupies along the confines of Westmoreland and Cumberland the summits of all the great ridges about the sources, between the dales, of the Ribble, Rother, Wharfe, Nidd, Swale, Greta, and Tees. Where these rivers pass away from the highest ground to the south and east, they enter a connected area of millstone grit, which thus appears to occupy a very large space in the West and North Ridings. It in fact constitutes most of the high heathy moors of these districts, and contributes much both to their barrenness and their picturesque effect. The most characteristic rock is the quartzose conglomerate, still used in making millstones; and where, as in Bramham Crags, the atmosphere has produced unusual waste, the appearance of the huge blocks is most singular and impressive. The whole series is about a thousand feet thick, and contains, besides the beds already named, a few thin limestones and cherty bands. Its fossils are like the shells of the mountain limestone, and like the plants of the coal series.

Mountain Limestone.—Yoredale Series.—This is about one thousand feet thick, and consists of five principal bands of limestone, alternating with gritstones, shales, thin coals, and some ironstone nodules. This is the character presented along all the northern dales; but in Nidderdale and towards Craven the limestones lose their importance, and almost vanish as we proceed south: the coal also vanishes, and the gritstones become less frequent, till the whole assumes an argillaceous type, and is called in Derbyshire the limestone shale.

Many of the magnificent mural precipices ('scars') which surround the great mountains of Ingleborough, Penyghent, Pen Hill, and Micklefell, and range along the sides of the romantic dales of the Swale and the Yore, are formed of the limestones of this series; and many of the finest waterfalls (Hardrow, Millgill, &c.) happen where they cross the rivers. Swallow-holes abound on the edge of the limestones, and receive the water of rains and small streams. Some of the limestones (especially the upper-thick belt, called the main, or twelve-fathom limestone) are very rich in lead-ore. The flagstone and some of the building-stones are of excellent quality, and the farther north we go the better is the quality of the coal. The lowest limestones yield black marble, and the upper ones encrinal marble.

Mountain Limestone.—The Lower Series.—This is in the south of Yorkshire almost wholly calcareous, and makes in the vicinity of Clithero and Settle, round Pendle Hill, Ingleborough, and Penyghent, mighty ranges of rock four or five hundred feet thick, and nearly perpendicular. Farther north and west, near Kirkby Stephen and Brough, it begins to admit shales, sandstones, and beds of coal; and as we advance into Northumberland these interpolations grow more and more important, the limestones grow thinner and less pure, and the whole group resembles closely the Yoredale rocks as they are seen in Yorkshire. The grandest exhibitions of these rocks are at Greenhow Hill in Nidderdale, in Wharfdale, in Ribblesdale, about Settle, Clapham, Ingleton, and Kirby Lonsdale. In these parts they are full of caverns of great size and beauty, sometimes giving subterranean passage to the rivers, and forming enormous breadths of bare weatherworn rock. Lead and copper are found in veins in this limestone, but not very frequently. Calamine occurs in it, in the district of Bowland Forest, and oxides of zinc on Malham Moors. The organic remains of the mountain limestone in Yorkshire are extremely numerous and interesting.

Old Red Sandstone.

This rock hardly occurs in Yorkshire except as a conglomerate, locally accumulated in the valley of the Rother, near Sedbergh, and not in connection with the mountain limestone which rests on the slaty Silurian rocks, and in its lowest beds contains pebbles of those rocks and lumps of quartz.

Silurian System.

This class of strata appears to be unconformed to the limestone series above. It is found in two separate districts: one near Sedbergh, west of the summit of drainage, and naturally associated with Westmoreland, rising into a characteristic group of hills called 'Howgill Fells;' the other a narrow band exposed along the line of an enormous dislocation on the south side of the mountains of Graygarth, Ingleborough, and Penyghent. In both localities slaty cleavage disguises the original stratification of the Silurian sediments. Fine blue flags are dug at the crooks of Lune, near Sedbergh, and about Horton in Ribblesdale, and at Ingleton a greener rock is cleft into tolerable slate. It is a most singular geological scene which is presented in the vicinity of Ingleton and Horton, for there slaty rocks of extremely various qualities, with *vertical cleavage* and inclined beds, are covered for many miles by a *horizontal* cap of mountain limestone 500 feet thick. Orthocerata and other fossils occur in the dark thin flags of Horton in Ribblesdale.

Disturbances of Strata.

Such is the series of Yorkshire strata, much thicker, more complete, and more varied than belongs to any other county of the empire. It will be found that three cases of general unconformity have been noted: the oldest is between the Silurians and the mountain limestone; the next between the coal and the magnesian series; the last between the oolitic series and the chalk. The prevailing dip of the strata is eastward; indeed, except in the western parts of Craven and in the line of great faults, this general dip is very little modified. In the district of Craven several anticlinal axes of limited extent, mostly ranging north-east, make elliptical elevations about Greenhaw Hill, Skipton, Lothersdale, and in Bowland Forest. These are often connected with the production of metallic veins. A slight broad anticlinal axis affects the oolitic strata *beneath the chalk*.

Some of the dislocations, which occasion great vertical movement of the strata, are very striking. The Great Craven Fault, which ranges nearly east and west from Wharfdale to near Kirby Lonsdale, and is in part of this course double, causes a downthrow to the south of from 1000 feet to more than 1000 yards, and is accompanied by a grand and characteristic change of physical geography. North of this line the country rises to the height of 2400 feet, and south of it sinks to a few hundreds of feet. Where this fault turns to the north from near Kirkby Lonsdale, and receives the name of the 'Penine Fault,' its effects are equally extraordinary, and the western border of Yorkshire derives its pecular bold escarpment from Wharnside to Mickle Fell from the operation of this fault.

There are several curious faults visible in the oolitic and lias strata of the coast near Whitby and Scarborough, and the coal-field is full of them. The magnesian limestone is dislocated near Robin Hood's Well and in a few other places. These and many other fractures of the earth's crust are wholly or principally unconnected with great masses of igneous rock, and devoid of such rocks along the line of fissure. Under Ingleborough however a curious red felspathic dyke is seen to coincide with the Craven fault, and a very large and remarkable greenstone dyke, accompanied by a dislocation of strata, traverses the northern parts of this county, and the southern part of Durham. from near Middleton in Teesdale to near the High Peak, south of Whitby. Along the line of this great 'whindyke' the argillaceous strata are bleached, and the sandstones indurated. It is geographically related to the east end of the great whin sill, as it has been called, which fills a considerable space on the Yorkshire side of the Tees, and causes the great waterfalls of Caldron Snout and the High Force. This mass is in places 200 feet and in others only 24 feet thick. It is a sort of 'interposed bed,' which was formed from lava poured out on the sea-bed with some local violence and rending of the strata. It is in a few places subcolumnar, and varies in crystallization. The limestones have been altered by its heat to white crystalline masses, the sandstones hardened, and the shales locally changed, so as to yield in one spot garnets. No particular dislocations appear to mark its course, and its relation to the local richness in lead of the mining district of Teesdale and Alston Moor is obscure. Lead-veins traverse it in the mines about Hilton and Dufton and yield ore, a circumstance in which it appears to differ from the toadstone of Derbyshire, which is also interposed in the limestone series.

The authorities employed in compiling this abstract of the geology of Yorkshire are chiefly the publications of Professor Phillips (*Geology of Yorkshire*, vols. i. and ii.; *Geol. Transactions*, 1827; *Phil. Magazine* and Annals, passim); Professor Sedgwick (*Cambridge Phil. Trans.*); and Dr. Smith (*Geological Map of the County*). In the *Geology of England and Wales*, by Conybeare and W. Phillips, are many useful notices.

Climate.—The great extent of the county of York, and the variety of surface, occasion considerable differences in the climate in various districts. Tuke, in his 'General View of the Agriculture of the North Riding of Yorkshire,' published in the year 1800, observes that the climate of the coast is, from its situation, cold and bleak, but that in some of the vales near it, which are sheltered from the westerly winds and from the sea air, the climate is such as to favour the ripening of corn. The Vale of Cleveland near the Tees, is very cold, being open to the sea on the north and east, and to the cold winds from the central mountains on the west. The Eastern Moorlands, from their great altitude, have a climate so severe as to present an almost insuperable bar to agricultural improvements; and Tuke, in a note upon his description of the climate of this district, gives the following particulars:—'About the end of August the clouds begin to descend, and in the form of dense fogs, almost amounting to heavy rains, impinge in a morning against these hills, according to the course of the wind, at an elevation of about 700 or 800 feet, and as they become rarefied by the warmth of the day, either ascend above their summits, or remain upon them at an elevation in proportion to their rarefaction. As the autumn approaches, they hang in a morning lower on the hills, and leave their summits clear occasionally only, and then but for a short time: and from that period, during several months, this country is enveloped in fog, chilled with rain, or locked up in snow from about an elevation of 600 feet, with little interruption.' The Howardian Hills partake, though in a less degree, of the coldness and severity of the Eastern Moorlands; and the Wolds of the East Riding are subject to cold winds from the sea, though their diminished elevation, and the different character of the soil, make them so much more favourable to cultivation, that it is observed in the work above quoted, that the crops ripen more than a month earlier than at a similar level on the Moorlands. Ryedale and the East and West Marishes have a mild climate, remarkably favourable to the perfection of crops, but when Tuke wrote, it was, owing to the want of drainage, by no means salubrious. The districts between the Wolds and the coast are liable to cold winds and fogs from the sea and the Humber. In the Vale of York the climate is generally mild and temperate, but the northern part is subject to cold winds from the adjacent Moorlands, while the extensive levels in the southern parts of the county, though comparatively mild in consequence of being sheltered from easterly winds by the Wolds, are very liable to

np and foggy atmosphere. The climate of the West
ıg generally appears to be tolerably healthy, as the
ge duration of human life in that district is quite as
as the average of the whole kingdom. The Western
lands are more liable to rain than the Eastern,
owing to their greater altitude, and not being ex-
to sea-air, the snow remains longer upon them.
part of the high lands which lies in the West
g, though tempestuous and very rainy, is con-
ed salubrious for strong constitutions, perhaps in con-
nce of the frequent purification of the atmosphere by
winds. The quantity of rain which falls annually in
icinity of Ingleborough Hill is about 48 inches; and,
h the lower tracts are very much milder and less
the average annual fall of rain at Sheffield is 33
s, which is 5 inches more than the general average
gland. Tuke observes that the general character of
orth Riding, like that of all the counties bordering
the German Ocean, is that of dryness throughout the
and of peculiar coldness during the first half of it,
the prevailing winds are from the eastern points of
ompass; they set in with the regularity of a monsoon
the end of February or beginning of March, and
ue with almost uninterrupted drought and uniform
ity till the middle of May, and frequently later.
t that time, he adds, their violence begins to abate,
he west winds enter into conflict with them, but the
do not entirely prevail until the approach of July.
t the middle of May the west winds will sometimes
for an hour or two in the morning, but then give way
superior power of those from the east, but about a
h later the east wind will be perceptible only for an
or two in the afternoon, and even then perhaps may
enetrate the country more than 20 or 30 miles. Dur-
is conflict the line of contact may often be readily
ived, and is sometimes marked by a few drops of
Tuke attributes the almost unceasing rains which
pon the mountain district to the arresting of the
brought from the Atlantic by the westerly winds,
mountains themselves, and still more by this vio-
onflict between the currents from opposite sides of
land. During March, April, and May, the east
are usually accompanied by a bright sun in the day-
nd sharp frosts at night, with frequent showers of
nd sleet, the united effect of which is to parch the
and greatly to arrest the progress of vegetation.
sometimes occur even as late as June. Though the
s of Tuke, as above quoted, refer principally to the
Riding, they are also in a great measure applicable
r parts of the county. Some further observations on
e will be found under the head of *Agriculture*.

rography and Communications.—The description
great valley of the Ouse and its principal tribu-
will give a general idea of the position of the rivers
county. The drainage of the extensive tract which
es the waters of the Ouse tends towards the point
the Aire unites with that river at Armin, about
les south-south-east in a straight line from the city
rk, and not quite 10 miles in a straight line, though
nuch more when measured along the windings of the
west by north of the junction of the Ouse and Trent;
o this point converge a great number of small rivers,
nencing in the south-west with the Rother, which
from the border of the county near Rotherham, and
acing the numerous rivers which descend along the
s of the high lands on the west of the county, and
which flow through almost the whole of the western
orthern districts, as well as the drainage of the totally
ct high lands on the north-east, which finds its way
he course of the Derwent. In the article TRENT AND
ER (vol. xxv., p. 191), where the leading features of
eat basin, of which this forms a part, are more fully
bed, it is computed that the drainage of about seven-
of the total area of Yorkshire, or about 4500 square
runs into the basin of the Humber; and, with the ex-
n of the district between the Wolds and the sea, the
of this district pours its waters into the Ouse. In the
raphy of Great Britain' (p. 33) the estimate is rather
, it being computed that the whole surface drained
Ouse alone is probably about 4800 square miles.
otal length of the Ouse, together with the Swale, is
aken at a higher figure than in other works, being
ated at about 160 miles.

The Ouse, which is sometimes called, to distinguish it from other rivers of the same name, the Northern Ouse, is formed mainly by the union of the Ure or Yore and the Swale, and, according to Langdale and some other writers, takes the name of Ouse at the junction of those streams, about three miles below Boroughbridge, although on some maps the name of Yore is continued several miles lower down, to the junction of the Linton. It is stated under TRENT AND HUMBER that the total length of this stream from the source of the Swale may be estimated at from 130 to 135 miles, and it appears to be about the same if we take the Ure or Yore as the main stream, which several writers do.

The Ure rises in the high mountains at the western extremity of the North Riding, near to the border of Westmoreland, and in close proximity to one of the sources of the Eden. It flows first towards the south-east, and then eastward, near Hawes and Askrigg, along Yoredale and Wensleydale to Middleham, receiving in its course several small tributaries on each side, especially on the south side, where it receives one stream from the Simmer lake and another from Bishopdale. A little below Askrigg the Ure falls over a succession of limestone rocks, forming what is called the Aysgarth Force. Below Middleham it is joined on the south by the Cover, a stream which rises at the head of the long narrow valley of Coverdale; and shortly afterwards it turns more to the south and flows past Masham, a few miles below which place it reaches the boundary-line between the North and West Ridings, and receives on the west side the small river Binn, which has numerous branches among the comparatively low hills that gradually subside into the level plain of the county. It then pursues a very irregular course by Tanfield to Ripon, where it receives from the west the united streams of the Skell and the Laver, the former of which rises near Segsworth Fell and flows by Fountains Abbey. Though a small stream, the Skell is of great utility to the inhabitants of Ripon by supplying them with excellent water. At Ripon the Ure quits the boundary-line and enters the West Riding, but it rejoins the boundary near Boroughbridge, and passes by that place and Aldborough to the junction of the Swale, where, according to Lewis, it takes the name of Ouse from an inconsiderable stream which runs into it. Langdale, in his 'Topographical Dictionary of Yorkshire,' says the change of name takes place at Ouseburn, a few miles farther south, but others place it yet lower at Linton. The united stream, which according to different authorities, may at this part be called either the Ure, the Swale, or the Ouse, continues in an irregular course to the south-east, forming the boundary of the North Riding as far as York, receiving the Linton with its tributaries on the north, and the much more important river Nidd on the south-west. At York the Ouse receives the river Foss from the north, and from that city to near Cawood its course runs southward, a little inclining to the west, and it forms for the most part the boundary between the Ainsty and the East Riding. Near Nun-Appleton, a little above Cawood, it receives the Wharfe, which forms the southern limit of the Ainsty, and in the remaining part of its course the Ouse constitutes the boundary between the East and West Ridings. Inclining now to the south-east, it pursues a very irregular course by Cawood and Selby, and after receiving successively the Derwent from the north, and the Aire with its tributaries from the south-west, it pursues a very tortuous course near Howden, and by the newly-formed port of Goole, where it is joined by the Dutch River, or River Dunn Navigation, to the confluence with the Trent at Faxfleet, whence the united stream, under the name of the Humber, pursues an eastern course to the ocean. [TRENT AND HUMBER.] The Humber is navigable as far as Hull for ships of the largest burthen, and vessels drawing not more than sixteen feet water may ascend to Goole. Vessels of 140 to 150 tons' burthen can ascend the Ouse as far as York, while barges of 30 tons may ascend the upper part of the river. The Ure is navigable for barges up to Ripon, and the Swale for several miles from its junction with the Ure. More than half a century since a lock 21 feet wide and 70 feet long was erected on the Ouse at Naburn, four miles below York, previous to the formation of which the tide ascended above that city, and, according to some authorities, flowed to the height of four feet at the Ouse Bridge in

York, a distance of 80 miles from the sea. But according to a map of the environs of York, published by W. Palmer in 1725, and referred to in the 'Geography of Great Britain,' the spring-tide was only two feet at York, six feet at the mouth of the Wharfe, and ten feet at that of the Derwent. The same writer refers to Drake's 'Eboracum,' to show that the greatest rise at York, before the lock was made, was two feet or two feet and a half, and observes that these facts serve to show the nature of the York plain, and that a very small permanent change in the relative levels of the sea and land would turn the valley of the Ouse up as far as York, and the corresponding valley of the Trent as far as Newark, into sandy æstuaries. The Ouse and its principal northern tributaries have been the subject of several acts for the improvement of the navigation; and Priestley, who gives a full account of these, observes that notwithstanding the limited trade of that portion of the Ouse above the city of York, it 'has such an immense traffic in the lower part, by reason of the numerous rivers and canals immediately communicating with the manufacturing districts of Yorkshire and Lancashire, in addition to the coal-mines, stone-quarries, and various iron-works situate in the West Riding, as will undoubtedly rank it the second river of the kingdom in importance and utility; whilst by its union with the æstuary of the Humber merchandize is exported to and imported from all parts of the world.'

The Swale is formed principally by two streams, which, rising respectively near two hills called the Lady's Pillar and Shunnor Fell, which separate its sources from those of the Ure, and the latter of which has an elevation of 2329 feet, flow in an easterly direction along the opposite sides of the high ground called the Water Crag, which has an elevation of 2180 feet, until, the first-mentioned and principal branch having turned to the south, after flowing through the valley called Swale-dale, they unite at Muker. From Muker the river has an irregular course towards the east to Richmond, before reaching which place it receives several small tributaries, principally from the north, the most important being the stream which flows along Arkindale and Arkingarth-dale, and the little river Marske. Below Richmond its course inclines somewhat to the south, and it receives, together with several minor streams, the river Gilling on the north side. On reaching Bowes Hill, near Northallerton, it inclines suddenly to the south-south-east, and runs parallel to a ridge of hills which separates it from the valley of the Wiske; and in this part of its course it receives on the western side a considerable stream, which, rising near Cogdon Haugh, at a very short distance from the upper course of the Swale, flows past Bedale, and conveys the drainage from several other streams into the Swale, and also affords facilities for navigation, which it was proposed, many years ago, to render available by improvements; but though an act was obtained for the purpose, the intended navigation was never completed. Langdale styles this stream Bedale-beck, but it is sometimes called the Bedale river. A few miles farther south, in the latitude of Thirsk, the Swale is joined by the Wiske, a stream which rises near Osmotherley, on the west escarpment of the Eastern Moorlands, and after flowing for some distance northward towards the Tees, turns westward past Great Smeaton, near which place it is connected with some small lakes, and then turns nearly south by Danby Wiske, and near Northallerton, until, having passed the southern termination of the ridge which separates it from the Swale, it inclines westward, and joins that river. From this point the course of the Swale, though very tortuous, continues its south-south-east direction to its junction with the Ure, receiving in its course two considerable streams which descend from the Hambleton Hills, on the escarpment of the Eastern Moorlands, the northern and most important of which flows by Thirsk, and is called the Cod-beck. Several acts have been obtained for rendering portions of this and the other northern feeders of the Ouse navigable; but Langdale remarks of the Swale, the Esk, and the Rye, that though they are all considerable streams, they are scarcely capable of navigation, for, having their sources in very mountainous countries, they are shallow, rapid, and, as well as all the other streams in the North Riding, with the exception of the Wiske, whose circuitous course lies almost wholly in the upper part of the valley of the Ouse, subject to sudden and violent floods.

The Nidd rises about three miles north-east of Kettlewell, at the adjacent mountains called the Great
and Black Fell, and after flowing eastward t
Scar, receiving on its way a small stream fro
the neighbourhood of the Haw Hills, which
the valley of the Nidd, called Nidderdale or N
enters the earth near Bleasfield Scar by a wid
cavern called Goydon-Pot-Hole. It re-appear
miles south of that point by two issues, the
which shortly unite, and then, after receiving
little river which rises in Netherdale Forest, ve
source of the Nidd itself, the river takes a tole
course towards the south-east to Pateley Bridg
being hemmed in on both sides, but especia
north-east, by high hills, from the sides of wh
tributaries descend. It then inclines more to t
descends along the slope of the Western Mo
Ripley and Knaresborough to Colthorpe, when
ral direction is north-east to the Ouse at Nun M
lower part of its course forming the boundary of
The whole course of this river is in the West
though an inferior stream to the Ure and the
tween the basins of which it runs, it forms a c
affluent of the Ouse.

The Wharfe, the next tributary on the same
river Ouse, and which is considered by some t
the most beautiful streams in the island, rises
Western Moorlands, very near the source of
but at what precise spot it is difficult to deter
face of conflicting statements. 'There are,'
writer of the 'Physical Geography of Great Brit
'occasionally some discrepancies in the statem
the sources of the great rivers which rise in these
regions; and this appears to be owing to the circu
that they have all several sources at some small
from one another, giving origin to small stream
unite in one main valley.' 'It is therefore impo
say which is the true source of these rivers. Th
fact a great nucleus of water-heads lying within a
ten or twelve miles diameter, in which we find
the sources of the Swale, Eden, the eastern affluent
Lune, the Ribble, Wharfe, and Ure.' The main
the Wharfe, rising about three miles north of the
gant mountain (according to Greenough's Map), flo
ward through Langster-dale or Langstrath-dale to B
very near the border of the North Riding, where
nearly due south along Kettledale, passing Kettlew
which place it receives a considerable tributary,
cipal branch of which rises near Pennigant, an
along Littondale, and also a smaller tributary f
east. After pursuing the same direction to Gras
the river becomes very tortuous, but inclines gen
the south-east, by Barden Tower and Bolton A
Ilkley, near Rommell's Moor, whence it turns
Ottley and Harewood to Wetherby. Along this p
course it receives several little streams, but its only
of any importance is the Washburn, which rises ne
stone Moor and flows south-south-east to the Whar
below Ottley. From Wetherby the Wharfe inclin
to the south-east, and passing by Tadcaster, up
place it is navigable, forms the south-western bou
the Ainsty to its junction with the Ouse at Nun-A
a little above Cawood. Wetherby may be consid
termination of the high land in this direction, th
to the east of that place forming part of the grea
the vale of York. The course of the Wharfe, e
where it forms the boundary-line, is wholly wi
West Riding.

The source of the Aire, Air, or Are, is in Mal
or Water, five or six miles east by north of the
Settle, in the district of Craven, among the Weste
lands; but for about a mile south from this lake t
runs underground, and re-appears at the base of
dicular rock 286 feet high, which forms the ce
romantic amphitheatre of limestone rocks called
Cove, of which there is a view in Dr. Whitaker's
and Antiquities of the Deanery of Craven,' w
(p. 193) is a remark which may be worth referri
the alleged inaccuracy of Camden in deducing th
of the Aire from the roots of the mountain of P
(by Whitaker spelt Penygent). Whitaker obse
some of the little rivulets which feed Malham
be actually traced to the buttresses of that m
According to this authority it is somewhat

ther the stream which issues from Malham Cove is lly that which enters the earth at Malham Tarn; but rees with others in stating that when, in seasons of rains, the Tarn overflows its banks, the waters spread lves over the surface of the rocks; and at length g Malham Cove, are precipitated over the centre precipice in a vast cataract. This phenomenon, s of very rare occurrence, is by some attributed to racted dimensions of the subterraneous channel, ning of which, at the base of the Cove, is at such vidently insufficient for the escape of the swollen id stream. The course of the Aire, and of those y streams which unite with it in the upper part urse, is generally towards the south for a few miles, ar Gargrave, it is crossed by the Leeds and Liver- nal, which passes over it by a large aqueduct at an n of about 414 feet from the sea at low water, and rom that point follows the valley of the Aire to und the levels of which, hereafter noticed, will give lea of the descent of the valley. From Gargrave eral course of the river is south-east, passing to the rest of Skipton, Rommell's Moor, and Bingley, east ghley, and north of Bradford, along the picturesque of Airedale, to Leeds, passing in its course the f Kirkstall Abbey. At Leeds the canal terminates, rer itself being made navigable below that town. eeds in the same direction from that town to Castle- where it receives the Calder from the west, and from point it pursues a very irregular course, the main ion of which is nearly due east, but inclining a little south, by Knottingley, Ferrybridge, and Kellington, ith, a little below which town it receives the Don the south, and from this junction it runs east by north e or six miles (direct distance) to its junction with use at Assleby Island, near Armin, or Airmin, a little south-west of Howden. The improvement of the with its important tributary the Calder, for the pur- of navigation, forms an important feature in the his- of this class of improvements, these rivers having made navigable under the powers of an act passed in (10 & 11 Will. III., c. 19), upwards of half a century to the date of any enactment for a canal navigation. efore intimated, the Aire is not navigable above Leeds; nder the powers of the act referred to, the navigation formed from that town to the junction with the Calder, tance of 11¼ miles, in which there is a fall of 43¾ feet, ted by six locks, and also from the junction of the two s to Weeland, a farther distance of 18¼ miles, with a of 34½ feet, by four locks, making a total navigable th of about 30 miles, with which several short con- ons have been formed by private canals and railroads ding to quarries and collieries in the vicinity. An ccessful attempt had been made to obtain an act for navigation as early as 1625, and when it was revived, 99, very warm opposition was offered to the scheme he part of the citizens of York, who dreaded the in- of the Ouse, while evidence, of which some extracts given by Priestley, was adduced to show how great a ssity existed for such an improvement, owing to the asing trade of the district. Under an act passed in the lower part of the river, from Weeland to the Ouse, been improved, and a direct cut has been made from Aire at Haddlesey to the Ouse at Selby, a distance of t five miles. More recently, under an act obtained 820, the proprietors of the Aire and Calder Navigation formed a canal from Ferrybridge, through Knottingley, direction nearly parallel with the river, but more t, and lying south of it, by Egborough and Heck, to Ouse at Goole; the eastern portion of this canal, from Don to the Ouse, being formed parallel to that branch e Don, or Dun, which is commonly called the Dutch . The total length of this cut is about 18½ miles, and all, to low-water mark at Goole, 28¾ feet. Goole was e commencement of this work an obscure hamlet ining only a few houses; but in consequence of the ruction of the canal, and of the place having received, 28, the privileges of a port, it has risen so rapidly in rtance as to contain, in 1841, 479 houses, and a lation of 2850. The canal was projected by the late Rennie, but executed by Mr. George Leather. By arious improvements which have been effected from to time by the Aire and Calder Navigation Company, avigation has been rendered available for vessels of 100 tons burthen, which are aided by steam-tugs, as far as Leeds on the Aire, and Wakefield on the Calder.

The Calder, the principal tributary of the Aire, rises on the high ridge called the 'Backbone of England,' just beyond the county boundary, in the adjacent county of Lancaster. Its principal source is in a marsh in Cliviger Dean, a little to the south-east of Burnley, from which marsh also rises one of the feeders of the West Calder, a stream which, flowing westward, joins the Ribble. The waters of its several sources are collected together in the deep and romantic valley of Todmorden, and flow with a very winding course through a deep and often exceedingly narrow valley in a direction mainly to the east, passing by Sowerby, about two miles south of Halifax, north of the hill called Bank Top, by Elland, Dewsbury, Horbury, and Wakefield, from which place it inclines a little towards the north to its junction with the Aire at Castleford. From near Todmorden to a point a little above Elland the Rochdale Canal runs in the same narrow valley as the Calder: and as this valley has also been selected for the turnpike-road and the Manchester and Leeds Railway, there are many parts at which these several lines of communication jostle and intersect each other in a most remarkable manner, the valley being frequently so narrow as scarcely to leave room for them all. The river has consequently been diverted from its natural course in several places. The Calder receives in its course numerous small streams which descend from the high lands on each side: of these the principal are a stream which joins it on the south side, near Sowerby Bridge, at the foot of the Bank Top mountain; the Hebble, a rapid stream which descends from the northern mountains, eastward of the town of Halifax, and joins the Calder at the termination of the Rochdale Canal; the Colne, which rises near the boundary of Derbyshire, and flows by Holmfirth and Huddersfield in a northern and north-eastern direction; and a stream which has several sources in the country between Barnsley and Wakefield, and flows north by west into the Calder. The portion of this river which was made navigable by the Aire and Calder Navigation Company, and which now receives vessels of 100 tons burthen, extends from Wakefield to its junction with the Aire; but a further distance, extending to Sowerby Bridge, near Halifax, has been rendered navigable by the construction of locks and short cuts, under the name of the Calder and Hebble Navigation. This navigation, which extends to a length of about 22 miles, with a fall of 192½ feet, effected by twenty-eight locks, forms the connecting link between the Rochdale Canal and the Aire and Calder Navigation. The line was surveyed by Smeaton, and commenced under the powers of an act passed in 1758, but improved and extended under subsequent Acts, one of which, passed in 1825, empowered the proprietors to form a branch canal to Halifax. The difficulties attending the formation of this navigation, and of other works in the valley of the Calder, are increased by the number of mills established upon the streams, the rights of which it has been necessary to regard. These difficulties, in the case of the Halifax branch, led to the supply of the canal with water by means of a drift 1170 yards long, from the basin of the canal at Salterhebble to a pit beyond the uppermost lock, whence it is raised to the summit level by a steam-engine. In this branch, though only 1⅜ mile in length, there is a rise of 100½ feet. Several short private canals and railways communicate with the Calder for the conveyance of minerals.

The Don or Dun, the only remaining tributary of the Aire which requires special notice, rises near Saltersbrook, upon the high ground called Snealsden or Snailsden Pike, near the border of Cheshire, and a few miles west by north of Penistone. It pursues an easterly course to the latter place, and then turns south-east towards Sheffield, receiving on its way the Little Don, which rises very near the same point, but flows in a straighter direction along Midhope-dale; the Ewden brook, a similar stream rather farther south, descending from the high lands on the border of Derbyshire, and skirting the northern escarpment of Bradfield Moor, and the Loxley river, which descends from the southern slope of Bradfield Moor, and receives two or three short tributaries, the principal of which, the Riveling, descends from Lord's Seat, near the county boundary. For the whole of this distance, and also for some miles below Sheffield, the Don receives no feeder from the north or north-eastern side, which is hemmed in by a ridge nearly parallel to its course. At Sheffield it is joined by the Shef or Sheaf, which rises in the Derbyshire mountains, and runs north-north-east, skirting the boundary of the county for a short distance, and receiving another small stream from the high lands to the west. From Sheffield the Don runs north-east by Rotherham and Doncaster to Thorne, when it turns north, and runs to the Aire just below Snaith. The principal tributaries received along this part of its course are the Rother, which rises in Derbyshire [DERBYSHIRE, vol. viii., p. 418], enters Yorkshire a few miles south of Rotherham, and joins the Don at that town; the Dearn, or Darn, the longest branch of which rises at the hill called Denby Moor, to the north of Penistone, and flows first north-east and then south-east, collecting the waters of several tributary streams, by Barnsley and Darfield, below which place it receives from the west the little river Dove, to its junction with the Don near Conisbrough; a stream of considerable length which descends from Hemsworth, Kirkby, and Clayton in the Clay, and flows westward to the Don at Barsley; and the Went, which originates in the last slope of the high lands on the west of the Ouse valley, and flows by Wentbridge and Kirk-Smeaton to the Don about midway between Thorne and its junction with the Aire, receiving some minor streams in its way.

The navigation of the Don or Dun commences at Tinsley, south-west of Rotherham, at which point the river is joined by the Sheffield canal, a separate undertaking, though forming part of the same extended line of communication; but in many parts below that point a navigation is effected by artificial cuts to avoid bends and difficulties in the bed of the river. The first act for this navigation was passed in 1726, and there have since been several others, of which that of 1826 empowered the company of proprietors to make very extensive improvements by new cuts and other works. The portion of navigation from Tinsley to Doncaster, which by the old course was 21 miles long, is thus reduced to 18 miles, with a fall of 67½ feet by eleven locks. From Doncaster to Fishlake Ferry, near Thorne, the navigation is continued in like way, sometimes in the old course of the river and sometimes in artificial cuts, and the distance has been reduced by recent improvements from 12 to about 10½ miles. From Fishlake Ferry to New Bridge, near Snaith, is a distance of 5½ miles, and from this point the antient and natural course of the Don was, as before stated, nearly due north to the Aire; but the navigation, instead of proceeding along it, turns east-south-east to the Ouse by the nearly straight cut called the Dutch river, the length of which from New Bridge to Goole is 5½ miles: and in consequence of this diversion the old channel has been allowed to silt up. The channel of the Dutch river formerly consisted of two parallel drains, cut during the reign of Charles I. by Sir Cornelius Vermueden, for the purpose of draining the lowlands in the vicinity of Hatfield Chace, and his successors levy an acreage rent upon the lands so benefited. In 1688, during a great flood, the sluices at Goole were carried away, and the tides, which consequently obtained entrance to the drains, destroyed the intermediate division, leaving nothing but the outward banks, and converting the channel into a very wide canal, which at high water during spring-tides is navigable for brigs of 300 tons burthen. The bridges over this channel are made moveable, to allow the passage of masted vessels. The total length of the improved Dun navigation is about 39 miles, with a total rise from low-water mark in the Dutch river of 92½ feet, effected by sixteen locks. Priestley says that when the tide flows 15 feet at Goole it will only flow 7 feet at Fishlake, and 3½ feet at Barmby Dun Ford. Besides the canals hereafter noticed, this navigation is joined by private cuts from the Masbrough Iron-works and the Greasborough coal and iron works; and Priestley observes that it is of the utmost importance for exporting the produce of the extensive coal and iron works which abound at its western extremity, as well as the vast quantity of manufactured iron goods and cutlery produced in Sheffield and its neighbourhood. The trade of Rotherham, the limestone and plaster at Sprotbrough and other places on the line, and the agricultural produce of the neighbourhood of Doncaster, also constitute considerable branches of traffic; while the imports embrace every article required for the supply of an extensive and populous manufacturing district.

The rivers which join the Ouse on the north-eastern side are far less numerous and important than those on the south-west. The Linton, which joins it near Newton-upon-Ouse, and which is the first of any consequence below the junction of the Ure and the Swale, is a stream of little importance, which rises on the Howardian Hills, a little north of Easingwould, and flows south-west to near Alne, where it received another small stream from the south of Easingwould, and one on the opposite side from the lower ground of the vale of York. Its principal tributary rises a few miles north of York, near the river Foss, and runs first north and then west through the tract called Galtres Forest.

The Foss, according to Priestley, rises near Newburgh Hall, about four miles north of Easingwould, then crosses Oulstone Moor, where is a reservoir for supplying the navigation in dry seasons, and after passing towards the south-east through the parish of Craike, which forms a detached part of Durham, reaches Sheriff Hutton Bridge, from which point it has been made navigable by the aid of a cut of about two miles, to avoid a considerable bend, for a distance of 12½ miles, with a fall of 47 feet 8 inches to the level of the Ouse in its ordinary summer state. The lower part of its course is to the south, with a slight inclination westward, and after passing through the eastern quarter of the city of York, it falls into the Ouse on the south side of the castle. The objects of this navigation, which was designed by Mr. William Jessop, and formed under an act of 1793, are the conveyance of coal and general merchandize into the interior of the county and of York, the exportation of agricultural produce, and the drainage of the low grounds in the immediate vicinity of the city.

The Derwent, which is the only important stream descending from the high lands on the eastern side of the county, rises, according to Priestley, near the Flask Inn, about twelve miles north-west of Scarborough, and three miles south-west of Robin Hood's Bay, in the Eastern Moorlands. From this point it runs nearly parallel with the coast in a southern direction, with a very tortuous course, to the boundary between the North and East Ridings, in the vale of Pickering, receiving several tributaries from the west, from Harwood-dale, Long-dale, D[illegible]dale, and Trout's-dale, and passing, a few miles west of Scarborough, between the hills called Birch How and Seamor Beacon. On arriving at the boundary of the Riding, the Derwent is joined by the Hertford or Hartford, which rises very near the coast at Filey Point, and flows along the boundary-line, and from this point to Stamford Bridge, about eight miles east by north of York, the Derwent forms the boundary of the Riding. From the junction of the Hertford, near Ganton, the river runs westward along the valley which separates the Eastern Moorlands from the Yorkshire Wolds, to Yedingham bridge, below which it is navigable for barges, and its course becomes south-west, and at length nearly due south. Below Yedingham or Yeddingham, and about five or six miles south by east of Pickering, the Derwent, which has hitherto received none but very trifling streams, is greatly augmented by the waters of the Rye, which, according to Langdale, rises in Snilesworth, in the Eastern Moorlands, not far from the Black Hambleton mountain, and which in its course to the south-east by Bilsdale, Rivaulx Abbey, Helmsley, Butterwick, and Wycomb, receives the waters of numerous streams descending from the high lands in every direction, from the Howardian Hills on the south, the Hambleton Hills on the west, and the Eastern Moorlands on the north. Of the principal of these streams, one flows from near Coxwold in the west, and bears, for at least a part of its course, the name of Hole-beck: another, called the Rical, gives name to Rical's dale, to the north of Helmsley; the Hodge-beck, which flows through Bransdale, has a subterraneous course for some distance near Kirkby Moorside, a peculiarity which, according to Lewis, is possessed in common with the Rye itself, the Rical, the Dove, the Seven, and the Pickering-beck, all of which, he says, pass under the narrow range of limestone hills which skirts the southern side of the Eastern Moorlands, and emerge at its foot, on the northern side of Ryedale, having run underground from half a mile to a mile and a half: the Dove rises at the head of Farn-dale, and passes to the east of the last-mentioned town; the Seven-beck descends from Rose-dale and Hartoft-dale, by Sinnington and Ne

; and the river Costa, or Pickering-beck, descends
akehoe Moor, along Newton-dale, and by the town
ering. From the junction of the Rye, which gives
the wapentake of Ryedale, the Derwent flows by
alton through a beautifully diversified district, past
s of Kirkham Abbey, by Stamford Bridge, where it
he East Riding, to East Cottingwith, where it re-
e Pocklington canal from the north-east, by Bub-
Wressle, to its junction with the Ouse at Barnby,
ven miles below Selby. It receives on the east
eral rivulets from the slope of the Wolds. The
on, the lower part of which was formed under an
he year 1701, is the property of Earl Fitzwilliam,
ended originally to New Malton, about 38 miles.
litional length of nearly 11½ miles to Yedingham
was made navigable in 1805. The first lock is
es from the Ouse, and the rise of tide at that point
three feet at spring-tides. The use of the naviga-
chiefly for the supply of the neighbourhood with
eals, and general merchandize, and the exportation
ultural produce.

e rivers belonging entirely to Yorkshire, but which
empty themselves into the Ouse, we may notice
ll and the Esk; and of such as do not belong ex-
y to Yorkshire, but flow partly within the county
its boundary, the Torne, the Ribble, and the Tees
pecial notice.

Hull rises at the eastern foot of the Wolds, in the
iding, about three miles west by north of Great
l, and flows south-east to a point about six miles
it town, where it receives another stream, called in
igh's Map the Old How Drain, which rises near
coast, a little north of Hornsea, runs northward to
and then turns west and south-west to the Hull,
t joins near Frodingham. From the junction the
ns southward to the Humber at Kingston-upon-
which town it gives the name by which it is most
y known. The Hull is navigable from the junc-
its two principal feeders, the upper part of the
on being effected by an artificial channel, and it
icates with the Driffield, Leven, and Beverley
It receives some small streams from the Wolds on
, and also, near Hull, the Lambwith stream, which
r the east coast at Aldborough, and flows by Ben-
ne. This river drains the greater part of the
which is cut off from the valley of the Ouse
Wolds; but the northern portion of that district
nto a small stream which rises near Wharram-le-
nd follows the course of the northern range of the
partly by a subterranean channel, to the sea near
ton; and a part of the southern extremity of Hol-
drains into an independent stream which flows by
into the Humber. On the western slope of the
besides the streams which run into the Derwent,
e the Foulness river, and another still smaller
flowing by Hotham and North Cave, which run
the Humber.

Esk, with its numerous tributaries, drains the
portion of the Eastern Moorlands. It rises about
miles in a straight line to the west of Whitby, and
rom Roseberry Topping, and collecting the streams
veral dales which run at right angles or nearly so
urse, flows eastward through the narrow but beau-
ley of Eskdale to the sea at Whitby.

Torne rises in the neighbourhood of Tickhill, near
h-east boundary of the county, and flows in a very
r course to the north-east, being separated from
ey of the Don by the intervention of some compa-
high ground. After meandering through the low
the vicinity of Hatfield Chace, it joins the county
y a little south of the point where it is crossed by
nforth and Keadby canal, and for the remainder of
se to the Trent, which it joins just before its con-
with the Ouse, this stream, the lower part of which
l the Old Don, forms the boundary between York-
d Lincolnshire.

Ribble rises very near to the source of the Wharfe,
orth-western extremity of the West Riding, and
st to the west past Cam Hill, and then to the south
on, Settle, and near Long Preston and Gisburne,
county boundary at Grindlaton. It turns towards
h-west above Gisburne, and continues in that di-
along the border of the county for a few miles, past Clitheroe, until the boundary turns northward, while the Ribble pursues its former direction through Lancashire. The Hodder also, a feeder of the Ribble, rises in this county, near Bolland Knot, to the west of Settle, flows south-west to the boundary of Lancashire near Bleasdale Moor, and turns south-east to the Ribble near Mitton, forming the county boundary as far as its junction. For a further notice of these rivers see LANCASHIRE, vol. xiii., p. 289.

The Tees joins the county boundary at its north-western extremity, at the junction of Yorkshire, Westmoreland, and Durham, in the Lune Forest, and it continues to form the boundary between Yorkshire and Durham for the whole of its course from that point to the sea. This river being fully described under DURHAM, vol. ix., p. 208, it is sufficient here to notice its principal tributaries on the Yorkshire side, which are as follow:—the Lune, which rises near the border of Westmoreland, and flows north-east through Lune Forest, collecting rivulets from the hills on each side, to the Tees a little below Middleton; the Bander, which flows in the same direction, and enters the Tees about midway between the junction of the Lune and Barnard Castle, passing in its course those hills in Stainmoor Forest which, in common with the heights near Robin Hood's Bay, bear the name of Robin Hood's Butts; a similar stream which enters the Tees at Barnard Castle, and is called the Deepdale river; the Greta river or beck, sometimes called the Barney, the longest branch of which rises in Westmoreland, but which, though very winding, pursues the same general course towards the north-east by Greta Bridge to the Tees, a considerable length between Bowes and Brignal being nearly due west and east, while the lower part of its course turns to the north; a small stream which rises very near the course of the Greta at Brignal, and, flowing nearly parallel with the Tees towards the east, passes by Barningham, Hutton, Stanwick, and Barton, to the Tees at Croft; and the Leaven, which collects the waters of numerous rivulets from the north-western escarpment of the Eastern Moorlands, and of the Tame from the vale of Cleveland, and, flowing westward by Stokesley to Rudby, thence turns north by a winding course to the Tees below Yarm. Still farther eastward several small streams flow through the vale of Cleveland direct to the sea, one of the principal being that which passes by Guisborough, and enters the sea at Saltburn.

The other streams which rise in this county, but soon cross the boundary into the adjacent counties, are of but little importance; the chief are—the Blythe, which rises to the east of Rotherham, flows westward into Lincolnshire, and there joins the Idle; the Tame, a tributary of the Mersey, which leaves Yorkshire at its junction with Cheshire and Lancashire; the Wenning, a tributary of the Lune of Westmoreland and Lancashire, which rises north-west of Settle, and flows westward into Lancashire; the Greta, being a second rivulet of that name, which rises at two points near Wharnside, the streams from the two sources flowing southward toward Ingleton, where they unite, and turn westward across the county boundary to the Lune, a short distance north of the Wenning; the Dee, which rises north-east of Wharnside, flows west by north along Dent-dale to Sedbergh, beyond which place it turns west by south, and, after forming the county boundary for a short distance, enters the Lune in Westmoreland; and the Rother, the second river in the county of that name, which rises on the north-west boundary, near the sources of the Eden, flows first north-west along the boundary of Westmoreland, and then turns southward by the Calf and Cautley Crags and the hill called Serker to Sedbergh, where it receives a stream which flows westward through Garsdale, and below which place it joins the Dee.

Canals.—The North Riding of Yorkshire is almost entirely destitute of either artificial canals or navigable rivers, and the canals of the East Riding are few and unimportant; but the West Riding is peculiarly rich in this species of communication, while the exceedingly difficult character of the country through which the principal canals are conducted has rendered necessary the construction of engineering works of astonishing boldness and magnitude in order to effect navigable communications between the eastern and western sides of the island, across the central mountain chain on the Lancashire side of the county. Of the formidable nature of the difficulties to be overcome some idea may be formed from an examination of the section given by Priestley of the inland navigation between the ports of Liverpool, Goole, and Hull, by the river Mersey, the Duke of Bridgewater's and Rochdale Canals, the Calder and Hebble, and Aire and Calder Navigations, and the rivers Ouse and Humber, a distance of 158¼ miles by that route. Commencing along the tideway of the Mersey, the level is suddenly raised by locks at Runcorn to an elevation of about 90 feet above the level of the Mersey at Liverpool. The next material rise takes place beyond Manchester, on the Rochdale Canal, which, in a distance of 17 or 18 miles, rises to the summit level near Stansfield, at an elevation of 600 feet above low-water line on the Mersey at Liverpool, according to the section, or, according to Walker's Map of the Inland Navigation of Great Britain, which with Priestley's work was published as a book of reference, 610½ feet above the sea at low-water. From this point, which is about 60 miles by the navigation from Liverpool, and a very short distance west of the western boundary of Yorkshire, the level of the canal falls very suddenly to Todmorden, and after entering Yorkshire continues to descend, until, at the junction with the Calder and Hebble Navigation, about 73 miles from Liverpool, the elevation is only about 250 feet. From this point the descent, though far less rapid, continues considerable until arriving at the junction of the Calder and Hebble and Aire and Calder Navigations at Wakefield, while the total fall in the remaining distance of about 62 miles to Hull is only about 70 feet. Other lines of water-communication from the Irish Sea to the German Ocean are formed by the more circuitous route of the Leeds and Liverpool Canal, together with the Aire and Calder Navigation, and by the more direct cut of the Ashton-under-Lyne and Huddersfield canals, which communicate with the Calder and Hebble Navigation through Sir John Ramsden's canal. For convenience of reference the principal canals of Yorkshire may be noticed in alphabetical order.

The Aire and Calder Navigation has been sufficiently noticed under the rivers from which it takes its name. It forms a connection between the Ouse and Humber on the south-east, the Leeds and Liverpool Canal on the north-west, the Calder and Hebble Navigation on the west, the Barnsley Canal on the south, and numerous private canals and railways to mines and quarries, especially in the vicinity of Leeds and Wakefield.

The Barnsley Canal was formed under an act of the year 1793, additional capital being raised by the company for paying off their debts and completing their works by a second act in 1808. It commences in the Calder, a little below Wakefield Bridge and the junction of the Calder and Hebble Navigation, and proceeds southward for about 10 miles, in the first 2¾ miles of which a rise of 117 feet is effected by 15 locks. It then turns westward, and, after crossing the river Dearne by a stone aqueduct and forming a junction with the Dearne and Dove Canal, passes Barnsley and extends to Barnby Basin, in the township of Cawthorne, where it communicates with a railway from the Silkstone collieries. The latter part of its course has a rise of 40 feet by five locks, but of its total length of 15¼ miles 11 miles form one level. This canal was opened in 1799, and has been both highly profitable to the proprietors and useful to the neighbourhood, introducing Silkstone coal to the London market, and aiding the cultivation of the moor-land in the vicinity of Barnby Basin.

Beverley Beck is a short canal or creek connecting Beverley with the river Hull, and kept in a fit state for navigation under acts passed in 1726 and 1744.

The Bradford Canal, formed under an act of 1771, and completed in 1774, is a cut of about three miles from the Leeds and Liverpool Canal southward to the town of Bradford, with a rise of 86¼ feet by ten locks. It is very useful for exporting paving-stone, coal, and iron from the neighbouring parts, and has been the main cause of the establishment or extension of several iron-works, some of which communicate with Bradford by private railways. Wool is also a considerable article of traffic, in consequence of the importance of the stuff manufactures of Bradford and its vicinity.

The Calder and Hebble Navigation, a considerable portion of which consists of artificial cuts, is noticed under the river Calder. It connects the Aire and Calder Navigation on the east, with Sir John Ramsden's Canal, the Rochdale Canal, and by its branch, with the town of [illegible] the west. It was projected solely for the pur-
pose of affording facilities to the manufacturi
west of Wakefield, but it has become very
as a link in the navigation by the Rochdale
dersfield Canals. For many years a consideral
of the manufactures of Manchester and Roc
brought by land-carriage across the central ridg
tains to this navigation at Sowerby Bridge, but
ing of the canals occasioned a vast accession of
brought very large profits to the proprietors of t
tion.

The Chesterfield Canal, which belongs chief
tinghamshire and Derbyshire [NOTTINGHAMS
xvi., p. 338; DERBYSHIRE, vol. viii., p. 419],
southern extremity of Yorkshire between Shir
the village of Wales, near which there is a tunn
yards upon the summit level of the canal.

The Dearne and Dove Canal, constructed b
years 1793 and 1804, commences at Swinton, in
which forms part of the Dun or Don navigatio
ceeds north-west to the aqueduct for cond
Barnsley Canal across the river Dearne near
distance of 9¼ miles, with a rise of 127 feet, b
locks. It has a branch of two miles to Worsbro
communicates by a railway with extensive coll
Stainbro' Hall; and there is also a branch
miles, belonging to Earl Fitzwilliam, to the E
works. The chief objects of this undertaking
munication with the mining district about
extremity, and the exportation of the manuf
Barnsley through the port of Hull.

The Derwent River Navigation is sufficiently
the account of the river in a previous column.

The Driffield Navigation commences in the
at Aike Beck Mouth, about 4½ miles north of
and half a mile north of the junction of the Lev
For a distance of 5¾ miles northward the navi
chiefly in the natural bed of the river, and it
short distance up Frodingham Beck, the chief
the Hull, which has a short private cut to Foston
but a little north of the junction of Frodingham Be
the Hull the canal leaves the former, and proceed
artificial cut of nearly 5½ miles, partly parallel
Hull, to Driffield on the north-west. This navi
formed under an act of 1767, is used for the import
coal from the West Riding, timber and merchandi
Hull, and the exportation of wool and farm produc

The Dun or Don River Navigation is described
under the river Don; so likewise is the Foss Nav
under the river Foss.

The Hedon Haven Navigation, from the Hu
Hedon, in the promontory of Holderness, is of
importance: it was the subject of an act passed
It is a natural creek or stream improved for the p
navigation.

The Huddersfield Canal, which was formed un
passed in 1794, 1800, and 1806, is one of the
pendous works of the kind, considering its limited
ever executed. The projectors perceived that i
possible to form a canal in a tolerably direct co
tween that made by Sir John Ramsden from t
and Hebble Navigation to Huddersfield and the
under-Line Canal, then approaching completion
supply the most direct line of communication be
eastern and western seas, and they determined u
ing the present line, which was surveyed by Mr.
Brown; but the almost unprecedented difficul
works compelled the proprietors twice to inc
capital before the central portion was complet
a part of the canal was opened in 1798. This c
is fitted for small craft seven feet wide, and is
admitting boats of twenty-four tons burthen, con
the south of the town of Huddersfield, and tak
west direction by Slaithwaite, being nearly par
of the branches of the river Colne, a tribut
Calder, which it crosses by aqueducts in th
Approaching Marsden in the same direction
feet, by forty-two locks, and thereby attains
level, which is rather more than 656 feet abov
of the sea at low water, and higher than any ot
the kingdom. This level it maintains for a dist
miles, of which a distance of 5451 yards, or mor
miles, is in a tunnel under the mountain-ridg
called Standedge. As there is no towing-path

hauled through this tunnel by manual labour in about hour and twenty minutes. Emerging from the tunnel Diggles, the canal pursues the same direction by Saddle- rth along the valley of the Tame, which river it crosses eral times, and after running parallel with the boundary Lancashire for some miles, it turns westward near ckinfield, and passes for a very short distance through at county to its junction with the Ashton Canal. Its ngth from Huddersfield to the summit-level is 7½ miles, level itself 4 miles, and the descending slope, which s a fall of 334½ feet, by thirty-three locks, 8¼ miles, king a total length of 19¾ miles. The summit tunnel, ally called the Marsden tunnel, is 9 feet wide and 17 t high, the depth of water being 8 feet, and the height ove the water 9 feet; and there are on the western pe two other tunnels of 204 and 198 yards respectively. e navigation across the island by this route is 9¾ miles orter than by any other, and its utility to the manufac- ing district through which it passes is very great, both the importation of raw materials and the exportation of nufactured goods.

The Hull and Leven Canal, which extends about three les eastward from the river Hull to Leven, for the con- yance of lime, manure, corn, and other produce, was med by a private individual, under the powers of Acts ssed in 1801 and 1805. It is sometimes called the Leven nal.

The Knottingley and Goole Canal, forming part of the ire and Calder Navigation, has been described in con- ction with the river Aire.

The Leeds and Liverpool Canal, which is partly de- ribed elsewhere [LANCASHIRE, vol. xiii., p. 290], com- ences at the north-western termination of the Aire and lder Navigation at Leeds Bridge, proceeds a short dis- ce along the river Aire, and then enters an artificial nnel, which pursues a north-western course parallel h and on the south side of that river, following all its dings to Shipley, where it receives the Bradford Canal, ing a rise in this portion of its course of 155 feet 7 es. From Shipley it proceeds westward to New Mill, re it crosses the Aire by an extensive aqueduct, after h to the neighbourhood of Gargrave it continues a ing course to the north-west along the northern bank e river. At Bingley, a short distance beyond the New aqueduct, the canal rises suddenly by a series of locks her height of 88 feet 8 inches, and thereby attains a which extends for 18 miles without a lock, passing Keighley and Steeton, and close to Silsden and on, where there is a short branch, called the Thanet l, to a limestone wharf. At this place the level of canal is 272½ feet above that of the Aire at Leeds. nd Gargrave the canal turns south-west, crosses the again by a large aqueduct, and runs southward across Craven Moors, attaining at the summit-level at Green- ld an elevation of 411 feet 4 inches above the Aire eeds, and about 500 feet above the level of the sea at water. On the summit-level it receives a branch from stone-quarries at Rainhill Rock; and this level con- es beyond the point where the canal enters Lancashire Foulridge, near Colne. The length from Leeds to the mit-lock at Greenberfield is 41 miles. This great un- taking was forty-six years in progress, and was not com- ted so as to allow vessels to pass from Leeds to Liver- ol until 1816.

The Market Weighton Canal is important both for the rposes of navigation and the drainage of the low levels rough which it is conducted. It commences at a point lled New River Head, near Market Weighton, in the t Riding, and pursues a nearly straight course to the th, joining the Humber by a sea-lock very near the con- ence of the Ouse and Trent, passing through Walling , which contains 20,000 acres of land. It is supported an acreage tax upon the occupiers of the lands drained, by a traffic in agricultural and other produce, especi- in a beautiful and durable kind of brick, called the lling Fen brick. It was made under an act of 1772, Mr. Whitworth.

he Ouse River Navigation is described among the rs in a previous page.

he Pocklington Canal was formed under an act of the r 1815, for the conveyance of coal and lime to, and icultural produce from, the neighbourhood of Pock- ton, in the East Riding, near the Wolds. It commences in the river Derwent at East Cottingwith, and runs nearly parallel with one of its feeders, in a circuitous north-eastern course, to near Pocklington. It length is about 8½ miles, and it has four locks.

Sir John Ramsden's Canal commences at the river Calder, at Cooper's Bridge, and runs south-west for about 3¾ miles to Huddersfield, with a rise of 93 feet. In addition to its importance as a link in the communication across the island by the Huddersfield Canal, this navigation has been the chief means of raising the town of Huddersfield, which was built chiefly on Sir John Ramsden's property, to its present position as one of the chief markets for woollen goods in the county. The act for its formation was obtained in 1774.

The Ripon Canal is a short cut parallel with the river Ure, for connecting Ripon with the navigable part of that stream.

The Rochdale Canal commences in the Calder and Hebble Navigation, at Sowerby Bridge Wharf, near Halifax, and runs west by north along the valley of the Calder to Hebden Bridge, where it turns with the river west by south, leaving the county near Todmorden, where it enters Lancashire. [LANCASHIRE, vol. xiii., p. 290.] It rises considerably on this part of its course, but does not attain its summit-level till after leaving the county. This canal is made of sufficient size to receive vessels capable of navigating the tideways of the Humber and the Mersey, so that goods may be transmitted by it from Liverpool to Hull without change of vessel, a circumstance of great importance in the transmission of Baltic produce into Lancashire, and of the manufactures of Lancashire to Hull for shipment to continental markets.

The Selby Canal is a short cut connecting Selby, on the Ouse, with the Aire at West Haddlesey. It is alluded to in the account previously given of the navigation of the Aire.

The Sheffield Canal, made under an act of 1815, commences in a cut communicating with the river Don or Dun at Tinsley, and pursues a course of a little more than four miles, nearly parallel with the Don, to Sheffield, crossing by an aqueduct over the road from Worksop to Attercliffe. It rises rather more than 70 feet, by eleven locks. This canal communicates, by a railway previously formed, with collieries in the parish of Handsworth.

The Stainforth and Keadby Canal, formed under acts of the years 1793, 1798, and 1809, commences in the River Don Navigation, near Stainforth, and proceeds eastward by Thorne into Lincolnshire, where it joins the Trent at Keadby, crossing the county boundary near Crowle. Its total length is 15 miles, of which about half is in Yorkshire, and passing through a very flat country, it has no lock, except at its junction with the Trent. By avoiding the shoals in the lower part of the Don, this canal affords a superior line of communication with Hull and the East Riding, as well as with Lincolnshire, to that by the Don and the Ouse.

The Thanet Canal is a short branch from the Leeds and Liverpool Canal to limestone-quarries near Skipton, formed by the Earl of Thanet, under an act of 1773.

The River Ure Navigation is noticed under the river itself, and a part of it also under the title of the Ripon Canal.

Roads and Railways.—Marshall, in his 'Rural Economy of Yorkshire' (vol. i., p. 180, &c.), mentions the very bad condition of the roads of Yorkshire within his memory, owing to improper modes of road-making and repair; but he intimates that considerable improvements had been effected before he wrote (about the year 1788), and mentions, among others, the road from York to Doncaster as a favourable specimen. A few years later, in the 'General View of the Agriculture of the West Riding of Yorkshire,' drawn up by Messrs. Rennie, Brown, and Shirreff (pp. 36-39), it was stated that the district contained a great number of very good roads, and also many that were indifferent, chiefly from the deficiency of good stone for forming the surface, especially near the manufacturing towns; a circumstance which called forth the ingenuity of the surveyors in the application of calcined freestone and brick in lieu of harder materials. Owing to the friable nature of these materials and the great number of waggons travelling from town to town, some of the most important roads were in a very bad state; but the extension of water communication has both reduced the heavy traffic [illegible]

d without any gradient of steeper inclination than
i0, a slope which is conveniently surmounted by
tive engines. A branch line is being formed to
, and a railway from Leeds to Bradford has been
ed, which, if continued to Halifax, would form a
horter though less level communication between
and the western portion of the line. By a short
n-line now forming at Manchester, this line will be
 into communication with the Liverpool and Man-
 Railway, thus completing an uninterrupted railway
nication between Liverpool and Hull, through the
nd North Midland, Leeds and Selby, and Hull and
ailways.

North Midland Railway, which, in common with
eeding line, was laid out by Mr. George Stephenson,
his county from Derbyshire near Beighton, a few
outh-east of Sheffield, and proceeds northwards to
ugh, near Rotherham, where it crosses and communi-
ith the Sheffield and Rotherham Railway. Thence it
s northwards by a very winding course to the junction
 Manchester and Leeds Railway at Normanton, and,
farther on, those of the York and North Midland
, near Methley, from which it turns north-west to
inus at Hunslet Lane, Leeds. This line forms,
 the Midland Counties or the Birmingham and
ailways, both of which it joins at Derby, and the
and Birmingham Railway, the main line of com-
ion between Yorkshire and the southern counties.
ormed under an act of 1836, and opened in 1840.

Sheffield, Ashton-under-Lyne, and Manchester
, which is now (1843) approaching completion
 act of 1837, will form when completed the most
ilway line between Manchester and Yorkshire; but
to accomplish this it is necessary to pierce the
igh lands by a tunnel about three miles long,
nnel crosses the county boundary from Cheshire
the point of union between Yorkshire, Cheshire,
byshire, a few miles west of Penistone. Emerging
s long tunnel at the head of the Don valley, the
proceeds along the course of that river, first east-
 Penistone, and then south-south-east from that
 Sheffield. Part of this line towards the Man-
end has been completed and brought into use,
unnel is not yet finished. A branch is proposed
 line at Penistone, by Barnsley, to the North Mid-
, which would afford a new route to Leeds, rather
han that by the Manchester and Leeds Railway,
more precipitous; and another line is suggested
Sheffield terminus, along the valley of the Sheaf
orth Midland at Chesterfield, which would greatly
he distance between Sheffield and the south. An
 passed as early as 1831 for a railway between
 and Manchester, but the project then failed.

heffield and Rotherham Railway was projected in
t the act was not passed till 1836, in consequence
enuous opposition of some interested parties. It
 from Sheffield in a north-easterly direction to
gh and Rotherham, communicating with the
dland Railway, and, by a branch, with the Greas-
collieries. This line, which was opened in 1838,
5¼ miles long, and the Greasborough branch is
mile.

ckton and Darlington Railway belongs chiefly
nty of Durham [**Durham**, vol. ix., p. 209], but,
ct of 1828, the company formed a branch or ex-
m Stockton, crossing the Tees by a suspension-
hich, having been found too weak, has been
ed from beneath, and proceeding eastward to
of the æstuary of the Tees in the township of
rgh or Levensthorpe, where it has been the
establishing a port of considerable trade, and
leveland Port, a little farther eastward. The
rgh or Middlesbrough branch is about 4 miles
 the Cleveland extension 1¾ mile.

itby and Pickering Railway, a line of about 24
ked by horse-power, excepting on two inclined
ich the carriages descend by gravity alone, was
der an act of 1833 and opened in 1836. From
arbour the line proceeds south-west for about 6
g the valley of the Esk, which river it crosses by
er bridges. About 6½ miles from Whitby, the
 southward through a short tunnel into the ro-
ale of Goathland, after which it passes along

Newton-dale, nearly in the course of the stream called Pickering Beck, to the town of Pickering. This railway has a single track, and was formed for the small sum of 4400*l.* per mile on an average. Besides passengers and goods, the line conveys much mineral produce, especially stone from the quarries of the Whitby Stone Company, which are connected with the line by a short branch near the tunnel. A beautifully illustrated volume, descriptive of this line and the varied scenery through which it passes, was published in 1836 by Mr. Belcher.

The York and North Midland Railway, formed under acts passed in 1836 and 1837, and completed in 1840, was originally intended to be a York and Leeds line, but was modified in consequence of the design of the North Midland Railway. It commences within the city of York, passes through the city wall through an archway common to this and the Great North of England Railway, which joins it outside the city, and then proceeds south by west to Sherburn, crossing the river Wharfe by an extensive bridge. At Sherburn a branch of about a mile curves eastward to join the Leeds and Selby Railway, which is now leased, but is about to be purchased by the proprietors of this company, at Milford, 14½ miles from York, 13½ miles from Leeds, and 6½ miles from Selby. The main line proceeds southward under the Leeds and Selby Railway by a bridge, and south of the point of intersection is a second branch curving north-eastward towards Selby.

The line then turns south-west, with some heavy earthworks and an extensive bridge across the Aire, and eventually joins the North Midland Railway by two branches, one of which crosses the Calder and turns towards Leeds, while the other inclines southward, and joins the North Midland at Altofts. The main line, which is remarkably level, is 23½ miles long, and the branches amount to about 4 miles more. Besides forming a link in the line of communication from London to Newcastle and Edinburgh, the southern portion of this line, from Milford to Altofts and Methley, forms part of the railway connection between Hull and the west, and also a better though somewhat longer route between York and Leeds than that by the Leeds and Selby Railway. Branches are proposed to Scarborough and the Whitby and Pickering Railway, and also to Knaresborough and Harrogate.

Manufactures.—In its industry, as well as in other respects, Yorkshire is an exceedingly varied and interesting portion of the kingdom; and the West Riding forms one of the most important manufacturing districts in England, comprising important seats of the woollen, cotton, linen, iron, and hardware and cutlery manufactures, as well as considerable quarries and mines. Of these the woollen manufacture may be considered the great staple of the district, and therefore claims a special notice. Cotton factories have been established at Easingwould, and also in some other parts of the West Riding, of which Lewis mentions Wensley-dale and Masham. Flax-spinning, as observed by Mr. M'Culloch, in his 'Statistical Account of the British Empire,' vol. pp. 157, 158 (second edition), is carried on to a greater extent at Leeds than anywhere else in England. Extensive iron-works, which formerly enjoyed considerable celebrity, were seated at Rotherham, and there are others in the neighbourhood of Bradford; but, according to the work just quoted, which is the principal authority for this part of the article, the iron-works of Yorkshire, if not actually declining, are making but little progress. Their total produce in 1830 was estimated at about 28,000 tons. For a further notice of these see **Rotherham**, vol. xx., p. 185, and **Bradford**, vol. v., p. 318. The manufactures of hardware and cutlery at Sheffield, and in the district surrounding that town, are very extensive, and in some departments excel those of Birmingham. In cutlery and plated goods Sheffield stands pre-eminent, and it maintains a high reputation in other branches of manufactures, which are noticed under **Sheffield**, vol. xxi., pp. 366-368. The manufactures of the North and East Ridings are of comparatively small importance, and even the mineral productions of the county, consisting of freestone, limestone, coal, iron, copper, and lead, are most extensively found in the West Riding. At Wickersley, about four miles east of Rotherham, several thousands of grindstones, suitable for the [illegible] descriptions of cutlery, are made for the use of the Sheffield manufactures, some of which are as much as [illegible] in diameter. The coal, which forms an important of the manufacturing prosperity of the district, is found chiefly in the vicinity of Leeds, Sheffield, Bradford, and Wakefield. Alum-works have been carried on in the county, first at Guisborough, and more recently at Whitby, ever since the time of Queen Elizabeth.

The manufacturing district of the West Riding extends from north to south about 40 miles, has a mean width of about 20 miles, and includes an area of about 800 square miles, comprising the hardware as well as the clothing district. The clothing district commences below the part of the county which bears the name of Craven, and extends over the tract which comprises the towns of Leeds, Bradford, Halifax, Huddersfield, and Wakefield. In the several articles on those towns will be found particulars of the respective branches of which they may be considered the centres, and especially under Leeds, Bradford, and Halifax, the history and statistics of the woollen manufactures are treated at length. 'Cloth is,' observes Mr. M'Culloch, 'the chief article manufactured in this district, the greater part being made in the neighbourhood of Leeds, Wakefield, Huddersfield, and Saddleworth.' 'Leeds, in particular,' he proceeds, 'is the grand mart for coloured and white broadcloths. The former, which are usually called *mixed cloths*, are made wholly of dyed wool. The mixed-cloth manufacturers reside partly in the villages belonging to the parish of Leeds, but chiefly at Morley, Gildersome, Adwalton, Driglington, Pudsey, Farsley, Calverley, Eccleshill, Idle, Baildon, Yeadon, Guiseley, Rawden, and Horsforth, in or bordering upon the vale of the Aire, principally to the west of Leeds; and at Batley, Dewsbury, Osset, Horbury, and Kirkburton, west of Wakefield, in or near the valley of the Calder. Very few mixed-cloth manufacturers are to be found to the east and north of Leeds, and there are but few in the town itself.' 'White cloth,' according to the same authority, 'is principally manufactured at Alverthorpe, Osset, Kirkheaton, Dewsbury, Batley, Birstal, Hopton, Mirfield, Eccleshill, Cleckheaton, Bowling, and Shipley, a tract of country forming an oblique belt across the hills that separate the vale of the Calder from the vale of the Aire, beginning about a mile west of Wakefield, leaving Huddersfield and Bradford a little to the left, terminating at Shipley on the Aire, and not coming within less than six miles of Leeds on the right.' Though generally distinct from each other, the districts of the mixed and white cloth occasionally, as will be seen from the above description, run into each other, especially upon their southern and south-western extremities. Flannels and baizes are the principal articles made about Halifax, and the chief district for blankets and flushing lies between Leeds and Huddersfield. Worsted-spinning is largely practised at Bradford, where also, as well as at Halifax and Leeds, stuffs are manufactured. In and near Huddersfield are made narrow cloths; and Saddleworth produces kerseymeres and broadcloths nearly equal to those of the west of England. Wakefield is chiefly celebrated for its wool-market and the skill of its cloth-dyers. Near Batley and Dewsbury are establishments called *shoddy-mills*, for manufacturing yarn from woollen rags and refuse goods, of which considerable quantities are imported. A little new wool is usually added, and the yarn is made into a coarse kind of cloth which is used for padding and similar purposes. From the nature of its manufactures, consisting of baizes, flannels, kerseys, and broadcloths, Rochdale may, though situated in Lancashire, be considered to belong to the woollen district of Yorkshire.

Though it is difficult to estimate the proportion exactly, M'Culloch conceives that the woollen manufactures of Yorkshire form fully three-fourths of those of the whole kingdom. From the Returns of the Factory Inspectors it appears that there were, in 1834, 1102 woollen factories at work in the whole of England, employing 65,461 persons, while those in the West Riding alone amounted to 601, giving employment to 40,890 individuals. Full accounts of the great cloth-halls are given under the towns to which they belong, where will be found details as to the mode of conducting the business. Much cloth is however produced and sold without passing through the halls. For a long period, until the year 1818, various Acts of Parliament were in force, under the name of *Stamping Acts*, for the purpose of preventing fraud in the measurement of cloth, and from the year 1726 to 1813 annual returns were made of the quantity of cloth milled at the several fulling-mills of the West Riding. In the first of these years the number of pieces of broad-cloth amounted to 26,671, and it increased pretty steadily to 369,890 pieces in the latter year, containing 11,702,037 yards. In 1738, the first year for which the return embraces narrow-cloths, the number of pieces of that kind was 14,495, and in 1813 it had increased to 142,863, the length of which amounted to 5,515,755 yards. Since the close of the period embraced by these returns, the manufacture has continued to increase, with even greater rapidity, as may be ascertained from the increase in the number of factories and in the imports of foreign wool.

Formerly the greater proportion of the woollen goods produced in Yorkshire consisted of the coarser kinds of cloth; but the manufacture has been so greatly improved that Yorkshire cloths are no longer looked upon as inferior to those of other districts, while the finer qualities of cloth made in the West Riding are excellent. Every branch of the woollen manufacture is at the present time (1843) in a state of activity, and in some branches it is difficult to obtain a sufficient supply of hands. So extensive are the operations of some of the principal master-manufacturers, that one house alone, at Halifax, gives employment to between 5000 and 6000 individuals, of whom nearly one-half are engaged in the various factories belonging to the firm, while others perform their work on their own premises in the neighbouring towns and villages. The extent and prosperity of the manufactures in the West Riding, by opening markets for produce, exercise a most beneficial effect upon the agriculture of the district.

Agriculture.—This is one of the most important counties in an agricultural point of view; but from its great extent and the variety of soils and difference of climate which are found there, it is absolutely necessary to treat of its subdivisions or Ridings separately, and consider them as if they were separate counties. We shall begin with the North Riding, which extends southward from that portion of the county of Durham which lies to the north of it along the coast of the North Sea or German Ocean to the river Hartford, which forms its southern boundary, as far as Stamford-bridge, where the road to York is its boundary till it meets the Ouse: it then has the Ainsty of York to the south-west, and the West Riding and Westmoreland to the west. The length of the Riding from east to west is [illegible] miles, and from north to south 47 miles: it contains about 1,300,000 acres, of which nearly one-third are uncultivated, or at least were so at the Agricultural Survey in [illegible]. Some part of this has no doubt been brought into cultivation and some planted, but there are still extensive moors and mountains, which are scarcely capable of much improvement.

The soil on the coast is mostly a brownish clay, or a loam incumbent on a clay or on freestone; and in some valleys west of Whitby the soil is a rich deep loam. The soil of Cleveland is mostly a fertile clay or fine red sand, as betwixt Marske and Worsall, and about Lavington and Crawthorn. In the neighbourhood of Kildale there is a good deal of deep rich loam. The surface is diversified with hills, and there are very few level fields. Near the Tees in the valley of York there is generally a rich gravelly loam. On the whole it may be asserted that in all the valleys and on the lower hills the soil is fertile and mostly fit to bear good crops with proper management. The extensive tract of high hills called the Eastern Moorlands, which occupy a space of about 30 miles by 15, is penetrated by many cultivated valleys more or less fertile. The hills are covered with ling where the freestone does not crop out and present a bare rocky top. The western moorlands have not the same dreary aspect, but are covered with green pastures; and even where it is brown with ling there are sweet grasses interspersed with it, which cattle and sheep soon find out. The farmhouses are not generally so conveniently situated for the occupation of the land as they might be, but are often crowded in villages at a distance from the fields. Where new buildings have been erected on the inclosures of common land, they are better situated, and save the farmer much useless expense in the carrying home of his crops and hauling manure to his fields. Large haybarns were once thought essential, owing to the uncertainty of the weather; but now that the hay is mostly stacked in the meadows, these are no longer necessary; and where they remain they only cause a useless expense in repairs. When a tenant hires farm, he expects to find the buildings in good repair, and gages to keep them so, which condition is not often ictly adhered to. The cottages for labourers are small d mean, and generally consist of two small rooms on the ound floor, which is often damp, and consequently un- althy. Nothing is so important to the farmer as that his bourer should be comfortably lodged, and have a certain tent of garden-ground to raise vegetables for his family. e will not then be tempted to steal the turnips and cab- ges on the farm.

The farms in the North Riding of Yorkshire, as in the st of the county, are of every imaginable size, from 50 to 00 acres and more. It is generally found that farms m 300 to 500 acres, occupied by intelligent tenants with fficient capital, are the best cultivated, and give the eatest proportional profit. Small farms are usually occu- ed by men who have little more capital than their stock, en if that is their own, free from debt, and consequently ve not the means, if they had the inclination, to bring eir farms into a high state of cultivation by feeding cattle d purchasing bones, oil-cakes, and artificial manures, on hich high farming depends. When a farm is too large, it quires too great a capital, and every portion cannot so ell be attended to by the farmer: we mean those which nsist chiefly of arable land; for very extensive pastures e more easily attended to, and require much less labour. ost Yorkshire farms have extensive pastures attached to em, where horses and cattle are bred, for which the unty is celebrated. The rent of land is moderate, con- lering its quality, but leases are not common, except ere wastes and commons have been inclosed, and the ants have undertaken to bring them into regular cul- tion. In the leases granted there are frequently many ditions and restrictions which are unnecessary and in- ous to the tenant, such as not to plant above one or acres of potatoes, as if on a well-managed farm pota- were not one of the most profitable crops; and their duction into the regular rotation on light soils would le the tenant to pay a better rent. If there must be ctions, let it be that potatoes shall not recur above in eight or ten years on the same spot. The exact on of crops is likewise laid down in some leases, which ely precludes any improvement, and takes from the er the strongest incitement to cultivate in the best ner. It presumes that the agent or surveyor who lets arm has discovered the *ne plus ultra* of good farm- which reminds one of a very common saying, when a er has failed, that it was not his fault, for he farmed and as well as it was possible; by which was meant he followed some old established routine without de- on, and was ruined in the end.

some old leases there is a covenant that all the dung, , and manure produced in the messuages shall be d on the *pastures and meadow grounds;* than which cannot be a more absurd clause. Lime is almost in- bly directed to be put on the land in a certain pro- on, whether the land requires it or not.

w waggons are used in this part of Yorkshire, owing e frequent hills; and single-horse carts are found more convenient and economical, especially where orses are strong and active.

eshing-machines were very early introduced from nd, and there is scarcely a farm of any extent which t one: with these machines the labourers undertake sh and clean oats at 6*d*. the quarter, and wheat at e horses being supplied them. The great advantage ing a large quantity of corn locked up at once in a y and ready to take to market, and not lying about arn floor subject to daily pilfering, is the principal age of a machine. It also leaves less corn in the when properly managed. The ploughs are mostly t wheels, and, like the Scotch ploughs, are univer- orked with two horses abreast, unless some very stiff to be broken up. The Cleveland horses are very and active, and many good carriage-horses are bred leveland mares by giving them a full blood horse.

e modern and complicated implements, such as ers, drills, and horse-hoes, are used by gentlemen e wealthier farmers; and every new improvement is ntroduced and tried. As much hay is made and put icks in the field, it would be a loss of time, in the period of haymaking, if it were loaded on carts or ons, to be immediately unloaded on the rick; it is therefore usually dragged along the ground by means of a wooden frame called a hay-sweep, which is drawn by two horses, kept at some distance from each other, which collect and drag, as on a sledge, a great cock of hay, and, after bringing it to the foot of the rick, leave it there to fetch another. The frame, being lifted up, slides over the heap of hay; and the horses generally trot in the operation.

On an average of farms, the grass land is two-thirds of the whole farm, and the arable one-third; in the drier portions of the Riding, as in Cleveland, the proportion of arable is greater; as you approach the west, it is less, the climate being there better adapted for grass.

In ploughing the land the practice used to be to gather it in high ridges, whether the subsoil was retentive or porous. Since the introduction of under-draining, which however is not sufficiently general, these ridges have been lowered and gradually brought to a level, being reduced in width from seven yards to three or four yards.

Clean fallows were once universal on all the heavy soils, and many good farmers still think them necessary to keep clay soils clean and sweet. Wherever a useful crop can be introduced into the fallow years, such as tares sown after the land is worked in autumn after harvest, and cut green or fed off in the next summer in time to allow another cleaning and stirring before wheat sowing, this is taken advantage of by industrious cultivators. On the lighter loams turnips have entirely superseded clean fallows, and even on the heaviest fallows do not recur so frequently as they did formerly, seldom sooner than after an interval of six years. This is in consequence of the introduction of improved rotations of crops.

The most common rotation on heavy loams is, fallow, wheat, beans and peas mixed, oats, which, if the beans and peas are used for fatting cattle and not sold, is a good rotation, but otherwise too exhausting. The hay produced on the grass land, and given to cattle in winter, may in some measure give a sufficiency of dung to keep the land in heart. On the gravelly loams the Norfolk course is commonly adopted, viz. turnips, barley, clover, or grass seeds, wheat. Sometimes peas take the place of the clover; they might be profitably introduced between grass seeds and wheat, as this last does not give so good crops after rye-grass as after clover; and the introduction of peas is according to the right principles of the succession of crops. A curious alternation is practised by some on light soil, which is, turnips and barley, the turnips fed off; and it seems to be a very profitable course. How long it will succeed we will not pretend to determine; but, as with wheat and beans on good loams in Kent, with a careful destruction of weeds, it may succeed for many years. If the turnips continue good, it is a very profitable course. The only manure used for the turnips is lime: bones would be better, and are no doubt employed by the best farmers. The manure is *spared for the grass land*, a most preposterous arrangement. In the very rich soils of Ryedale several crops of oats are often taken in succession with much success; but, like all very rich soils, they will do so for a time only, and at the expense of the *heart* of the land, and all the future crops for generations to come. It is literally eating up the capital, which should produce a good interest for ever. An old and bad course on heavy lands is still occasionally met with in Cleveland, which is, fallow, wheat, oats, and clover left two years: by merely transposing the two last, or taking oats after the fallow and wheat after the clover, the same crops would give a greater return and leave the land clean. Oats after wheat must fill the land with weeds, and the clover cannot possibly thrive in foul soils.

There is no part of England where lime is so much used on the land as in Yorkshire; but however advantageous this may be on some soils, it must evidently be thrown away on others, if it does not do harm by exciting the land to bear crops, and exhausting it of its natural organic components. On land which has been long in grass, and where the soil contains little calcareous matter, lime is extremely beneficial; but upon poor hungry soils, unless a good dressing of rich dung be given at the same time, it does more harm than good. Wheat is generally sown in the first week of October, although some continue to sow it in open weather till March, as the turnips come off, and have good crops, if the summer be not too wet.

The corn, when not mown, is reaped with the sickle, generally by women; the men seldom reap, but they also tie up the sheaves, one man tying for three women; sometimes a boy makes the bands for him. The sheaves are set up in tens, two sheaves being turned over them as a protection from the wet. In rainy weather this may be advisable; but if the weather is fine, it is much better to let the ears have the advantage of the sun and morning dews; even a few showers will not hurt the corn after it is in sheaf. The best wheat is grown in Cleveland, but the crops are not so abundant as those in Ryedale, where the turnip-system is more general, instead of fallows. Much wheat is exported from the ports of the North Riding, chiefly to the manufacturing districts, besides what supplies its own population; but, till of late years, oat and rye meal were the chief food of the labourers, as well as meslin, that is, wheat and rye sown together, which makes good wholesome bread. On the good light soils as much as six quarters of rye per acre has been grown. The barley of this Riding is not particularly fine, nor the crops large. It seems as if the land was better suited to rye and oats: the reason of this it may be more difficult to explain; it arises probably from the natural texture of the soil, more than from its composition. The quantity of barley sown is usually ten pecks, and the crop averages four quarters per acre.

Ryedale is remarkable for its fine oats, which are usually sown on the turnip land, or on the grass land when ploughed up. The sort is generally the Friesland oat, and the quantity of seed is from four to five bushels per acre. On some of the best lands they sow as much as eight bushels, which appears enormous, and probably diminishes the crop by weakening the stems, which grow too close. The idea is, that on good land, the more seed the greater crop, which is by no means a necessary consequence. The farmers are particular in getting a change of seed from Holland every four or five years. Oats are sown in March and April, the earlier the better, if the weather permits. Eight quarters per acre is an average crop in Ryedale. The oats are threshed out soon after harvest, as new oats make the best oat-meal, to which purpose they are chiefly applied. A quarter is supposed to weigh twenty-four stones, and is often sold by weight, instead of measure, at this rate.

Rape is sown extensively for seed on the best lands, and the preparation is often by paring and burning grass lands, which is sure to secure a crop. The seed is sown in July or August, and the plants thinned out or transplanted in October. Where there is a great breadth of rape, the plants are raised in seed beds, and transplanted with the plough. A furrow is made and the plants are placed a foot apart, leaning on the furrow-slice turned over; when the plough returns, it covers the roots, and the plants stand upright: should the soil be very loose, a woman treads by the side of every plant to fix it; a shower of rain renders this operation superfluous. Rape is usually ripe in July, and threshed out on a cloth in the field, by which much shedding of the seed is saved. It should be cut before the pod is quite ripe. These threshings are a kind of festival, like hop-picking in hop countries, and draw together many labourers and more idlers; but the work must be finished rapidly in so precarious a climate, for a wet day would spoil all. If there is much seed, great care must be taken that it do not heat too much in the heap. This inconvenience is avoided where the rape is stacked in the straw for some time before it is threshed; but then it must be very carefully handled in the stacking and carrying, or much seed will be shed and lost. When it is in stack, the outside is beaten with poles, a cloth being laid under the part which is beaten. This beats out the seeds; they would otherwise soon be devoured by the birds, which are very fond of them. In carrying rape a cloth is spread over four poles, one at each corner of the waggon, forming a bag to catch the seed; there are also light barrows with cloths over them, to carry the sheaves to the waggon or stack. The straw and refuse of the rape is excellent fodder for the cattle in winter. It is therefore waste to burn them in the field, as some do. The crop usually averages the same as wheat: but the price fluctuates greatly. To be a profitable crop, it should not be less than the price of wheat.

Turnips used to be sown on grass land pared and burnt, or ploughed two or three times after having been fed off late in spring; but now the usual cultivation of this root Northumberland plan is generally adopted, with a reful preparation and manuring

Potatoes are become a very essential crop on farms, and are mostly shipped to London, where they a good price. The Yorkshire reds are a favourite the market. The sets are generally cut; but it is by experience that a more certain crop is produced selecting middle-sized potatoes and planting them Twenty bushels are required to plant an acre in twenty-seven inches distance and eighteen inches the rows. Twenty loads of good dung should be the land, and spread in the furrows when the sets in. The deeper the ground has been stirred the but the high moulding up of the stems, as they not found so advantageous as merely stirring the vals and keeping down the weeds. The produce is 200 to 300 bushels per acre; 400 have been obtained this is a very great crop.

The opinion that potatoes greatly exhaust the land led some proprietors to prohibit the cultivation of the any extent; but if the above-mentioned quantity of is given to the land, there will be no fear of exhaust and the subsequent crops, which should be spring and not wheat, and clover or grass seeds after will show no diminution of fertility. Potatoes leave ground too loose for wheat, which is apt to be thrown by the frost: by leaving the land exposed to the frost, sowing in spring, it will be both rich and mellow, and spring crop and young clover will grow well. A cannot afford to have a great breadth of potatoes, each acre takes 15 to 20 tumbril loads of dung. experienced men think that Swedish turnips are valuable as a crop, and raised at less expense.

A little flax is still sown, but not in the quantity once, when domestic manufactures had not yet been stroyed by the power of steam and machinery. The petition of the foreign flax-grower makes this branch agriculture less profitable than it was once. It is hoped that in time it will revive.

A considerable quantity of mustard is sown neighbourhood of York, which is ground and Durham mustard.

The principal part of the North Riding consists of lands, and is appropriated to the dairy, which is but managed in the vale of York and other parts Riding. The grass lands are laid down in high ridges, so that the upper part, being too dry, is with moss and poor herbage, and the low intervals of rushes and aquatic plants, a necessary consequence this mode of ridging. They are thus left, when might be improved by cultivation, partly from the hibition to break up pastures, and partly for fear of tithe-owner, if they are cultivated. This last exists no longer, and a great blessing it is for all for although the fear of the tithe-owner was often a bugbear, it still impeded improvements.

In the dales of the Western Moorlands the meadows more carefully managed. The weeds are eradicated, the grass is regularly manured by top-dressings. done in spring or autumn; in the last case the pastures not fed off close before winter, by which the surface be chilled by the frost; but an early bite in spring pensates the loss fully. It is thought by some that the butter made off poor pastures is firmer and better in long voyages, than where the pastures rich and the grass succulent. This however is by the quality of the Dutch and Holstein butter, the pastures are very rich. Artificial grass chiefly to make permanent pastures. They c of white clover, trefoil, rib grass, and hay are called, which are only the sweepings of which some seeds of the early grasses may vegetate; but much the best mode is that o grass seeds by hand, and sowing them in just to produce a good sward. If these cannot obtained, it is better to sow some perennial about two bushels per acre. In making hay, in Moorlands, where this is done in a better mann other parts of the Riding, the grass is tedded out hands, by which it is better divided; it is turned soon as the top is dry, with the rake handle, raked into windrows, and made into small cock foot cocks, the same day. After the dew is off day, these cocks are opened to the sun and win again is done with the hands. As soon as it is suff

hese are raked together, and either stacked at once,
there is a large quantity, and the weather is pre-
us, they are collected into large cocks, where they
ly heat, before they are carried to the stack; but
hould be avoided if possible, as some of the bottom
e cock is always more or less damaged by the
ure rising from the ground; besides, being considered
fe in these cocks, it is often left too long in the field,
ometimes no sufficient interval of dry weather occurs
ck them in good order. The dairy and fatting cattle
heep are usually sent to the pastures about the 12th
ay, till October, when they are removed to the after-
or fog, as it is called; the pastures are then stocked
lean shorn sheep, and kept bare all winter—a very
ractice, which impoverishes the land and encourages
All pastures should be mown once at least in
or four years, to improve the grass and destroy rank

ere was once a fair proportion of timber-trees both
woods and hedge rows of this Riding; but they
been much thinned, and at present the quantity
onsiderable, as well as their size. Ash still abounds
dairy districts, being useful for butter firkins and
dairy implements which require a white wood.

short-horned breed of cattle is the prevailing sort
er Yorkshire, and of this there are some varieties.
of Cleveland and the vale of York are known by
me of the Tees-water breed, and in England are
the Holderness breed. They originally came over
olland, and are very profitable where the pasture is
but on poorer land they soon degenerate. Oxen are
to a great size, and seldom used for draught. In
est Moorlands the cattle are smaller, and on the
s of the West Riding and Westmoreland the long-
breed is very common. A cross of the two breeds
en praised by some, but it is doubtful if anything
ood could be produced by it beyond the first pro-
etween them. It would not be advisable to rear a
the cross, however he might appear well shaped;
ntinued cross will invariably introduce defective
Many heifers and cows of the Tees-water breed
t to the dairymen in London. They suit them, by
close confinement well; giving much milk, al-
not so rich in cream as some of the smaller breeds.
heifer with a calf by her side, or ready to calve,
tch 20*l*. or more, which pays well for her rearing.
ire cows have a great flow of milk, and sometimes
fficult to dry the old milk in proper time before
, or when they are put up to fatten. Saltpetre given
, an ounce or more at a time, after bleeding them,
the most efficacious remedy, and soon diminishes
k. They should at first be milked only once a day,
some milk in the udder at each milking; and they
only be relieved when the milk seems to accumu-
d might cause inflammation in the udder.

old Tees-water breed of sheep is large and coarse,
to 30 lbs. and even 40 lbs. per quarter at three
ld, and producing 10 lbs. or 11 lbs. of wool; but
ed has been much improved by crosses from the
breed. The wool and carcass have both been
mproved by it. The sheep on the Western Moor-
horned, with grey faces and legs; and many of
ve a black spot on the back of the neck: their
coarse. The breed of horses all over Yorkshire is
wn and highly appreciated. In no county are so
luable horses bred, especially carriage-horses and
which fetch great prices. For carriage-horses,
d bays are in high repute when they have some
In the dales of the Eastern Moorlands and on the
ny useful horses are bred, of a moderate size and
mpact, which suit the manufacturing districts.
often a cross of the Scotch galloway and the
orkshire horse. Some large farmers buy colts
ars old, and work them moderately till they are
n they are sold for carriage-horses or for the
by this means they often have all the work done
or nothing, the improved price paying for the
the horse. Mares are used very generally for
k, and are made to give foals every year. They
ed till a few weeks before foaling, and again a
ks after, the foal often following the team or the
when of sufficient age. They generally drop in
d are weaned in October, when they can live in the pastures. The practice of making up horses for sale is too well known to need a description. Yorkshire dealers are notorious for their art in hiding natural defects in horses; but as this is well known, every purchaser takes his precautions, and has good advice if he is not skilled himself: if he is ignorant and conceited, he will probably be taken in and then laughed at. Yorkshire pigs and hams are celebrated, but it is not in this portion of the county that they are the best. We will notice them in the other Ridings.

The markets and fairs in the North Riding are as follows:—Askrigg, Thursday, May 11, first Thursday in June, Oct. 28, 29 (cattle and sheep); Bedale, Tuesday, Easter Tuesday, Whitsun Tuesday, July 5 and 6 (cattle), October 10 and 11 (cattle), Tuesday se'nnight before Christmas (cattle); Brompton, November 12 (swine and horses); Coxwould, August 25 (cattle and sheep); Easingwould, Friday, July 5 and September 25 (cattle); Egton, Tuesday before February 15, Tuesday before May 11, September 4, Tuesday before November 22 (cattle); Guisborough, Tuesday, third Monday and Tuesday after April 11 (cattle), Tuesday in Whitsun week (cattle), August 26 (cattle), September 19 and 20, and first Monday after November 11 (cattle); Hawes, Tuesday, Whit-Tuesday and September 28 (cattle); Helmsley Black Moor, Saturday, Saturday before Palm Sunday (cattle), Saturday before Whit-Sunday (sheep), October 10 (cattle and horses and a great ram show), October 11 (sheep); Leybourn, Friday, second Fridays in February, May, October, and December; Malton (New), Tuesday and Saturday, Monday and Saturday before Palm-Sunday, Saturday before Whitsuntide, July 15, October 10, 11, and 12; Masham, Wednesday, September 17, 18, and 19 (cattle); Middleham, Monday, November 6 and 7 (cattle); Northallerton, Wednesday, February 14, May 15, September 5 and 6, October 3 and 4 (cattle), second Wednesday in October (cheese); Pickering, Monday, September 24 (cattle); Reeth, Friday before Palm Sunday, Friday se'nnight before May 12, Friday before August 24, Friday se'nnight before November 22; Richmond, Saturday, Saturday before Palm Sunday, first Saturday in July, September 14 (cattle); Scarborough, Thursday and Saturday, Holy Thursday; Seamer, July 15 (cattle, sheep, &c.); Stamford Bridge, December 1 (cattle, &c.); Stokesley, Saturday, Saturday before Trinity Sunday (cattle); Thirsk, Monday, Shrove Monday, April 5, August 5, October 28 and 29, Tuesday after December 11 (cattle, &c.); Tollerton, August 26 (cattle); Topcliffe, July 17 (cattle), 18 (sheep); Whitby, Saturday, September 6, November 22; Yarm, Thursday, Thursday before April 5, Holy Thursday, August 2, October 19 (cattle), October 20 (horses).

Many of the observations made on the agriculture of the North Riding of Yorkshire are equally applicable to the whole county, and consequently need not be repeated: we shall only notice those points which are peculiar to each Riding, and begin with the East Riding. This Riding extends along the German Ocean, from the river Hartford, southward to the Humber, having part of the North Riding and the Ainsty of York to the north and west, and the West Riding to the south-west. The length of this Riding from the south-east to north-west is 52 miles, and from south-west to north-east 42 miles, containing above 800,000 acres, mostly cultivated. The high hills called the Wolds are cold and bleak, from their exposure and want of shelter; but they are healthy, and form strong robust constitutions; and although the winters and springs are cold, the soil is fertile, and the crops generally abundant, especially in very dry seasons. There is a moisture arising from the chalky subsoil which is very favourable to vegetation. The Wolds, however suited to pastures and spring corn, produce no good wheat: the crops of this grain, when attempted, are small, and the sample of the corn coarse and thick skinned. In Holderness, on the contrary, where the land is sheltered and the soil fertile, abundant crops of excellent wheat are raised, and the fine rich pastures along the Humber are equally remarkable for good grass. The climate on a level with the sea is much milder.

Howdenshire, with Ouse and Derwent, which districts comprises all the country to the south of the Weighton and York road, and west of the Weighton and South Cave road, being situated inland, and sheltered by the Wolds from the north-east, have an earlier climate than the tricts nearer the sea, although the frost and snow are of more continuance in winter. The sea air tends to keep a more regular temperature, cooling the summer heats, and moderating the cold frosty winds in winter. Chalk forms a principal portion of the substratum of the southern part of the island, but disappears in a bold lofty front to the north of this Riding. It occupied a great portion of the centre of this Riding from the Humber to Flamborough Head.

The soil of the Wolds is a light friable calcareous loam over a chalk rubble, which covers the solid mass of chalk. There are flints in the soil, but not of such a size and in such quantities as in other chalk districts in the south. On the banks of the Humber there are above 14,000 acres of warp land, a stiff clay of extraordinary fertility. [WARPING.] A certain proportion of fine sand in the warp is essential to its greatest fertility. Sunk Island, now a most fertile spot, was once a mere sand-bank in the Humber. It now contains 4700 acres of fertile land; a chapel has been erected upon it, and the embankments are gradually increasing. It is now a part of the coast, although ships once used to sail round it. To make up for this increase of land, the sea has gradually carried away whole villages and farms along the eastern coast from Bridlington Bay to the Spurn Point, a distance of 37 miles.

A large tract of poor sandy land extends in a north-west direction from South Cave nearly to York. Parallel to this and along the Ouse lies a tract of a very fertile alluvial soil, fit for any kind of agricultural produce. In the vale of Derwent the soil varies greatly. The East Riding is very well watered; the Derwent, being navigable from its junction with the Ouse to Malton, greatly facilitates its communications. The railway lately made from Hull to York is a great advantage to trade, although the Ouse forms a ready communication for heavy goods from York to the Humber. There are several smaller rivers, but not so navigable.

The farms in the East Riding are of considerable extent, and so are the estates. The farmhouses are comfortable, except in the Wolds, where they are of a very inferior kind, excepting those which have been erected within a few years by judicious landlords; but the application of fancy styles, such as the Gothic or Elizabethan, to farmhouses and labourers' cottages, justly exposes the proprietors to ridicule, being quite incongruous. The labourers' cottages are generally comfortable, and chalk is a cheap material to build them with, besides being dry and wholesome.

Leases are not generally granted, but a tenant who pays his rent and cultivates well is seldom turned out. In very fertile soils this may be of less consequence; but no inferior soil was ever permanently improved without the security of a lease. Agreements in writing with special conditions are very general, in order to avoid disputes arising from verbal agreements. The rotations and succession of crops in the East Riding are similar on similar soils to those in the North Riding, and need not be repeated here. The wheat is usually mown with a cradle-scythe. The produce on the best soils is from thirty to forty bushels per acre; sometimes considerably more.

There is a peculiarity in the harvesting of oats in this Riding, which is worthy of notice. The oats are cut by the sickle, as wheat is elsewhere: the sheaves are tied loosely very near to the corn, and the butts are spread out and set singly and upright; so that the wind readily finds access to dry them. Some time after a fresh band is made, and the first sheaf is tied round the middle, while the upper band is loosened; this serves to bind the next sheaf, and so on. There is a little extra labour in this mode of tying, but it is well repaid in a moist climate by the condition in which the oats thus treated are stacked, and by the goodness of the straw, which otherwise often acquires a musty taste in the stack, even if the oats are not injured.

Beans are a profitable crop in the heavy soils of this Riding. The old rotation used to be, fallow, wheat, beans; and where sufficient manure could be obtained from the stock fed on the grass land and on hay in winter, it was not unprofitable. The fallows were well worked, manured, and limed, and the crops were good, while the land was improving; but a better practice has succeeded, which is, to take the beans first, plant or drill them in wide rows, and horse-hoe them repeatedly. No crop pays better on heavy [illegible] lime, and the wheat sown immedi[illegible]. If the beans are kept very clean, the fallow becomes unnecessary, and may [illegible] deferred until the state of the land absolutely requires. This improved practice however is by no means gener[illegible] adopted; and in some of the richer soils in Howdensh[illegible] beans are still sown thick and broadcast, so that hoei[illegible] them is out of the question, and the crop is often chok[illegible] with sow-thistle and other rank weeds, which abound [illegible] such soils. No wheat can be expected after such a cr[illegible] and a fallow is indispensable. Spring tares are someti[illegible] sown with the beans, in the proportion of half a bushel [illegible] three and a half of beans. The seeds are easily separa[illegible] by the sieve when threshed. This mixture is good wh[illegible] beans are sown to be cut up green, to give the pigs [illegible] cattle; a very excellent practice, which ought to be m[illegible] common on heavy soils. The weeds then are choked, [illegible] have no time to ripen their seeds, and the ground m[illegible] admirably prepared for wheat by a bastard fallow, as [illegible] usually called.

Rape is extensively grown in Holderness both for [illegible] feed and for seed: in the first case it is generally [illegible]ceeded by wheat; in the latter, by oats. The time of [illegible]ing is about the middle of June; the quantity of [illegible] a peck per acre. Rape and cole seed are often [illegible]founded, but the rape shoots up straight stems [illegible] better calculated to be fed off: the cole-seed m[illegible] best oil at the mill. If rape be sown early in spri[illegible] seed the same year: cole is a decided biennial. [illegible] Hedon, Patrington, Sunk Island, and other r[illegible] lands, much cole-seed and rape-seed are rai[illegible] are sent to the oil-mills at Hull. On breaki[illegible] sheep-walks on the Wolds rape is often [illegible] grown; but it may be doubted if so exhaus[illegible]ing [illegible] be not too much for thin poor lands which have [illegible] the temporary richness produced by the roots of [illegible] and are readily exhausted. The organic matter cannot well be restored by manure from the distance of the [illegible] pastures from the homesteads and villages.

Sainfoin has been introduced wherever the [illegible] is chalk, where it is an invaluable plant. The mode of cultivating sainfoin has been fully given in S[illegible]—[illegible]*culture of*, to which we refer. Potatoes are very [illegible]sively cultivated in Holderness and Howdenshire. The[illegible] grown upon the warp lands are preferred in the L[illegible] market to those grown on the sandy soils. The best [illegible] have been long known by the names of Red-nose kidney, Flat white, Purple kidney, and Cape kidney; the [illegible] top and Ox noble are very productive, but better suited to feed cattle with than for the table. They are cultivated, as we described, in the North Riding.

Swedish turnips, cabbages, and carrots are grown in the soils which suit them, with much advantage for feeding cattle and sheep in winter.

Buckwheat is advantageously grown in the sandy soils: it is sown in June and reaped in October: it draws little from the soil, and is an excellent smotherer of weeds, which makes it a good preparation for turnips.

In the East Riding the proportion of grass land on the farms is much less than in the other Ridings. Most of the pastures have been ploughed up, even on the Wolds; and those only which lie low along the rivers have been left as permanent meadows. The salt-marshes along the sea are very useful, especially to recover horses which have been over-worked: sheep likewise get fat on them after a time, the first effect of the salt pasture being to purge them: but once recovered from this salutary preparation, they fatten rapidly.

There is but little timber in this Riding, either in woods or hedge-rows. The Wolds are naturally quite bare of trees, and in the rich alluvial soils the tenants and proprietors have generally been wise enough not to plant the hedge-rows. Some plantations have been formed on the Wolds, but they contain little useful timber.

Draining, on a very extensive scale, has been done in Holderness and other flat and low parts of the Riding, by which low and marshy grounds have been rendered fertile. Works have been erected at great expense under the authority of several acts of parliament, from 1762 to the present day. In 1811 the sum expended on the drainage of two levels, the one extending from Fosten to Barmston, and containing 2136 acres, and the other from the same point to Wincolmlee near Hull, containing 10,432 acres, amounted already to 135,000*l.*, the interest of which was barely repaid by the improved value of the land drained.

me want of care and economy in the com-
something like jobbing in the contractors.
f 10,500 acres, called the Hertford and Der-
part of which is in the East Riding, cost
ut 4*l*. per acre only. This pays the pro-
cent. on their outlay. Other less extensive
been executed, much to the improvement

-coast *wreck* or sea-weed is very extensively
e; and after a storm the farmers' carts may
employed at low water to collect it. It is
vhere it soon ferments, and, as soon as is
arried on the land; if left to rot, it would
l be of little use. The fresher it is carried
better. It is excellent for turnips. Bones
ively used on the lighter soils, and many
ually imported from the Continent into the
this sole purpose.
cattle have been mentioned before, and
other breed is found in the East Riding.
ntly of Dutch origin, perhaps through Hol-
ey have also been introduced from Holland.
s been bestowed on the breeding of the
e a finer race than the Dutch, with less
proportions; whether the quantity of milk
not quite so sure; but the fatting qualities
hich are of more importance in a district
and fatting stock is generally preferred to

pastures the improved Leicester breed of
the most profitable; on the Wolds the
ave been introduced with great success:
een attempted, but, on the whole, the pure
t for their food.
England produces so fine and valuable
East and North Ridings of Yorkshire. We
l the Cleveland bays. The introduction of
this breed has produced some clever hunters,
en sold at high prices; but for the carriage
er the pure Cleveland bays without a cross.
pact, hardy, and of good courage, and can
lay's work better than the half-bred horses,
much good grooming. Another cross
attempted, and which must be altogether
hat with the large Lincolnshire hairy-legged
his is quite incongruous, destroying the very
the Cleveland bays excel, which is the ab-
om the legs, and the neat clean look which
hining, and smooth appearance of the skin
s gives them. The agricultural labourers
general in the East Riding: they often
farmers, and are at work early and late.
ges tempt labourers from other counties to
e, they soon find that they have not so
ey imagined, and few men of other coun-
ete with the Yorkshireman in task-work.
of fuel in most districts is a great advan-
r.
g are the fairs in the East Riding:—Ald-
4; Beverley, Thur. before Feb. 26, Holy
Nov. 5, Wed. before April 6, or on the 6th,
lay 13, or on the 13th, Wed. before Sept.
4th, Wed. before Dec. 25; Brandes-burton,
ington, Mon. bef. Whit-Sunday, Oct. 21;
, Aug. 2, Sept. 26, Nov. 17 (a market for fat
ernate Monday); Hornsea, Aug. 12, Dec.
nd Tues. after Jan. 11, Tues. before April 5,
r July 11, Oct. 2 (a great fair for horses);
(horses); Hunmanby, May 6, Oct. 29; Kil-
Nov. 12; Little Driffield, Easter-Monday,
Aug. 26, Sept. 19; N. Driffield, May 4;
ton, July 10, Oct. 2; Patrington, March
c. 6; Pocklington, March 7 (if leap-year,
6, Aug. 5, Nov. 8 (large fairs for sheep
South Cave, Trinity Monday; Stamford
(large fair for Scotch cattle); Weighton
14, Sept. 25 (one of the largest sheep-fairs
England).
iding of Yorkshire is situated nearly in the
ingdom, but, from its numerous rivers and
ee intercourse with the east and west coasts.
as the Ainsty of York and the East Riding,
s separated by the river Ouse. The coun-
ties of Nottingham and Derby are on the south, and on the west are those of Lancashire, Chester, and Westmoreland. The North Riding forms its northern boundary. It is 95 miles long from east to west, 48 from north to south, and contains about 1,500,000 acres of land.

In so great an extent the soil and climate naturally vary. It is in general dry and healthy. The eastern and northern portions are similar to the Ridings so situated, while the west partakes of the moist and hilly nature of the counties bordering on the Atlantic. We have entered so fully on the agriculture of the North and East Riding, that we shall only observe that a great part of the West Riding is in pasture, the arable land being chiefly found on the northern and eastern portion, where it is cultivated much in the same manner as in the adjoining Ridings. An elaborate account of the West Riding was drawn up from the original survey made in 1793 for the Board of Agriculture, by Mr. Robert Brown of Markle, to which we must refer for particulars.

As grazing is well understood in this Riding, much cattle is purchased to be fatted here, but not many are bred; consequently a much greater variety may be observed in the stock than in the other Ridings. The manufactures, which have rapidly sprung up, and cause a great demand for butcher's meat, are a great encouragement to the grazier. The grass will nearly fatten an ox in summer, which formerly would have been considered as quite ripe for the butcher; but with the addition of turnips and hay in autumn they are made very fat, especially with the help of linseed cakes, which is sometimes succeeded by oatmeal and hay for the last 10 days, in order to avoid the flavour which some very delicate palates discover in beef fed with oily food. Many hogs are fatted in this Riding, the hams being cured for the London market, while the flitches are readily disposed of among the manufacturers, who never find bacon too fat. This riding was formerly better wooded than the rest of Yorkshire; but the forests have been destroyed, and the land divided and cultivated. There is a considerable demand for oak and ash of small size for the use of the mines and collieries. Much land in the Riding is fit for little else than planting firs and larch, and where the latter wood has thriven considerable profit has been made in a few years by well-managed plantations.

The properties and farms in the West Riding are generally smaller than in the other Ridings, and there are more freeholders, which is not so favourable to improvements as if they were of greater extent, and held on lease under liberal landlords. The small freeholder has seldom capital to lay out on his land, and, having no rent to make up, is satisfied if his farm feeds him and his family, which it often does but scantily, after very hard labour, such as a tenant holding a large farm would disdain to submit to.

The following are the fairs and markets in the West Riding:—Aberford, last Wednesday in April, last Wednesday in May, last Wednesday in October, Wednesday after St. Luke's, October 18; Adwalton, January 26, February 26, Thursday in Easter week, Thursday fortnight after Easter, Thursday month after Easter, Whit-Thursday, and every Thursday fortnight after Michaelmas for horses, cattle, &c.; Boroughbridge, April 27, July 22, October 23 (horses and cattle); Barnsley, last Wednesday in February preceding 28th, if 28th is a Wednesday then the Wednesday before May 12, October 10; Bawtry, Holy Thursday, Old Martinmas, November 22; Bingley, January 25, August 25, 26, 27; Bradford, March 14, 15, June 28, 29, 30, cattle, December 20, 21, 22, hogs; Bentham, June 24, cattle; Bradfield, June 17, Dec. 9, swine; Cawood, May 12, Dec. 19; Clapham, St. Matthew, September 21; Doncaster, April 5, August 5, November 26, Monday before Old Candlemas-day; Dewsbury, Wednesday before May 12, Wednesday October 10; Gargrave, December 11; Gisburn, Easter-Monday, Monday fortnight after Easter-Monday, month after Easter, and Saturday after that; Halifax, June 24; Holmsworth, May 24; Ingleton, November 17; Keightley, May 8, November 8; Knaresborough, Wednesday after January 24, Wednesday after March 12, May 6, Wednesday after August 12, Monday after October 10, December 13; Lee or Leegan, August 24, September 17; Leeds, July 10; November 8; Otley, August 1, November 15; Penistone, Thursday before February 28, last Thursday in March, Tuesday before Old May-day, Thursday after Michaelmas-day; Pontefract, first Saturday in Dece[illegible] first Saturday after December 5, Candlemas fair, [illegible]

Saturday after February 13, first Saturday after September 12, Saturdays before Palm-Sunday, Low-Sunday, and Trinity-Sunday, show of horses, February 5; Ripley, August 25, 26, 27, Thursday after January 24, Thursday after March 21; Ripon, May 12, 13, first Thursday in June, Holy Thursday, first Thursday after August 22, November 22; Rotheram, Whit-Monday, December 1; Sedbergh, March 20, October 29; Selby, Easter-Tuesday, June 22, October 10; Settle, Tuesday before Palm-Sunday, Thursday before Good-Friday, every other Friday till Whit-Sunday, April 26, August 18 to 21, first Tuesday after October 27; Sheffield, Tuesday after Trinity-Sunday, November 28; Sherburn, October 6; Slaidburn, February 14, April 15, August 1, October 20; Snaith, last Friday in April, August 10; Thorne, first Monday, Tuesday, Wednesday after July 11, same days after October 11; Topcliffe, July 17, 18; Wakefield, July 4 and 5, November 11 and 12 (if on Sunday, Saturday before); Wetherby, Holy Thursday, August 5, November 22; Whitgift, July 12.

Divisions, Towns, &c.—Yorkshire is divided into the East Riding, North Riding, and West Riding. The East Riding is divided into the wapentakes of Buckrose, Dickering, Harthill, Holderness, Howdenshire, and Ouse and Derwent. The North Riding is divided into the wapentakes of Allertonshire, Birdforth, Bulmer, East Gilling, West Gilling, Hallikeld, East Hang, West Hang, Pickering Lythe, Ryedale, and the liberties of Langbaurgh and Whitby Strand. The West Riding is divided into the wapentakes of Agbrigg, Barkstone Ash, Claro, Morley, Osgoldcross, Skyrack, Staincliff and Ewcross, Staincross, Strafforth and Tickhill, and the liberty of Ripon. The liberty of St. Peter of York (which comprises 51 places or parts of places in the East Riding, 42 in the North Riding, 25 in the West Riding, and 7 in the City and Ainsty of York) has, by virtue of an Act 5 and 6 Wm. IV., cap. 76, been abolished for all civil purposes, though its ecclesiastical jurisdiction remains the same. The Ainsty of the city of York has been annexed to the West Riding as a wapentake; though for electoral purposes it is joined with the North Riding. The wapentakes, which are similar to the hundreds of the other English counties, are divided into parishes and townships. The following places are described in separate articles:—BARNSLEY, BAWTRY, BEVERLEY, BINGLEY, BOROUGHBRIDGE and ALDBOROUGH, BRADFORD, BRIDLINGTON, DEWSBURY, DONCASTER, HALIFAX, HUDDERSFIELD, HULL, LEEDS, PONTEFRACT, RICHMOND, RIPON, ROTHERHAM, SCARBOROUGH, WAKEFIELD, WHITBY, and YORK. The other towns of most importance are the following:—

Aberford, a small town in the West Riding, in the wapentake of Skyrack and parish of Aberford, 185 miles from London and 15 miles south-west from York. The town consists chiefly of a long street on the south side of the river Cock. The parish church has accommodation for about 600 persons. The living is a vicarage, in the deanery of the City and Ainsty, and the diocese of York, and in the gift of Oriel College, Oxford, and of the net annual value of 305*l*. In 1833 there were three daily schools, one of which was a national school containing 90 children, partly supported by an endowment of 10*l*. a year given by Lady Elizabeth Hastings. The population of the township in 1831 was 614; in 1841 it was 782.

Askern, a village in the parish of Campsall, of some celebrity for its sulphureous waters. It is situated in the West Riding, wapentake of Osgoldcross, 7 miles north of Doncaster and 9 south of Pontefract. There are two good hotels, and numerous lodging-houses for the accommodation of visitors. The village is built on the edge of a rocky declivity, and borders on an extensive plain which spreads extensively to the north and east. The geological and the natural and topographical features of the neighbourhood, which are not without interest, are described in Dr. Lankester's 'Askern.' The earliest notice of the Askern waters occurs in a work by Dr. Short, published in 1734. There are several wells, and Dr. Lankester analysed the waters of six of them. The smell resembles that of the rinsings of a gun-barrel, and when taken from the spring the water is bright and sparkling, but assumes a milky a[illegible]ng a short time, and a slight film colle[illegible]d to stand for several hours, th[illegible]ate, which is composed [illegible]ces of sulphur, [illegible] tests indicate the existence of sulphuretted hydrogen, or hydro-sulphuric acid gas. The temperature is not higher than that of the springs in the neighbourhood. Drinking the waters and the use of them in baths have been very efficacious in rheumatism, gout, cutaneous diseases, indigestion, paralysis or palsy, and scrofula. A Bath-Charity was established in 1825 for enabling poor persons to avail themselves of the benefit of the waters. The number of cases admitted from 1832 to 1840 was 1094, the greater number of whom were for rheumatism. On the day when the census was taken in 1841, there were 131 strangers who had come for the benefit of the waters. Including strangers, the population was only 468. The only place of worship is a Wesleyan Methodist chapel; the building was intended to be used by different sects.

Askrigg is a market-town and chapelry in the parish of Aysgarth, wapentake of West Hang, and liberty of Richmondshire, in the North Riding. It is situated in Wensleydale, near the north bank of the river Ure, about 241 miles from London, 55 miles north-west of York, and 17 or 1[illegible] miles south-west of Richmond. The church is an ancient edifice dedicated to St. Oswald, and Baines says that there is an ash-tree growing out of the roof of the vestry. The living is a perpetual curacy, in the patronage of the vicar of Aysgarth, formerly belonging to the archdeaconry of Richmond and diocese of Chester, but now in the deanery of Catterick, archdeaconry of Richmond, and diocese of Ripon, with a gross income of 110*l*. There is a [illegible]ket on Thursday, and fairs are held on the 11th, 12th, [illegible] 17th of May, the first Thursday in June, and the 28th [illegible] 29th of October. Askrigg is a place of great ant[illegible] and had a population of 737 in 1831, and 727 in 18[illegible] in the population returns of 1841 it is stated that th[illegible]ship of Askrigg includes the hamlets of Newbiggin[illegible] and Woodhall, while the chapelry comprises [illegible] Bainbridge, and Low Abbotside, and has a tot[illegible]tion of 1698. In the township are six almshous[illegible] widows, founded in 1807 by Christopher Alde[illegible] and the free grammar-school of Yorebridge, [illegible] the forty-third year of Elizabeth by Anthony B[illegible] an endowment of 64*l*. 10*s*. per annum. This i[illegible] place for the North Riding. The neighbourin[illegible] country is exceedingly picturesque, and contain[illegible] waterfalls, of which may be mentioned Mil[illegible] Whitfield's Force, and, farther up the dale, [illegible] miles from Askrigg, Hardrow Force, where the [illegible] in a vast sheet a vertical height of 99 feet, and [illegible] for 300 yards along a rocky chasm or ravine. [illegible] hard frost of 1740-1 a prodigious icicle was for[illegible] of the whole height of the fall. There are lea[illegible] the neighbourhood, but they are not very produc[illegible]

Bedale is a market-town and parish, chiefly i[illegible]pentake of East Hang, but partly in that of Hal[illegible] the liberty of Richmondshire, and the North Ridi[illegible] county. The town, which is tolerably well built, is [illegible] in a rich valley, upon the stream called Bedale-beck [illegible] flows into the Swale, about 224 miles from Lond[illegible] miles north-west from York, 6 miles north-east [illegible] Masham, and about 2 miles west of Leeming Lane. [illegible] the surrounding country is extremely fertile. The ch[illegible] which is a spacious Gothic building, erected in the [illegible] of Edward III., is dedicated to St. Gregory; and the par[illegible] which comprises the townships of Aiskew, Burrel-[illegible] Cowling, Crakehall, Firby, and Langthorne, the town of Bedale, and the hamlet of Rands-grange, is a rectory, formerly in the archdeaconry of Richmond and diocese of Chester, but now in the deanery of Catterick, archdeaconry of Richmond, and diocese of Ripon, with a gross income of about 2000*l*. There are also places of worship for Roman Catholics, Baptists, Wesleyans, and other dissenters, and several schools, some of which are partly supported by endowments. There is a well-attended market on Tuesday, and there are several fairs, a list of which is given under *Agriculture*. The poor of Bedale are provided for by numerous bequests, and among the charities in the parish are an hospital for six poor men, founded in 1698 by Peter Samwaies, D.D., who was rector of the parish; an hospital for three poor widows, founded by Richard and Thomas Young, in 1667; and Clapham's hospital for a master and six aged brethren. From an inscription in the church it would appear that there was formerly a castle here, built by Brian Fitz-Alan, earl of Arundel, in the reign of Edward I., and it is said that there are some traces f it in the gardens of Bedale Hall, a mansion in the neighourhood. The tower of the church, which is very strong, as formerly used for defence by the inhabitants. The opulation of the township of Bedale was 1266 in 1831, nd 1250 in 1841, but the whole parish contained, at hose dates respectively, 2707 and 2803 inhabitants. The etty sessions for the division of East Hang are held at edale.

Cave, South, so called to distinguish it from the parish nd village of North Cave, which lies a little to the northest of it, is a parish and small market-town, partly in the berty of St. Peter of York, and partly in the Hunsleyeacon division of the wapentake of Harthill, in the East iding, about 175 miles from London, 27 miles south-east f York, and about 3 miles north of the Humber, near the estern foot of the Wolds. The parish is extensive, and omprises the townships of South Cave, Broomfleet, and axfleet, with an aggregate population of 1200 in 1831, nd 1852 in 1841, including 316 strangers attending the attle-fair at the time of the census. The living is a disharged vicarage, in the jurisdiction of the peculiar court f South Cave, with a gross income of 190*l*. The town ontains a neat church, built in 1601, and dedicated to All-Saints, several places of worship for dissenters, and a partially-endowed national school. The Hull Banking Company have a branch there, and petty sessions are held for the wapentake of Howdenshire. A market, at which much corn is sold for distribution by the Humber and its branches, is held on Monday, and there is a fair on Trinity Monday. Near the town is a mansion called Cave Castle, merly inhabited by the ancestors of General Washingn, whose great-grandfather emigrated thence in 1657. e population of the township of South Cave alone was in 1831, and 1288 in 1841, with the strangers mened above, or 972 without them.

wood, a small town in the West Riding, in the wa- ake of Barkstone-Ash, and parish of Cawood, 182 north by west from London, and 10 miles south from The town, which is tolerably well built, is situated e south bank of the Ouse, over which there is a ferry. is a manufacture of coarse bagging for hops and but little else. The church has accommodation for 350 persons: the living is a perpetual curacy, in the the dean and chapter of York, and of the net annual of 118*l*. The population of the parish in 1841 was The archbishops of York had a palace, or rather at Cawood as early as the 10th century; the hall was by Archbishop Bennet, and the gate, which is the part that remains, by Archbishop Kemp. Wolsey een residing here for some months when he was aron a charge of treason by the earl of Northumber- The castle was demolished by order of parliament the civil war between Charles I. and the parliament.

riffield (Great), is a market-town and parish, situated ly in the liberty of St. Peter of York, but principally he Bainton-Beacon division of the wapentake of Hartl, in the East Riding. The town is pleasantly situated the foot of the Wolds, near one of the sources of the ver Hull, about 193 miles from London, 26 miles east by orth from York, 11½ miles south-west of Bridlington, and 17 or 18 miles north by west of Hull. The parish, which contains, besides the township of Great Driffield, the chapelry of Little Driffield, and the township of Emswell with Kelleythorpe, is a discharged vicarage, in the diocese of York, with a gross income of 154*l*.; and the church, dedicated to All Saints, is an antient structure, with a comparatively modern steeple. The town consists chiefly of one long street, parallel with a clear trout-stream, which, below the town, is enlarged into a canal for communication with Hull by the river of the same name. It s lighted with gas, and contains chapels for Baptists, Inlependents, Primitive and Wesleyan Methodists, several unday and other schools, a mechanics' institution, and a ispensary. There is also a large workhouse for the riffield Union, which embraces 43 parishes. There are everal branch banks at Driffield, and manufactures of arpets, woollens, and cotton goods are carried on upon limited scale. Agriculture however forms the chief pport of the town, the surrounding district being a rtile corn-country, while the Driffield Navigation affords reat facilities for exportation. The market is on Thursy, when much grain is sold; and fairs are held at Little riffield on Easter-Monday, Whit-Monday, the 26th of August, and the 19th of September. Little Driffield was the burial-place of a celebrated Northumbrian king named Alchfrid or Alfred, who died here in 702; and it has been repeatedly stated that his remains were discovered entire, and re-interred, in 1784; but Baines shows that this story is incorrect, the search made at that time being entirely fruitless. (*History, Directory, and Gazetteer of the County of York*, vol. ii., p. 194.) The neighbourhood also contains, at the hamlet of Danes Hill, a great number of tumuli, supposed to be the monuments of Danish chiefs who fell in some engagement near the town, but nothing authentic is known concerning them. They are popularly called the 'Danes' Graves.' The chapelry of Little Driffield lies west of Great Driffield, and the living is a perpetual curacy annexed to the latter. The church, dedicated to St. Peter, was rebuilt in 1807; and there is a Wesleyan chapel. The population of the township of Great Driffield was 2660 in 1831, and 3223 in 1841, including 68 inmates of the Union workhouse; that of the chapelry of Little Driffield, 92 in the former and 154 in the latter year; and that of the whole parish 2854 and 3477 at the same periods. Great Driffield is a polling-place for the East Riding.

Easingwould is a market-town and parish in the wapentake of Bulmer, in the North Riding, about 208 miles from London, 13 miles north by west of York, and 11 miles east by north of Boroughbridge. The parish comprises the chapelry of Raskelf, and is a discharged vicarage, in the archdeaconry of Cleveland and diocese of York, with a gross income of 250*l*., in the patronage of the bishop of Chester. Easingwould contains places of worship for Roman Catholics, Independents, and Primitive and Wesleyan Methodists, as well as the parish church, which stands on an eminence above the town, and commands an extensive view over the antient forest of Galtres and the vale of Mowbray. There are several daily schools, two of which are endowed; a workhouse for the Easingwould Union, which comprises 29 parishes; and several branch banks. It is a place of little importance, and the surrounding districts are not very fertile, but considerable quantities of bacon and butter are sent to York, and forwarded thence to London and elsewhere. The market is on Friday, and there are fairs on the 5th or 6th of July and the 25th or 26th of September. Some chalybeate springs rise in the neighbourhood, one of which supplies a small bathing-house. The want of water-communication has been a disadvantage to this town, but is now partially supplied by the Great North of England Railway, which runs near it. The population of the township was 1922 in 1831, and 2171 in 1841, including 67 persons in the Union workhouse; that of the whole parish, in the same years, 2381 and 2719 respectively.

Egton is a small market-town and parish in the east division of Langbaurgh Liberty, in the North Riding, about 7 miles west by south of Whitby, on the edge of the Egton Moors. The church, which is dedicated to St. Hilda, was consecrated in 1349 by the bishop of Damascus; and the living is a perpetual curacy, with a gross income of 33*l*., in the patronage of the archbishop of York. It is in the archdeaconry of Cleveland and diocese of York. Egton also contains a Roman Catholic chapel and a public school. There was formerly a weekly market on Tuesday, but this is now held only from the Tuesday before Palm-Sunday to Midsummer; and there are fairs on the Tuesdays before February 15 and May 11. on the 4th of September. and on the Tuesday before November 22. A cattle-market is also held on the Tuesday before Old Michaelmas. At Egton is a fine spring, called Cold Keld Well, much resorted to for strengthening weakly children. The parish, which contains several hamlets, had a population of 1071 in 1831, and 1128 in 1841.

Flamborough, though formerly a place of some importance, is now a mere fishing village, remarkable only from its proximity to the elevated cliffs and lighthouse of Flamborough Head. The village occupies the centre of the promontory so called, and is most generally supposed to derive its name from the practice in early times of mounting a flaming beacon on the cliffs. It was frequently used as a principal station by the Danes during their predatory inroads, and [illegible] structures remain in the parish. The [illegible] wald, and the living, a perpetual [illegible] of the East Riding and the diocese of York.

nce. The population of High Harrowgate, in 1841,
372, including 72 persons in Harrowgate workhouse;
pulation in Low Harrowgate, including the hamlet
k with and 60 persons in the Harrowgate Bath Hos-
as 1413; total 4785.

mineral springs are of different qualities, sulphur-
lybeate, and saline-aperient. The sulphur well is
Harrowgate, and is at all times sufficiently abun-
t only for those on the spot, but to supply the de-
r bottles of it, which is very considerable. The
Well, in Low Harrowgate, is also a sulphur
but of somewhat weaker quality than the sulphur
The Cheltenham Water, as it is called, is a saline-
spring. The Old Spa, the Tewit Well, and
Chalybeate Well, are all chalybeate springs at
arrowgate.

s, a market-town and chapelry in the parish of
n, wapentake of Hang West, liberty of Richmond-
the North Riding, is situated near the south bank
iver Ure, at the head of Wensley-dale, about 246
om London, 50 miles north-west by west of York,
iles west of Askrigg. The houses are generally
stone, which gives the town a very neat appear-
The chapel-of-ease is a plain edifice, and there are
ces of worship for the Society of Friends and the
anians; several schools, one of which was built
rtially endowed by subscription, and a very good
ption library. The living is a perpetual curacy,
gross income of 130*l*., now in the deanery of Cat
and archdeaconry of Richmond, in the new diocese
on, but formerly in the diocese of Chester. There
o branch banks, and small manufactures of hosiery
ome other kinds of woollen goods. The weekly
is on Tuesday, and there are fairs on Whit-
y and the 28th of September. The neigh-
g high lands supply coal and lime, and contain
ines, which are worked, but are not very productive.
hort distance from the town is a magnificent cascade,
Hardraw Scar or Force, with a perpendicular fall of
et. The population of the chapelry of Hawes was
n 1831, and 1611 in 1841.

lon, Headon, or Heydon, is a borough, market-town,
arish, in the middle division of the wapentake of
rness and liberties of Hedon and St. Peter's, in the
Riding, about 179 miles from London, 5 or 6 miles
Hull, in the promontory of Holderness. It is a
hort distance from the Humber, with which it is
cted by a creek formerly navigable; but though it
nce a port of considerable importance, it has declined
the growth of Hull, and is now chiefly dependent
the agriculture of the fertile and highly cultivated
t by which it is surrounded. A charter was granted
burgesses of Hedon by Athelstan, and it sub-
ntly received several others down to the first year of
s II. The income of the borough, in 1834, was
3*s*. 6*d*., and at that time, although a borough court
arter-sessions was still held as a matter of form, the
nal jurisdiction had fallen into disuse, and the monthly
rnment of the quarter-sessions served the purpose of
sessions. A court for the recovery of small debts is
here for the wapentake of Holderness. The borough
sent members to parliament in the 23rd of Edward I.,
subsequently ceased to do so until the accession of
ward VI., from which time it continued to return two
mbers until disfranchised by the Reform Act. The
ing is a perpetual curacy, annexed to the vicarage of Pres-
n, in the archdeaconry of the East Riding and diocese of
ork, and under the patronage of the archbishop, with a
oss income of 49*l*. According to Camden, there were for-
erly three churches here, although only one remained
his time, which still exists, and is a spacious
ifice. The town also contains places of worship for
man Catholics and for Independents and other dis-
nters, and several schools. There are also some almshouses
d bequests for the use of the poor. A great part of the
vn was destroyed by fire in 1656, and rebuilt in a superior
nner. It consists chiefly of one street, with a market-
ce in the centre, and a small town-hall. The Holder-
s Agricultural Society hold their meetings here, and
e a valuable library. The ordinary market is held on
urday, and since 1796 fortnightly markets for cattle
sheep have been held on alternate Mondays between
ovetide and Midsummer; in addition to which there are several considerable fairs. The old creek having become choked up, an artificial canal, suitable for small boats, was formed from near Hedon to the Humber, under an Act of 1774; and this has been very useful to the town, which had a population of 1080 in 1831, and 998 in 1841. At Newton, near this town, was formerly a small hospital for lepers, founded in the reign of King John, the revenue of which at the dissolution was 13*l*. 15*s*. 10*d*.

Helmsley, or Helmsley Black-Moor, a market-town and parish in the wapentake of Ryedale, in the North Riding, about 218 miles from London, 22 miles north of York, and 6 miles west by south of Kirkby Moorside. It is situated upon a gentle eminence sloping towards the river Rye, and appears to derive its name from having been a place noted for stately elms, beneath which it is said that the Druids performed their mystic rites; and from the dark heathy moorlands in the parish. The parish is one of the most extensive in England, comprising 29,020 acres, and measuring 16 miles from north to south. It comprises the townships of Helmsley, Haram, Laskill-Pasture, Pockley, Rivalx or Rievaulx, and Sproxton, and the chapelry of Bilsdale-Midcable, which includes that of Bilsdale-Birkham; and it had an aggregate population, in 1831, of 3411 persons, and in 1841 of 3475. The living is a discharged vicarage, with the curacies of Haram and Pockley, in the archdeaconry of Cleveland and diocese of York, with a gross income of 315*l*. The town is neatly built, most of the houses being of stone and slated; and the church, which is dedicated to All Saints, is a large and handsome old building, with an early hexagonal font. There are also some dissenting places of worship and several schools. The town contains two branch banks, has a market on Saturday, and several fairs. The manufacture of linen yarn, spun on the hand-wheel from the distaff, was formerly carried on here to a considerable extent; but the introduction of machinery in other places has destroyed this branch of industry, and left the town almost wholly dependent upon agriculture. The population of the township of Helmsley was 1485 in 1831, and 1465 in 1841, including 17 inmates of the Union workhouse. The town is the centre of a Poor-Law Union, which embraces 48 parishes. Helmsley was for a considerable time the residence of the profligate duke of Buckingham, after he retired from the court of Charles II. in a state of indigence. The neighbourhood contains many interesting natural objects and antient remains. Among the former are coal-mines, and a rivulet, called the Boro' Beck, which supplies the inhabitants with water, and after leaving the town has a subterraneous course of about four miles. Of the latter the principal is Helmsley Castle, built by the Ross family, to whom the town belonged in the time of Edward I. and II. It was held for Charles I. in 1644, and besieged by Fairfax, to whom it at length surrendered; and it was subsequently dismantled by order of parliament. Rievaulx Abbey, about two miles north-west of the town, and Byland Abbey, about four miles to the south-west at the entrance to the vale of York, are also interesting ruins; and in the immediate neighbourhood is the beautiful mansion of Duncombe Park, the grounds of which present the most charming scenery. The mansion-house itself was completed in 1718, from a design by Vanbrugh. There are chapels-of-ease in the townships of Haram and Pockley. Helmsley-Blackmoor must be distinguished from the much smaller parishes of Gate-Helmsley and Upper Helmsley, in the wapentake of Bulmer, much nearer to the city of York.

Hornsea is a parish and market-town on the east coast of the county, south of Bridlington Bay; it belongs to the northern division of the wapentake of Holderness, in the East Riding, and is about 187 miles from London and 36 miles east of York. The town is said to have been formerly ten miles inland, but the encroachments of the sea have brought the coast within about half a mile at the present time, and have utterly destroyed the village of Hornsea Beck. The church, which is dedicated to St. Nicholas, is a spacious building, and had formerly a spire, which formed a noted landmark, but it was long since blown down, and has not been restored. The town contains also dissenting places of worship. The living is a vicarage with the curacy of Long Reston, in the archdeaconry of the East Riding, and the diocese of York, with a gross income of 40*l*. There are several schools and benefactions for the poor. The market-day is Monday, but the market has long fallen almost entirely into disuse there are two annual fairs; and annual races are held in the neighbourhood. The town has a fine chalybeate spring, and good accommodation for sea-bathing, and is chiefly worthy of notice as a place of considerable resort during the season. In the immediate neighbourhood is the lake called Hornsea Mere, which covers about 436 acres, contains some picturesque islands, and affords an abundant supply of fine fish. The population of the parish, which is called Hornsea-with-Burton, was 780 in 1831, and 1005 in 1841.

Howden is a market-town and parish in the wapentake and liberty of Howdenshire, in the East Riding, about 175 miles from London, 20 miles south-east from York, near the north bank of the Ouse, and south of the Hull and Selby Railway. The parish is very extensive, and comprises the townships of Howden, Asselby, Balkholme, Belby, Cotness, Kilpin, Knedlington, Metham, Saltmarsh, Skelton, Thorpe, Yorkfleet, and the chapelries of Barmby-on-the-Marsh and Laxton, having an aggregate population of 4531 in 1831, and 4860 in 1841. The living is a vicarage, in the archdeaconry of the East Riding, and diocese of York; gross income 163*l*. The church is dedicated to St. Peter, and was formerly collegiate, but the establishment was dissolved in the first year of Edward VI., after which time the church fell into decay. A portion of it is maintained as the parish church, but the remainder forms an extensive and beautiful ruin, which has a very lofty and well proportioned tower. The structure was originally cruciform, and is said to vie with any building of the kind in England for beauty of architecture. The chapter-house, which is octagonal, and contains 30 canopied seats, is particularly celebrated as a fine piece of pointed architecture. It was formerly surmounted by a beautiful spire, which fell in 1750. The town also contains the ruins of an antient palace of the bishops of Durham, supposed to have been originally erected by Walter Skirlaw, who was bishop about the year 1390, and who built part of the church. The town contains neat chapels for the Independents, Wesleyan Methodists, and Sandemanians; and several schools and charities. The houses generally are of mean appearance, but the town has improved greatly of late years, and is lighted with gas. A large building, called the Moot-hall, which formerly stood in the market-place, was removed in 1822. The town contains three branch banks, has a court for the recovery of small debts, and occasional courts-leet and courts-baron; and it is one of the polling-places for the East Riding. The weekly market is on Saturday, and there are several fairs, by far the most important being a great horse-fair, which generally lasts a fortnight before October 2, which is the principal day. This is considered the greatest horse-fair in England, and it is said that recently more horses have been exhibited here than at any other fair in the world. The dealings are by no means confined to England, but many foreigners attend, and continental princes frequently commission dealers to purchase large numbers of horses here. With this exception, the trade and industry of Howden present no remarkable feature. It lies about a mile from the Ouse, where there is a ferry and a small harbour for boats, to accommodate the town. The population of the township of Howden was 2130 in 1831, and 2332 in 1841.

Hunmanby is a parish, township, and formerly a market-town, in the wapentake of Dickering, near the sea-coast and the northern limit of the East Riding, in the valley which lies north of the Wolds. It lies about 207 miles from London, 35 miles north-east of York, and 8¼ miles south-east of Scarborough, two or three miles from the coast at Filey Bay. The living is a vicarage with the curacy of Fordon, in the archdeaconry of the East Riding and the diocese of York, with a gross income of 350*l*. The church is dedicated to All Saints, and contains a handsome monument of the Osbaldeston family, to whom most of the township belongs, and who have a mansion there. The town contains Baptist and Wesleyan chapels, several schools, two public libraries, almshouses for six widows, and a branch of the Yorkshire district bank. It is well built, and very pleasantly situated in a fertile district. On the Castle Hill may be traced some remains of an antient fortress. The town formerly had a market on Tuesday, but it has long been discontinued, though a monthly cattle-market, and fairs on the 6th of May and the 29th of October, are still held. T [illegible] 1079 in 1831; and in 1841, together wit[illegible] [illegible]rdon, which was previously included in the returns of another parish, but which contained only 63 inhabitants, 1277.

Keighley, a considerable market-town, in the West Riding, in the wapentake of Staincliff and Ewcross, [illegible] parish of Keighley, 206 miles north-north-west from London, and 39 miles west by south from York. The town is situated in a deep valley, at the junction of two small streams which fall into the river Aire about three-quarters of a mile to the north-east, and about a quarter of a mile farther to the north-east is the Leeds and Liverpool Canal. The houses are mostly of stone, and in general tolerably well-built. The parish church, which was rebuilt in 1805, is spacious and handsome, with an octagon tower containing eight fine-toned bells and a clock of beautiful workmanship by Prior of Nestfield; the church has also a powerful organ. The living is a rectory, in the gift of the duke of Devonshire, and of the net annual value of 358*l*. It is now in the deanery and archdeaconry of Craven in the diocese of Ripon. There are three other episcopal churches. There are 14 places of worship belonging to different classes of dissenters. Of the schools, which are numerous, one is a free grammar-school, founded in 1716: a Mechanics' Institute was established about [illegible]. The worsted manufacture is the chief trade of the place, but cotton goods are also manufactured to some extent. The Keighley Union workhouse in 1841 contained [illegible] persons. The population of the town of Keighley in [illegible] was 9255; the population in 1841 was 13,378; in [illegible] it was 11,176.

Kirkby-Moorside, or Kirby-Moorside, is a parish and market-town in the wapentake of Ryedale, in the North Riding, about 224 miles from London, 25 m[illegible] [illegible]iles north-east of York, 6 miles east by north of Helm[illegible]nsley, and [illegible] miles west by north of Pickering. It is a sm[illegible]all and [illegible] regularly built town, on the banks of the river [illegible]r Dove, and surrounded by steep hills. The parish is exten[illegible]sive, comprising the townships of Kirkby-Moorside, Brans[illegible]dale (East-side), Fadmore, Farndale (Low-quarter), and [illegible] Gillimoor, with an aggregate population of 2324 in 1831 (wi[illegible]thout including Bransdale East-side), and 2758 in 184[illegible]1. The living is a discharged vicarage, with the cura[illegible] Cockan and Gillimoor, in the archdeaconry of Cle[illegible] and diocese of York, with a gross income of 456*l*. [illegible] church is dedicated to All Saints; and the Indep[illegible] Wesleyans, and Society of Friends, have meeting-[illegible]. There are several day and Sunday schools, and t[illegible] branch banks; and the town has a market on Wednes[illegible] and fairs on Whit-Wednesday and September 18. Near the town are quarries, coal-mines, and several corn-mills, and in the town much malt and some linen goods are made. The manor formerly belonged to the earls of Westmoreland, who forfeited it to the crown in the reign of Elizabeth. The duke of Buckingham, the favourite of James I., is said to have begged it of that king as an appendage to Helmsley, which he had obtained by marriage, and here, it is supposed in an old house still remaining in the market-place, his dissolute son breathed his last. His burial is entered in the parish register, but it is not known where his remains were deposited. The population of the township of Kirkby-Moorside was 1802 in 1831, and 19[illegible] in 1841.

Knaresborough, a market-town and parliamentary borough, in the West Riding, in the wapentake of Claro and parish of Knaresborough, 200 miles north-north-west from London, and 19 miles west by north from York. The town is situated on the side of a rocky hill, on the north-east bank of the river Nidd, across which there are two bridges, one at each end of the town. Most of the houses are of stone, and the town generally is well built, and well lighted with gas. The market-place is large, and the market, which is on Wednesday, is well attended, particularly the corn-market. About midway between the two bridges are the ruins of Knaresborough castle, on a rocky eminence. It was originally built by Serlo de Burgh, who came to England with William the Conqueror, and was a place of great strength till it was dismantled in 1648 by order of the parliament. Little of the ruins remain, the stones having been used for building houses in the town.

The parish church, dedicated to St. John the Baptist, is antient, and has sittings for 1200. The living is a vicarage, formerly in the diocese of Chester, but now in the deanery of Boroughbridge, archdeaconry of Richmond, and diocese of Ripon, in the gift of a prebendary of York cathedral, and net annual value of 393*l*. There is also a chapel g to the established church which has sittings for c Methodists, Independents, and Roman Catholics es of worship, with sittings for about 2000.

There were 16 daily schools in Knaresborough, ch, containing 30 scholars of both sexes, was by endowment. There were also 3 day and hools, 1 day and Sunday national school, and chools, one of which was supported by the church.

f manufacture is linen, which has long been at Knaresborough, and a large capital is in- mills, machinery, and warehouses. The river p and rapid, and affords water-power, of which e use is made at present, and which might be a much greater extent if the increase of trade ire it.

rough has returned two members to parliament y, 1553. The right of election was originally ge tenements, which were nearly all purchased of Burlington, and the duke of Devonshire was r of them at the time of the Reform Act, under resborough still returns two members. The ry borough comprises the township of Knares- d part of the township of Scriven-cum-Tenter- e population of the borough in 1841 was 5382. r of electors on the register in 1835-6 was 262; the number was 240, of whom 238 were 10*l*. ers.

opulation of the town of Knaresborough in 1821 ; in 1831 it was 5296; in 1841 it was 4678 (2232 d 2446 females), including 57 persons in Knares- workhouse and 17 in three prisons.

half a mile down the river are the ruins of a r friars of the order of the Holy Trinity, which was by Richard Plantagenet, brother of Henry III. are some curious dwellings excavated in the rock, St. Robert's Chapel, which is said to have been in the thirteenth century by a hermit, son of the of York, and St. Robert's Cave, which is supposed e been his residence. This cave has been made no- by the singular circumstances of the murder com- there in 1744 by Eugene Aram, who was not detected 58. On the north-west bank of the river, opposite the of the castle, is a curious petrifying spring, called the ping Well. According to tradition Mother Shipton orn near this well. An extraordinary native of Knares- gh, John Metcalf, called Blind Jack of Knaresbo- , died there in 1810, at the age of 93. He lost his at the age of four years, and in different parts of his quired a reputation as a musician, a carrier, a guide, projector and constructor of roads.

re are some medicinal springs in the neighbourhood aresborough, which were once much resorted to, but ave since been almost deserted for those of Harrow- nd Scarborough.

bourn, Leyburn, or Leyburn-Lounds, is a small t-town in the parish of Wensley, wapentake of Hang liberty of Richmondshire, and the North Riding of unty, about 229 miles from London, 38 miles north- rom York, 3 miles north of Middleham, and 8 miles of Richmond. It consists chiefly of a spacious ob- quare of well-built houses, in the centre of which a t is held every Friday, where a considerable quantity rn is sold. It has also fairs on the second Friday in ary, May, October, and December, when many cattle isposed of. The town is pleasantly situated amidst resque scenery, and has places of worship for Inde- nts, Wesleyan Methodists, and Roman Catholics, l schools, a branch bank, and a public library. The ty contains mines and quarries, which supply lead, coal, me. In the neighbourhood are the remains of Bolton iddleham castles, and of the abbeys of Jervaux and rham, and the mansion and pleasure-grounds of n Hall. The population of the township was 1003 in and 829 in 1841, including 28 persons in Leybourn n workhouse.

lton, New, is a parliamentary borough and market- in the wapentake of Ryedale, in the North Riding, 214 miles from London, 17 or 18 miles north-east of , and 22 miles south-west of Scarborough. It is ed on the north bank of the river Derwent, over is a stone bridge to connect it with the suburb of Norton, and which here forms the boundary between the North and East Ridings. The borough comprises and is co-extensive with the parishes of St. Leonard and St. Michael, but for parliamentary purposes it unites with the adjoining parishes of Old Malton and Norton in the return of two members. Both of the parishes of New Malton, with that of Old Malton, form a perpetual curacy, in the archdeaconry of Cleveland and diocese of York, with a gross income of 198*l*. The churches of St. Leonard and St. Michael are supposed to have been originally chapels to Old Malton, which is presumed to have been the mother parish and church; and the former has a tall spire, the upper part of which has been left unfinished, in the form of a truncated cone, lest, according to the popular story, its weight should prove too great for the edifice. The town also contains places of worship for Roman Catholics, Presbyterians, Independents, Baptists, Primitive Methodists, members of the Society of Friends, and Unitarians; numerous schools, including large Lancasterian and national schools, a spacious workhouse for the Malton Poor-Law Union, which comprehends 68 parishes; a large market-place, including a town-hall; a neat theatre, built in 1814; and a handsome suite of public rooms, in connection with which are news-rooms and a subscription library. There were formerly two market-crosses, both of which are destroyed. The town is generally well built, and is favourably situated on an eminence; and it has a brisk trade, which is greatly aided by the river Derwent, that stream having been made navigable to Malton, under an Act of the reign of Queen Anne, and more recently to a higher point. The principal articles of trade are corn, bacon, butter, and other agricultural produce, which are sent down the river, and coals, various articles of general consumption, and woollen goods from the West Riding, which are brought up to the town. The market-days are Tuesday and Saturday, the latter being the principal, and well attended from a considerable distance; and there are several annual fairs—on the Monday and Saturday before Palm-Sunday, for horses and cattle, the Saturdays before Whitsuntide and the 15th of July, and the 10th, 11th, and 12th October. The quarter-sessions for the North Riding are held here, and this is one of the polling-places for the county members of that Riding. The borough sent members to parliament in the reign of Edward I., after which it appears not to have been represented until 1640, since which time it has continued to elect two members. The right of election rested, prior to the passing of the Reform Bill, in the burgage holders, inhabitants, who were rated to church and poor, and there were about 625 electors at the time of the Boundary Reports; the number registered in 1839-40 was 558. The bailiff is the returning officer. The population of the parishes of St. Leonard's and St. Michael's was 4173 in 1831, and 4021 in 1841; that of Old Malton, at the same dates, 1204 and 1296 respectively.

Old Malton stands about a mile north-east of New Malton, on the same side of the river, and it has a very antient church, dedicated to St. Mary, adjoining to which are the remains of a priory, founded in 1150, for Gilbertine canons, the revenues of which amounted, at the dissolution, to 275*l*. 7*s*. A free grammar-school was founded here in 1547, by Robert Holgate, archbishop of York, with an endowment which now produces about 100*l*. per annum. The town contains a Wesleyan chapel and some daily schools. It is observed in the Report of the Boundary Commissioners, that the presumption of some closer connection than that of mere vicinage having existed, in remote times, between Old and New Malton, is strengthened both by the Report of a Committee of the House of Commons in 1658, deciding that Old Malton had a joint right with New Malton in the election of members of parliament, and by the admission of rights of common by the inhabitants of New Malton, over certain commons and wastes belonging to Old Malton. The village is [illegible] its lime-quarries.

Malton is supposed to have been [illegible] gantian fortified towns [illegible] portance as a Roman [illegible] the number of [illegible] pear to have been [illegible] the [illegible] dunum [illegible] advantages [illegible] from times [illegible] tract of impassable marsh between the river Derwent and the Wolds. Numerous Roman coins, urns, and other remains have been found here, and entrenchments are yet visible on the opposite side of the river. In the Saxon times Malton became a royal villa to King Edwin: and after the Norman conquest the baronial family of Vesey, or De Vesci, built a castle here, as well as the priory mentioned above. This castle was demolished by Henry II., but while it stood the town was burnt down by Archbishop Thurstan, who besieged it for the purpose of dislodging a party of Scots who had obtained possession and garrisoned the castle. The town was rebuilt in the reign of Stephen, and then received the name of New Malton. A noble castellated mansion was erected on the site of the antient castle, about the close of the sixteenth century, by Ralph, Lord Eure; but in 1674, as his grand-daughters could not agree concerning the property, the greater part of the mansion was pulled down by the high sheriff, under an order of court, divided the materials between the contending parties, leaving only the lodge and gateway standing as a monument of their folly. About a quarter of a mile south-west of New Malton is a mineral spring, said to be similar to those of Scarborough, and to be an efficacious chalybeate.

Masham is a parish and market-town, partly in the liberties of St. Peter of York and Richmondshire, but chiefly in the wapentake of Hang-East, in the North Riding, about 218 miles from London, 30 miles north-west of York, and 14 miles south by east of Richmond, pleasantly situated on the western bank of the Ure, in a very fertile country, near the boundary of the West Riding. The parish comprises the townships of Masham, Burton-upon-Yore, Ellingstring, Ellingtons, Fearby, Healy-with-Sutton, Ilton-with-Pott, and Swinton-with-Warthermask, and had an aggregate population of 2995 in 1831, and 2974 in 1841. The living is a vicarage, annexed to that of Kirkby-Malzeard, in the archdeaconry of Richmond and diocese of Ripon, and was formerly a prebend, the richest in the cathedral church of York. The church is small, but handsome, with a lofty spire, and dedicated to St. Mary; and there are chapels for Baptists and Wesleyan Methodists, and several schools, one of which is a grammar-school, founded in 1760 by William Danby, Esq., and endowed with about 50*l.* per annum, and another a charity-school for 36 children, on the same foundation, and endowed with about 24*l.* per annum from the benefaction of three other persons. The town is well built, and has a considerable manufacture of woollen yarn, and a flax-mill, which in 1838 employed 122 persons. Coarse straw-plait for making hats is also produced here. The town has a weekly market, of but little importance, on Wednesday, and fairs on the 17th, 18th, and 19th of September. The population of the township of Masham alone was 1276 in 1831, and 1318 in 1841.

Middlesborough, or Middlesburgh, is a parish and township, partly in the liberty of St. Peter of York, but chiefly in the western division of Langbaurgh liberty, in the North Riding, situated on the southern shore of the Tees, close to its mouth, and which has risen to considerable importance in consequence of the formation of a branch or extension of the Stockton and Darlington Railway for shipping coals here, so as to avoid the river navigation. Middlesborough lies about 5 miles east by north of Stockton, and formerly had a chapel dedicated to St. Hilda, which was long in ruins, but of which no remains now exist, though the site is still used as a burying-ground. The parish of Middlesborough contains the township of that name and the township of Linthorp, and had a gross population of 236 in 1821, 383 in 1831, when the effect of the railway was only beginning to be felt, and 5709 in 1841, including 40 persons in barges and tents, but exclusive of 103 persons absent from home, and 50 who had emigrated to America in that year. The township of Middlesborough alone contained only 40 persons in 1821, 154 in 1831, and 5463 in 1841; and it has risen, within a very few years, from the rank of an insignificant village to that of a considerable sea-port town, with several foundries, a pottery, and other manufactories. The living is a perpetual curacy, in the archdeaconry of Cleveland and diocese of York, the gross income of which, in 1831, was 35*l.* The township contains Independent and Wesleyan Methodist chapels, and several schools.

Middleham is a parish and small market-town in the wapentake of Hang-West, liberty of Richmondshire, and North Riding of the county, about 226 miles from London, 41 miles north-west of York, and two or three miles south of Leybourn. The living is a royal peculiar, with a net income of 325*l.* The church is dedicated to St. Mary and St. Alkeld, and was made collegiate by Richard III., when duke of Gloucester. The town contains places of worship for Primitive and Wesleyan Methodists, and some daily and Sunday schools; and it is built, chiefly in the form of a square, upon a gentle acclivity on the south bank of the Ure. The market-day is Monday, but the trade of the town, which was never considerable, has almost entirely fallen away since the rise of Leybourn; fairs are held on Easter-Monday, Whit-Monday, and the 5th, 6th, and 7th of November. Petty sessions for the wapentake of Hang-West are held here, and there are small manufactures of woollen. The most interesting feature of the town is its antient castle, built about 1190, by Robert Fitz-Ranulph. In the reign of Henry VI. it belonged to the earl of Salisbury, who marched hence with 4000 men towards London, to demand redress for his son's grievances. Here also, according to Stow, the bastard Falconbridge was beheaded in 1471. Edward IV. was confined for a time in Middleham Castle by Richard Nevill, earl of Warwick, after he had been taken prisoner at Wolvey, but he subsequently escaped while hunting in the park. After defeating the earl of Warwick at Barnet, Edward gave Middleham Castle to his brother the duke of Gloucester, afterwards Richard III., who took a great liking to the place, and was preparing to found a college in Frodingham-field, when he died. His only son Edward was born here, but since that time hardly anything is known of the history of the castle, excepting that it was inhabited, in 1609, by Sir Henry Linley. Tradition says that it was reduced to ruin by Cromwell, but there is no historical evidence to prove it. The ruins of the castle stand on a rocky eminence near the town. The population of the parish of Middleham was 914 in 1831, and 930 in 1841.

Muker is a chapelry and customary market-town in that part of the parish of Grinton which belongs to the wapentake of Gilling-West, in the liberty of Richmondshire, and the North Riding of the county, about 252 miles from London, 54 miles north-west of York, and 17 miles [illegible] by south of Richmond. The township comprises the higher part of Swaledale, and the town stands in an angle formed by two of the streams which contribute to form that river. The living is a perpetual curacy attached to the vicarage of Grinton, formerly in the archdeaconry of Richmond and diocese of Chester, but now in the diocese of Ripon, with an income of about 98*l.* The town contains a chapel-of-ease, dedicated to St. Mary, and erected in [illegible] and some schools, one of which is partly supported by an endowment of about 20*l.* a year, bequeathed by Anthony Metcalfe in 1678, for a free-school. There is also a subscription library. The market, which has been established by custom, is held on Wednesday, and there is an annual fair on the Wednesday before Old Christmas-day. The parish contains mines of lead, iron, and coal, and also produces lime. About 2½ miles to the north-west is a cascade called Keasden Force, where the Swale falls over some rugged rocks into a romantic dale. The population of the chapelry was 1247 in 1831, and 1241 in 1841.

Northallerton, formerly, and still occasionally, written North Allerton, is a parish, parliamentary borough, and market-town, in the wapentake and liberty of Allertonshire, in the North Riding, about 220 miles from London, 32 miles north by west of York, and 16 miles east by south of Richmond. The town consists chiefly of one long street, in the line of the Great North Road, and is passed at a very short distance on the west by the Great North of England Railway, and the river Wiske, which forms on that side the boundary of the electoral district. The parish comprises the borough and township of Northallerton, the township of Romanby, and the chapelries of Brompton, Deighton, and High Worsall, and its aggregate population was 5118 in 1831, and 5273 in 1841. The living is a vicarage, with the curacies of Brompton and Deighton, formerly in the peculiar jurisdiction and patronage of the dean and chapter of Durham, but now in the archdeaconry of Cleveland and diocese of York, with a gross income of 862*l.* The church, dedicated to All Saints, is a spacious cruciform edifice, supposed to have been erected shortly after the destruction of the town by the Scots in 1381. The town contains also chapels for Independents and Wesleyan Methodists, and numerous daily and Sunday schools, three of the former of which are partially supported by endowments, and one, now the parochial school, was formerly a grammar-school, of royal foundation, though at what date is uncertain, and where several eminent men were educated. There was antiently a hospital dedicated to St. James, and founded by Hugh Pudsey, bishop of Durham, the clear revenue of which, at the time of the dissolution, was 56*l.* 2*s.* 2*d.*, and of the site of which some indications yet exist near the town. There was also formerly a house for Carmelites, or White Friars, dedicated to St. Mary; and the Austin Friars received some land here in the reign of Edward III., for the purpose of building a house and church. The town now contains an hospital, or Maison Dieu, founded in 1476 by Richard Moore, for the support of 13 poor persons, and rebuilt by the inhabitants, but for a smaller number. Northallerton is lighted with gas, and has a handsome modern sessions-house, to which is attached a House of Correction. Not being a corporate town, it has no municipal government, but is under the jurisdiction of the county magistrates. It has a Court of Requests for the whole of the manor of Allerton and Allertonshire, comprising 32 townships; and the quarter-sessions for the North Riding are held here. It likewise contains the Register-office for registering all transfers of land by deed or will in the North Riding, and is a polling-place for the election of county members. The town sent two members to Parliament in the 26th year of Edward III., but did not again exercise the privilege until it was resumed in 1640, by order of the House of Commons. From that time it sent two members until the passing of the Reform Bill, when it was reduced to one, and the boundaries of the electoral district were extended so as to embrace the adjoining township of Romanby and chapelry of Brompton. The number of electors registered in 1839-40 was 281.

The town contains no important manufactures, but linens and leather are made in the neighbourhood to a small extent. The market is held on Wednesday, and there are several fairs. Races are held annually in October, and the town has branches of the Darlington and Yorkshire district banks. The population of the borough and township of Northallerton alone was 3004 in 1831, and 3092 in 1841, including 100 persons in the House of Correction and 37 in Northallerton Union workhouse.

A very strong castle was founded at Northallerton by Hugh Pudsey, bishop of Durham, but it was razed to the ground by order of Henry II., in consequence of a quarrel with that prelate. The town is supposed to have been a Roman station, and subsequently a Saxon borough; and in Domesday-Book it is called Alvertune and Alreton, the prefix North having been originally applied to distinguish it from Allerton Mauleverar, a chapelry in the West Riding. At Cowton or Cuton Moor, about three miles om the town, was fought, in the year 1138, the battle of e Standard. The site of this engagement is still called ndard Hill, and the holes into which the bodies of the d were thrown are pointed out as the Scots' Pits. In 8 the town was plundered and burnt by the Scots; ing the civil war Charles I. lodged here, in an old nsion called the Porch-House, on one of his journeys to tland; and in the rebellion of 1745 the Duke of Cum- and's army encamped near the town, on the Castle s. Northallerton gave the title of viscount to the tor of Hanover, afterwards King George I., during the n of Anne.

ley, a small market-town in the West Riding, in the ntake of Skyrack and parish of Otley, 205 miles from on, and 30 miles west by south from York. The is pleasantly situated on the south bank of the river rf. The church has accommodation for 900 persons. orth door, which has a plain circular arch, is sup- to be Saxon, and there are several antient monu- in the interior. The living is a vicarage, in the eaconry of Craven and diocese of Ripon, in the gift crown, of the net annual value of 60*l.* There are of worship belonging to the Methodists and Quakers. is a free grammar-school, which was founded by as Cave in 1611, but the lands with which it was ved were let on a lease for 999 years, at a rent of 3*s.* 4*d.*; in 1833 the lands were let for upwards of Of the free income of the school, 20*l.* was paid to the master, and 6*l.* 13*s.* 4*d.* to the usher: it contained 2 males and 6 females; and there were 8 other daily schools The market is antient, and is supplied with a very larg quantity of corn and other agricultural produce. Woolle manufacture was formerly carried on to some extent, bu has been removed to situations more contiguous to fue and inland navigation. The population in 1831 was 3161 in 1841 it was 3445.

Pateley Bridge, a market-town in the West Riding, i the liberty of Ripon and parish of Ripon, 212 miles fro London, and 34 miles west-north-west from York. Thi town, which is situated on the north bank of the rive Nidd, appears to be in a state of rapid improvement. According to Baines's 'Religious State of the Manufacturing Districts,' 1843, there are in the township seven episcopa churches and eighteen chapels belonging to different classes of dissenters, in all twenty-five places of public worship, with sittings for 5700 persons: there are fou infant schools, 12 private schools, three factory schools, and seven public day-schools, in all twenty-six day-schools, with 658 scholars; besides which there were three Sunday-schools supported by the established church, and fifteen supported by different classes of dissenters, in all eighteen Sunday-schools, with 1060 scholars. The present population, according to Baines, is 7996. There are several lead-mines in the neighbourhood, from which the prosperity of the town seems to be chiefly derived.

Patrington is a parish and market-town in the southern division of the wapentake of Holderness, in the East Riding, about 188 miles from London, 57 miles south-east of York, and 18 miles east by south from Hull, in the promontory of Holderness. The living is a rectory, in the archdeaconry of the East Riding and the diocese of York, with a gross income of 660*l.* It has a beautiful cruciform Gothic church, with a lofty spire, places of worship for Independents, and Primitive and Wesleyan Methodists, several schools, and a Union workhouse for the Patrington Union, which comprehends 27 parishes. A navigable creek, which communicates with the Humber, brings vessels within a short distance of the town, which exports considerable quantities of corn, and receives lime and coal from the West Riding. The market is on Saturday, and there are fairs on March 28, July 18, and December 6. The town contains a branch of the Yorkshire District Bank. It is a place of considerable antiquity, and is supposed by some writers to be the Prætorium of the antient geographers, an opinion somewhat strengthened by the discovery, about eighty years since, of part of a Roman altar. Other writers derive the name of the town from St. Patrick, to whom the church is dedicated. The population of the parish was 1298 in 1831, and 1402, including 72 inmates of the Union workhouse and 16 persons in barges, in 1841.

Penistone, a small market-town on the right bank of the Don, in the West Riding, wapentake of Staincross, 177 miles from London, on the road from Sheffield to Huddersfield, 13 miles from each place. It is situated on the edge of the dreary moors which form the borders of Yorkshire and Lancashire. The climate is cold, and the har vest is sometimes not gathered in before November. Th parish comprises 21,580 acres, and consists of the chapelr of Denby, and the townships of Gunthwaite, Hunshel Ingbirchworth, Langsett, Oxspring, Penistone, and Thurle stone. Population of the parish, 5042 in 1821, 5201 i 1831, and 5907 in 1841. The chapelry of Denby co sists of the townships of Denby, Gunthwaite, and Ingbirc worth: the living is a perpetual curacy, net val 98*l.* The linen manufacture is carried on in the to of Penistone and in most of the hamlets in the p rish. The town consists of four streets crossing ea other at right angles. There is a market every Thursda chiefly for sheep and cattle. The church presents nothi worthy of note. The living is a vicarage, in the dioc of Ripon, net value 147*l.* The Society of Friends, Independents, and Wesleyan Methodists have places worship: in Mr. Baines's work it is stated that the senters have five places of worship in the parish. grammar-school, founded in 1604 and endowed with is free to all male children in the parish. The nat school is partly supported by an endowment. In 1843 were in the parish two church Sunday-schools, attende 143 scholars, and eight belonging to dissenters, with scholars; besides twelve daily schools, attended six miles, the Cleveland hills, including the mountain called Roseberry Topping, rise in the form of a semicircular amphitheatre, of which Stokesley is the centre. The parish comprises the townships of Stokesley, Great and Little Busby, Easby, and Newby, and had an aggregate population of 2376 in 1831, and 2734 in 1841, including the non-residents mentioned below. The living is a rectory, with the curacy of Westerdale, in the archdeaconry of Cleveland and diocese of York, and in the patronage of the archbishop of York, with a gross income of 1352*l*. Besides the parish church, there are places of worship for Independents and Primitive and Wesleyan Methodists. Among the schools are national schools for both sexes, partly supported by endowment. The town consists chiefly of one street, with many well-built houses, and it has an annual court-leet and weekly petty sessions. It has a considerable manufacture of linens, a good market on Saturday, and fairs on the Saturdays before Palm Sunday, Trinity Sunday, and Old Lammas-day. Stokesley is a polling-place for the North Riding, and the township had a population of 1967 in 1831, and 2310 in 1841, including the hamlet of Tanton, 16 persons in the Union workhouse, 34 in barns, and 270 visitors at the annual fair.

Tadcaster, a market-town in the West Riding, partly in the wapentake of Barkstone-Ash and partly in the Ainsty of York, 185 miles north-north-west from London, and 9 miles south-west from York. It is situated on both banks of the river Wharfe, over which there is a handsome stone bridge constructed with stones taken from the ruins of a castle which formerly stood on the south side of the river. The river is navigable for boats. The town has little trade, but was, previous to the formation of the railways between York and Leeds and Manchester, a place of great thoroughfare from York to the south-west. The church is dedicated to St. Mary; the living is a vicarage, in the archdeaconry and diocese of York, in the gift of the earl of Egremont, of the net annual value of 240*l*. In 1833 there were seven daily schools, one of which was a grammar-school endowed with the rent of a farm, for which twenty scholars were free, and ten others were paid for by their parents. Another daily school was endowed by Mrs. Dawson for forty females, but it contained only twenty-four when visited by the Education Commissioners in 1833. There were also two day and boarding schools, and three Sunday-schools. The population in 1841 was 1826; in 1831 it was 1666. Tadcaster is the Calcaria of the Romans, which was an outpost of their chief military station Eboracum, now York.

Thirsk is a parish, market-town, and parliamentary borough, situated partly in the liberty of St. Peter of York, but chiefly in the wapentake of Birdforth, in the North Riding, about 214 miles from London, 23 miles north-north-west of York, and 10 miles south-south-east of Northallerton. The parish comprises the borough of Thirsk, the township of Castle-Islebeck or Miniot, and the chapelry of Sowerby, and had an aggregate population of 3829 in 1831, and 4599 in 1841. The living is a perpetual curacy, in the archdeaconry of Cleveland and diocese of York, with a gross income of 143*l*. The church, which is dedicated to St. Mary Magdalen, is a large and handsome Gothic building, supposed to have been formed out of the ruins of the antient castle. Thirsk contains likewise places of worship for the Society of Friends, Independents, and Wesleyan Methodists. One of the schools of the town is conducted in a school-house under the chancel of the church, and another is a school of industry for clothing and educating poor girls. The town is pleasantly situated on both sides of the stream called Codbeck, a feeder of the Swale, in the fertile vale of Mowbray; that portion which lies east of the beck being called Old Thirsk, and that on the opposite side New Thirsk. At the south-western extremity of the town is the site of the castle, which is said to have been erected by the Mowbray family in the year 959, and to have been a noble pile of building, but scarcely any vestiges of it now remain except the mount on which the keep formerly stood.

Old Thirsk consists of a long range of cottages on the road to Yarm and Stockton, and of a square, called St. James's Green, surrounded by buildings of a similar character, and which marks the supposed site of an antient chantry, founded by William de Mowbray, in the time of Henry I. Upon another green at Old Thirsk formerly stood a venerable elm-tree, under which, from time immemorial, the election of members of parliament took place, and where also it is said that Henry Percy, the fourth earl of Northumberland, was put to death during a popular tumult in the reign of Henry VII. This curious tree was destroyed by fire in 1818, having been ignited by some mischievous boys. A substantial stone bridge, with arches of sufficient size to allow the free passage of the Codbeck when swollen by heavy rains and the melting of snow, connects the old with the new town, which has an extensive market-place. The present church is near the northern extremity of the new town, and it is supposed that there was formerly a church in the old town, of which no vestiges remain. Thirsk possesses no manufactures of importance, though coarse linens and saddlery are made in the town; but it has a well-supplied market on Monday, where great quantities of provisions are bought for Leeds and other places; and there are fairs on Shrove-Monday, April 4 and 5, Easter-Monday, Whit-Monday, August 4 and 5, October 28 and 29, and the first Tuesday after December 11. The Great North of England Railway passes a little west of the town, which is not a corporate borough but a burgage tenure borough by prescription. Old Thirsk sent two members to parliament in the reign of Edward III, but did not elect representatives again until the last parliament of Edward VI. At the time of passing the Reform Bill, the number of electors was 50, only 6 of whom resided in the borough; but by that Act the town was reduced to one member, and the electoral district was made to comprise several adjacent townships, of which the principal is Sowerby, an extremely neat village south of the new town, principally inhabited by retired tradesmen. The number of electors on the register in 1839-40 was 327. The surrounding country is very beautiful and salubrious, and near the town is a chalybeate spring resembling those of Scarborough and Cheltenham. Thirsk is a polling-place for the election of county members for the North Riding. The population of the borough and town was 2835 in 1831 and 3020 in 1841, including 61 persons in Thirsk Union workhouse and 12 in a tent.

Thorne, a small market-town, in the West Riding, in the wapentake of Strafforth and Tickhill, 163 miles from London, and 25 miles south of York. A part of the town, called Thorne Waterside, is on the south bank of the Don, and here are ship, rope, and timber yards, and wh… merchandise. The tide rises several feet, and brigs come thus far up the Don, bringing merchandise and g… from London. Steam-boats ply between Thorne and H… daily, but at neap-tides they do not come farther than Newbridge, on the Dutch river, 4 miles from Thorne. On the east side of the town the Stainforth and Keadby canal, 15 miles long, connects the Trent and the Don. There is a market for corn and agricultural produce every Wednesday, and the former is of sufficient import… been selected as one of the places for returning … prices under the Corn Act of 1842. A grea… the surrounding country was once a marsh, b… rendered highly productive by an extensive … drainage commenced in the reign of Ch… Cornelius Vermueden, a Dutchman, who came … a number of his countrymen. [AXHOLME.] The … of this immigration is not yet effaced in the vi… families still exist who trace their origin to Dut… tors. The waggon in common use is evidentl… and is not found beyond a limited district. The … Thorne comprises 10,840 acres; and the popul… 1841 was 3507, having been 3779 in 1831. In 18… were 849 houses inhabited, 68 uninhabited, and 1 b… in 1841, 796 inhabited, 123 uninhabited, and the… none building. The town is lighted with gas. The … was formerly a chapel-of-ease to the parish of H… but in the seventeenth century it was made paro… consequence, it is said, of a funeral party cross… marsh (now drained) having narrowly escaped dr… by the upsetting of the boat. The living is a pe… curacy, in the archdeaconry and diocese of York, o… annual value of 117*l*. The Unitarians and Baptists … chapels, which are licensed for the celebration o… riages; and the Methodists, Independents, and Q… have also places of worship. In 1833 there … children educated from Travis's charity, and … Brook's charity, the date of these endo… respectively 1705 and 1706. Thorne is t… Poor-Law Union.

ed northward to Castleford; a road from York in
nuation of the route from Manchester to that city,
eding to Malton, and then dividing into two branches,
ich the first, which is now called Wade's Causeway,
portion of which is in excellent preservation, twelve
road, paved with flint pebbles, and in some places
d more than three feet above the surface of the
nd, led to Dunsley Bay (the *Dunus Sinus* of Ptolemy),
Whitby, and the other to Scarborough and Filey; a
from York over the Wolds to Bridlington Bay, with
nch towards Hunmanby; and a road leading towards
ngton and the Spurn Point, which perhaps branched
the last mentioned at Stamford Bridge, and from
h, at Londesborough, a branch formerly called Hum-
treet extended southward to the village of Brough, on
Humber, opposite to Wintringham in Lincolnshire,
ce a Roman road proceeded southward to Lincoln.
es of Roman encampments, as well as of Saxon and
sh encampments, may be found in several parts of the
ty; and Roman antiquities have been discovered in
places, especially in York and its vicinity. Tumuli
ruidical remains are also found in several places.
Wolds contain many of the former; and of the an-
ies supposed to be Druidical may be mentioned a
s assemblage of rocks called Bramham Crags, about
iles north-west of Ripon, which from indications of
culpture are supposed to have been a Druidical
and three gigantic obelisks or single stones,
he Devil's Arrows, near Boroughbridge, which some
to be Druidical, and others of Roman origin. The
Roman stations were at Eboracum, now York;
on, Catarractonum, or Cataractonium, now Cat-
ambodunum, now Slack, near the border of Lan-
nd not far from Halifax; Isurium, at Aldborough;
a little below the junction of the Aire and
Danum, at Doncaster; Olicana, or Alicana, at
alcaria, at Tadcaster; Derventio, at Stamford
r at Aldby, about a mile north of that place;
a, at Londesborough; and Prætorium, at Flam-
A few other stations are marked on the Map of
ritain, published by the Society for the Diffusion
l Knowledge, which also indicates the probable
some Roman roads not alluded to above.

at is known of the state of Yorkshire shortly after
ination of the Roman dominion is that it formed
the British kingdom of Deifyr, Deifyra, or Deira,
e of which, as well as of Ella, one of its kings, an
axon chief, who obtained the government by con-
e well known in connection with the circumstance
said to have induced Gregory to send St. Augustin
companions as Christian missionaries to Britain.
ndaries of the Saxon and subsequently the Danish
of Northumbria, in which Deira was included,
equently with the fortunes of war, but it generally
the greater part of Yorkshire; and Baines ob-
hat the Villa Regia, the seat of the Northumbrian
conjectured to have been at Osmondthorp, in the
f Leeds. Of the history of the kingdom of North-
and the varying governments of its principal divi-
ryneich, or Bernicia, in the north, and Deifyr or
which was separated from it by a vast forest in what
the county of Durham, and which occupied the
ern or Yorkshire division of the kingdom, an account
ven under NORTHUMBERLAND, vol. xvi., pp. 318, 319.
herefore unnecessary to say much of the history of
shire as a part of that kingdom, which derived its
from the circumstance of lying north of the Humber.
tianity appears to have been introduced here about
ear 628, during the reign of Edwin, king of North-
ia, who with one of his sons and the greater part of
rmy fell in a great battle with Penda, the king of the
ians, and Cadwallon, or Cadwallader, king of North
s, in the year 633, at Hatfield, about seven miles east
ncaster, after which Osric, a nephew of Edwin, who
ne king of Deira, restored paganism. He was de-
and killed before York by Cadwallon, who remained
r of Deira for about a year, but was overpowered and
in 634 by Oswald, king of Bernicia, who restored
ianity, fixed his residence at York, and completed
the church which Edwin had left unfinished. He
efeated and slain in Shropshire, in 642, by Penda,
avaged his dominions. The subsequent contests for
vereignty of Deira, and the establishment of the Danish power there, are described in the article above referred to, where also will be found sufficient details of the history of this district down to the time of Harold, the last of the Anglo-Saxon kings. During his reign his brother Tostig invaded his dominions under the circumstances detailed under HAROLD II., vol. xii., pp. 51, 52, and was defeated by him in September, 1066, in a great battle near Stamford Bridge, after which the victorious Harold returned to York, where he soon afterwards received the first intelligence of the invasion of William of Normandy. Of the events which followed his victory at Hastings, so far as they relate to this county, some particulars are stated under YORK, which city suffered dreadfully in the struggle between the Norman invaders and the inhabitants of Northumbria, together with the Danes, whose assistance they had called in. So dire was the vengeance of William, that for the space of many years after his successful siege of York the surrounding country lay totally uncultivated, becoming the retreat only of robbers and wild beasts. Yorkshire is called Eurewickscire in the Domesday Survey, and appears then to have comprehended very nearly its present limits. It had been previously, during the Saxon dominion, subdivided into three ridings, or, as they were originally called, *trithings*.

In the year 1138, during the reign of Stephen, the north of England, as far as York, was invaded and ravaged by David, king of Scotland, who was defeated near Northallerton, at the famous battle of the Standard, by the neighbouring barons, who had been summoned by Thurstan the archbishop of York, under the command of Ralph, bishop of the Orkney Islands, Walter l'Espee, and William de Albemarle. One of the next important events in the history of the county was the siege of Piers Gaveston, the favourite of Edward II., in Scarborough Castle, where he was taken prisoner by the earls of Pembroke and Warren. In 1318 the northern part of the county was ravaged, the towns of Northallerton, Boroughbridge, Scarborough, and Skipton, were burnt, and Ripon and many other places were pillaged, by the Scotch under Douglas, who escaped to Scotland with an immense booty and numerous prisoners. In the following year another invasion of the Scotch, under the earl of Murray, advanced as far as York, and set fire to the suburbs, an indignity which so roused the archbishop of York, that he, accompanied by the bishop of Ely and a great number of clergymen, collected an army of about 10,000 men, and pursued Murray as far as Myton on the river Swale, about twelve miles from York, where a battle was fought, in which the English were thoroughly routed. From the number of clergy killed on this occasion, the engagement received the name of the 'White Battle.' Shortly after, in 1321, Thomas, earl of Lancaster, the leader of the barons who took arms against Edward II., was defeated and taken prisoner at Boroughbridge; and he, with several of his party, was shortly afterwards beheaded at Pontefract. In 1347, taking advantage of the absence of Edward III. in his continental wars, David Bruce led a Scottish army into England, and devastated the country as far as York, where he was checked by the forces of Queen Philippa, whose court was then at York: and who, marching in person with her army against Bruce, brought him to battle at Nevill's Cross, near Durham, where he was defeated. Yorkshire formed also the scene of many interesting events during the struggle between Richard II. and Bolingbroke, who eventually became king under the title of Henry IV.; and who, in 1399, on his return from banishment, landed at Ravenspur, or Ravenspurn, a port situated near the Spurn Head, but which has long since been washed away by the sea. He was immediately joined by several of the powerful northern barons, and he marched westward, by Hull, where he was refused admittance, towards Doncaster, on his approach to the metropolis. After he had assumed the crown, the deposed Richard II. was confined, successively, in the castles of Leeds, Knaresborough, and Pontefract, from the latter of which, after his death, his body was removed to London. In 1405 one of the conspiracies formed for the purpose of deposing Henry IV., by Percy, earl of Northumberland, Mowbray, earl marshal, and several other northern barons, was headed by Scroop, archbishop of York; but, though they collected a large body of troops to their rendezvous at York, Scroop and some others of the leaders were artfully drawn into a conference by Ralph Nevill, earl of Westmoreland, who commanded the troops sent against them; and the insurrection was thus stopped by their being taken prisoners, and afterwards beheaded. Percy escaped on this occasion, but in February, 1408, being again in arms, he was defeated and slain at the battle of Bramham Moor, near Tadcaster, by Sir Thomas Rokesby, then sheriff of Yorkshire. During the long war between the houses of York and Lancaster this county was the scene of several remarkable events, among which was the defeat of Richard, duke of York, by the army of Queen Margaret, in 1460, at the battle of Wakefield, in which he lost his life. His son, Edward IV., attacked the forces of Henry VI., or rather of Margaret, in the following year, in this county, after the battles of Mortimer's Cross and Bernard's Heath. Having reached Pontefract, he secured the passage of the Aire at Ferrybridge, and posted a detachment on the north side of the river. The forces of Henry, under Lord Clifford, forced this detachment back with great slaughter, but in the mean time Edward sent another detachment across the river at Castleford, about four miles higher up, which, approaching the rear of Clifford's army unobserved, completely routed them: Clifford himself fell in the contest. Edward then crossed the river with his whole army, exceeding 46,000 men, and on Sunday the 29th of March, 1461, fought the decisive battle of Towton, on the high ground between Towton and Saxton, a little south of Tadcaster, where he routed the Lancasterian forces with a slaughter extraordinary even in that sanguinary war. The fugitives attempted to escape by Tadcaster-bridge, but being so closely pursued as to be unable to reach it, they crossed the little river Cock with such precipitation that the bodies of those drowned in the attempt formed a bridge for the passage of the survivors. The total number slain on this occasion is reported to have been 36,776, including many leaders of distinction; and the result was that Henry and his queen fled to Scotland, while Edward advanced and took possession of York. Events having once more turned in favour of Henry, Edward fled to Holland in 1470; but on the 14th of March in the following year he returned to England, landed at Ravenspurn with 2000 men, and, being well received, proceeded to York, where he planted a garrison, and thence marched southwards towards London, and won the battle of Barnet, which established him on the throne.

The chief event in the history of Yorkshire during the reign of Henry VII. was the raising and defeat of an insurrection of the northern counties against a land-tax which had been imposed for the support of the army, and in the proposal of which the earl of Northumberland was supposed to have taken an active part. His residence at Topcliffe, near Thirsk, was assailed by the insurgents, who killed him and many of his servants; but the insurrection was eventually put down by the earl of Surrey, and several of the leaders, among whom was John à Chambre, were executed at York. Another of the chief insurgents, Sir John Egremont, escaped to Flanders. In the following reign an insurrection was raised by Robert Aske, Lord D'Arcy, Sir Robert Constable, Sir Thomas Percy (brother to the earl of Northumberland), and other powerful persons, to oppose the sweeping changes involved in the suppression of monasteries and other religious establishments; and in consequence of the sacred character of the objects for which, professedly, they took up arms, they styled their march 'The Pilgrimage of Grace.' They made an unsuccessful attack upon Scarborough Castle, but took those of Pontefract, York, and Hull, and persuaded many to join their standard; but after they had proceeded southward to Doncaster, to meet an army sent against them under the command of the duke of Norfolk, their progress was impeded by the Don being swollen by heavy rains, and negotiations were entered into, in consequence of which the insurgents dispersed. Some of the leaders, however, attempting to revive the insurrection, were subsequently executed. A similar but less important insurrection was raised in 1537 near Scarborough and Malton, and the rebels marched towards Hull, which was suddenly invested by royal forces under Sir John Constable and Sir Ralph Elliker, who, after sustaining a siege for several days, sallied out and defeated the insurgents. Shortly afterwards the remnant of the insurgents, under Sir Robert Constable, obtained possession of Hull, and held it for about a month, when they were overpowered by the inhabitants of the town, who took Constable and the other leaders prisoners, and they were subsequently hanged and quartered. A third insurrection, raised in the same neighbourhood i
dispersed with less difficulty, and the ring-lea
whom was Thomas Dale, the parish clerk of S
Scarborough, were taken and executed at Y
borough Castle was surprised and taken by th
during Wyatt's rebellion in 1553, but it was
the earl of Westmoreland after three days.

Some of the earliest movements in the
which Charles I. was dethroned took place in
Charles having, early in the year 1642, lef
York, where his adherents flocked to him.
garrisoned by Sir John Hotham for the par
he, in April, 1642, refused to admit the king,
demand entrance. Charles thereupon determ
forces for an attack upon Hull, and summone
bands in the neighbourhood of Beverley; but
off access to Hull by breaking through the
Humber, and flooding the country for two mi
town, which thus gained time, and received re
in July, when, by a vigorous attack upon the
king, he was compelled to raise the siege.
few months, Charles removed from York to
he made Sir Thomas Glemham governor o
the earl of Cumberland military commander o
Tadcaster and Wetherby were successively fo
parliamentarians, and Glemham was defeate
tacks upon the latter town; but subsequent
command of the king's forces being given t
Newcastle, who brought strong reinforcement
and Tadcaster were taken, and the parliame
received other defeats. In 1643 Leeds was t
parliament by Sir Thomas Fairfax, who subseq
possession of Bradford, where he was besieged
of Newcastle, who failed in his attempts to car
by storm, but subsequently obtained possession
the exhaustion of the ammunition of the garriso
escaping with a party of horse by cutting his wa
the ranks of the besieging army. In the same ye
Henrietta Maria landed at Bridlington with a
arms, which were safely conveyed to York, wher
mained three months. The earl of Newcastle wa
a marquis for his services in escorting the queen to
when she left York. He subsequently defeated F
Beverley, and laid siege to Hull; but though he co
the siege with his whole forces for about six we
natural advantages of its position enabled the ga
hold the town, and at length to compel him to
his attempt. In the following year, 1644, Fairfax
a battle against the royal forces near Selby, and af
with the Scottish forces of the earl of Leven, laid
York; but receiving intelligence of the approach
Rupert, they raised the siege after it had been
from April 19 to June 30, and went to Marston
a view of meeting the royal army, which howe
taken a different route, arrived at York. Con
advice of the marquis of Newcastle, Prince
York on the 2nd of July, to give battle to the
tary army, by which he was completely routed
structive battle of Marston Moor, in which more
lives were lost, chiefly royalists, and the par
forces obtained possession of more than 100 off
soldiers, and the artillery and stores of Rupert's
remnant of which soon escaped to Lancashire
marquis of Newcastle fled to the Continent.
ment soon afterwards obtained possession of Y
had sustained, in the whole siege, twenty-tw
and they also took Tickhill castle, Sheffield cas
borough town and castle, Helmsley castle, an
of Pontefract, where they laid ineffectual si
castle. The place was relieved early in 1645
course of that year the parliamentary forces
town, and again laid siege to the castle, whi
obstinate defence, surrendered on the 20th of
Scarborough also the royalists made a vigoro
tracted defence, but both town and castle a
into the hands of the parliament. Later in
Sandall castle, Bolton castle, and Skipton castle
by the parliamentary troops. In 1648 Ponte
was again taken for the king by Colonel Mo
endured a third protracted siege, which, for
conducted by Cromwell himself, but it finally
on the 25th of March, 1649. Colonel Boynto
Scarborough castle for the parliament, also

in September, 1648, but about three months after-
final siege by the parliamentarians was terminated
urrender of the garrison, the troops having be-
itinous.

e subsequent history of the county the leading
re—an insurrection raised in the West Riding, in
1663, by a body of misguided people, led by old
ntary soldiers and others disaffected to the restored
ent: they were speedily dispersed by a body of
d militia, who attacked them in Farnley Wood,
y, and took many prisoners, of whom twenty-one
cuted; the raising, during the rebellion of 1745,
ompanies of foot, supported by the inhabitants of
ty, for the defence of government; riots in 1757,
l parts of the county, occasioned by the introduc-
new and obnoxious regulations respecting the
of the militia; and serious disturbances, occa-
iefly by the distressed state of the manufacturing
in 1812, 1819, and to some extent also in the
of 1842, although the more serious outbreaks on
occasion were confined to Lancashire.

the more remarkable antiquities of Yorkshire,
those of the city of York itself, are the re-
the following fortresses:—Conisbrough or Conis-
castle, about six miles west of Doncaster, is one
liest and most interesting ruins of the kind in Eng-
has in its immediate vicinity a tumulus, which is
ve been raised over the body of the Saxon leader
who fell in a battle with the Britons near this place
year 488; Knaresborough castle, which was in a
asure destroyed during the civil wars, and about
om which, on the summit of a hill, are the re-
an antient camp—the castle is supposed to have
lt by Serlo de Burgh, who accompanied William
ueror from Normandy; Pontefract castle, the
hich were of enormous thickness, and which for-
ered seven acres, although now but few remains
, its demolition having been effected during the
wealth by order of parliament; Skipton castle,
well as that of Pontefract, was erected shortly
Norman conquest; and the castles of Cawood,
, Great Sandall, Sheffield, and Tickhill. All
ove, of several of which very trifling remains
were in the West Riding. The principal build-
character in the North Riding were the castles
ey, Malton, Mulgrave, Pickering, Richmond,
h, Sheriff-Hutton, and Skelton; while the most
castle in the East Riding was that of Wressle,
seat of the Percys. There are also a few an-
ions in the county which remain tenantable,
ich are Temple Newsome, near Leeds, and
tle, near Helmsley; while the remains of many
been converted into farm-houses. The number
mansions in the county, especially in the West
also considerable.

nty of York contained, according to Burton's
on Eboracense, or Ecclesiastical History of
about 106 religious houses, of which 14 were
priories, 7 alien priories, 13 cells, and 28 houses
f various orders. There were also three pre-
nd three commanderies in the county. Of the
esiastical establishments many ruins yet exist,
hich are exceedingly beautiful. The principal
beys are those of St. Mary's, at York; of Foun-
stall, Roche, and Selby, in the West Riding;
and, Rievaulx, and Whitby, in the North Riding.
priories are Bolton and Knaresborough, in the
ng; Guisborough, Mountgrace, and Wikeham,
orth Riding; and Bridlington, Kirkham, and
n the East Riding. Many of the churches also
riking specimens of ecclesiastical architecture,
of them contain curiously sculptured antient
ere are in the county remains of many remark-
nt chapels and other small ecclesiastical struc-
e very singular little chapel, excavated in an
rock near Knaresborough, presents a curious
of the romantic asceticism of its reputed founder,
posed to have lived about the time of Richard I.;
only called St. Robert's Chapel.

's *History, Directory, and Gazetteer of the*
York; Langdale's *Topographical Dictionary*
ire; Physical and Political Geography of Great
n the 'Library of Useful Knowledge;' Lewis's
Topographical Dictionary of England; Parliamentary Gazetteer of England and Wales; Tuke's *Agricultural Survey of the North Riding of Yorkshire*; *Maps* of the Society for the Diffusion of Useful Knowledge; Greenough's *Geological Map of England and Wales*; Priestley's *Historical Account of Navigable Rivers, Canals, and Railways*; M'Culloch's *Statistical Account of the British Empire*; *Parliamentary Papers*, &c. &c. An extensive list of works on the history and topography of Yorkshire, including several which have been consulted for this article, is given at the end of the sixteenth volume of the *Beauties of England and Wales*.)

C., No. 1768.

STATISTICS.

Population and Occupations.—In giving the statistics of this great county, whose area (5836 square miles*) is rather more than one-ninth (·1158 parts) of the whole area of England, and whose population (1,591,480) is between one-ninth and one-tenth (·106 parts) of the total population of England, it is fortunate that its three divisions have been generally treated distinctly, for otherwise nothing could be more unsatisfactory than to present a mass of facts, which could scarcely be called such when applied separately to any of the Ridings. The rank of each Riding, taking it as a separate county, and comparing it with other counties, and the proportion of its different classes, are shown in the following table:—

	W. Riding.			E. Riding.			N. Riding.		
	1811.	1821.	1831.	1811.	1821.	1831.	1811.	1821.	1831.
Agricultural Rank..	39	39	38	26	26	23	20	20	16
Ranked as non-agricultural	4	4	5	17	17	20	23	23	27
Proportion per cent. of agricultural classes	23	19	18	40	38	35	46	43	44
Do. of trading and manufacturing classes	64	67	69	35	41	29	30	30	29
Do. other classes....	12	13	12	24	20	35	23	26	28

The number of males aged 20 years and upwards employed in agriculture, in manufactures, in handicraft, &c., was as follows in 1831:—

	W. Riding.	E. Riding.	N. Riding.	City and Ainsty.
Occupiers of land employing labourers .	7,096	3,331	4,950	340
Occupiers of land not employing labourers	10,636	1,661	4,834	253
Labourers employed in agriculture . . .	24,509	12,727	14,[illegible]46	1184
Employed in manufactures	74,662	175	1,005	211
Employed in retail trade or handicrafts .	60,109	12,917	12,749	4069
Capitalists, bankers, the professions, &c. .	8,354	2,398	1,870	589
Labourers not agricultural	33,685	4,663	4,391	1212
Other males 20 years of age	10,366	2,627	2,836	650
Male servants	3,274	939	844	298
Female servants	22,167	8,235	9,261	2161

The return of occupations under the census of 1841 is not yet published, and we therefore give the following details from the Population Tables for 1831:—

The *West Riding.*—In the three wapentakes of Agbrigg, Morley, and Skyrack respectively, are found 17,000, 22,000, and 29,000 men employed in the manufacture of woollen cloth. The places most eminent in woollen fabrics and worsteds are—the parish of Halifax, containing nearly 12,000 men so employed; Leeds, 9400 in the town and liberty; Bradford, 7900; Almondbury parish, 4500, and (adjacent to it) Huddersfield (worsteds and silks), 3700; Kirk-Burton, 2400; Calverley, 2100; Dewsbury parish, 1800; Birstal, 1700; Batley, 1400; Kirk-Heaton, 1200; and Saddleworth, about 1300, besides the same number employed in cotton factories. In the manufacture of thread and linen goods, Leeds employs upwards of 500 men; Barnsley, 1300; the wapentake of Claro, about 1000 men, many of whom are at Knaresborough. In the wapentake of Staincliffe and Ewcross, about 2300 men are employed in linen and cotton fabrics; in Staincross wapentake, about 1000 in woollen and linen promiscuously; in Ripon liberty are about 100 linen weavers. The manufacture of iron and hardware is mostly confined to the wapentake of Strafforth and Tickhill, Rotherham being mostly occupied in the foundry and heavy goods, and Sheffield in edge-tools, to which it now adds silver-plated furniture for the table, and a variety of articles in such profusion, that the entire parish of Sheffield, or Hallamshire, contains as many men so employed as Birmingham itself, nor is the catalogue of articles very dissimilar. In the other townships workmen are distinguished as brass-founders, button-makers, die-sinkers, makers of edge-tools, and grindery in large proportion, makers of files, fire-irons, fenders, forks, table-knives, haft-pressers, knife-blades, moulders, razor-smiths, razor-case makers, ring-makers, saw-smiths, scale-cutters, makers of scissors and screws, scythe-grinders, sheer-steel and sheer-makers, silver-smiths, silver-platers, spade-makers, spring-knife grinders, steel-casters, steel-forgers, steel-burners, rollers and drawers of steel, stove-grate makers, tilters, turners in wood and ivory, type-founders, and white-metal smiths, in all 11,600; and at Bradfield and Ecclesfield are about 1000 men employed in similar occupations. Carpets are made at Dewsbury; glass and earthenware at Witchwood and other places; and about 200 nailors find employment at Darton and its vicinity.

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* The area of the county in square miles does not exactly agree with the area in statute acres given in the following tables. According to the Population Returns, the number of square miles in the West Riding is 2576; East, 1119; North, 2055; City, &c. 86.

The *East Riding* would be entirely agricultural, if the town of Kingston-upon-Hull (with its suburb Sculcoates) did not contain the manufactures indispensable at an active sea-port, about 100 men being there employed in making ropes, sail-cloth, and sacking, and in preparing colours. Boilers for steam-engines are also made at Hull, but this manufactory is on a very limited scale.

The *City of York* contains nearly 200 men employed in linen manufacture, and eighteen comb-makers; the brush-makers are entered above as handicrafts.

The *North Riding* may be deemed entirely agricultural, the manufacturers inserted in the list being weavers of linen yarn, which seems to be entirely the product of domestic industry. These weavers are much scattered: 123 at Hutton, 73 at Appleton-upon-Wiske, 62 at Osmotherley, 48 at Northallerton, 27 at Thornaby, 25 at Barrowby, 22 at Sowerby, 21 at Burton-upon-Yare, and 20 at Broughton. At Startforth is a very limited manufacture of carpeting; at Whitby and Whitby-Strand about 90 men are employed in making sail-cloth and sack-cloth, and 17 in the delicate manufacture of jet ornaments.

If the registered baptisms, marriages, and deaths bore the same proportion to the actual population as in 1801, the population of Yorkshire, in the under-mentioned years, would have been as follows:—

	W. Riding.	E. Riding.	N. Riding.	City & Ainsty.
1570	172,934	58,086	110,799	11,664
1600	211,835	60 018	119,095	14,480
1630	241,699	60,018	113,339	17,161
1670	259,010	63,287	121,052	17,552
1700	242,129	55,315	120,282	17,717
1750	325,716	61,417	115,548	17,703

The population actually enumerated at the following decennial periods was as under:—

		W. Riding.	E. Riding.	N. Riding.	City & Ainsty.
	1801	565,282	110,992	158,225	24,393
	1811	655,042	134,437	169,391	27,304
	1821	801,274	154,010	187,452	30,451
	1831	976,350	168,891	190,756	35,362
	1841	1,154,101	194,936	204,122	38,321
Increase per cent. in each decade.	1801–11	16	16	7	12
	1811–21	22	14	11	12
	1821–31	22	10	2	17
	1831–41	18·2	15·4	7	8·3

The following table distinguishes the number of each se

	W. Riding. Males.	W. Riding. Females.	E. Riding. Males.	E. Riding. Females.	N. Riding. Males.	N. Riding. Females.	City & Ainsty. Males.	City & Ainsty. Females.
1801	276,647	288,635	55,334	45,658	76,246	81,979	[illegible]	[illegible]
1811	322,816	332,534	65,636	68,339	82,733	86,658	[illegible]	[illegible]
1821	398,506	402,768	75,435	78,419	92,200	95,252	[illegible]	[illegible]
1831	485,812	490,538	82,142	86,749	93,203	97,553	[illegible]	[illegible]
1841	574,120	579,981	96,018	98,918	100,482	103,640	[illegible]	[illegible]

From 1801 to 1841 the population of the West Rid increased 588,819, or 104 per cent.; the East Rid 83,944, or 75 per cent.; the North Riding, 46,897, or per cent.; and the City and Ainsty, 13,928, or 54 per ce The total increase of the whole county was 733,588, or per cent. In the three years ending June, 1841, the p portion of marriages to the population was as under:—

	Marriages.	Births.	Deaths.
West Riding . .	1 in 122	1 in 27	[illegible]
East Riding . . .	1 in 107	1 in 35	[illegible]
North Riding . .	1 in 136	1 in 34	[illegible]
England . . .	1 in 127	1 in 31	[illegible]

In the same three years, the proportion per ce of persons married under 21 years of age was: West Riding—women, 20·57; men, 7·43: East Riding—women, [illegible]; men, 3·03: North Riding—women, 11·31; men, [illegible] The Census Returns of 1841 give the birth-place of th population: the following is an abstract:—

	Born in the County.	In other Counties.	In Scotland.	In Ire
West Riding	1,065,453	63,764	3688	[illegible]
East Riding	174,246	15,220	1129	[illegible]
North Riding	188,484	12,718	868	[illegible]
City & Ainsty	34,783	2,451	275	[illegible]
	Proportion per Thousand.			
West Riding	923	55	3	[illegible]
East Riding	893	78	6	[illegible]
North Riding	923	62	4	[illegible]
City and Ainsty	907	64	7	[illegible]

The number of foreigners and British subjects bo abroad was, 1137 in the West Riding, or 1 per 1000; in the East Riding, 431, or 2 per 1000; in the North Riding 14 altogether; and in the Ainsty, &c., 60. The proportion per 1000 of persons whose ages were not specified was 4 in the West, 10 in the East, and 5 in the North Riding and [illegible] Ainsty. The immigration into the West Riding is apparently less than in other counties where manufactures are predominant; but if the East and North Ridings had been distinct counties of themselves, with a different name, the real extent of immigration into the West Riding would then be shown.

The number of persons to a square mile in 1841 was 448 in the West, 174 in the East, and 99 in the North Riding, and about 445 in the City and Ainsty. In the Population Returns for 1841 the number of parishes is stated to be 196 in the West, 187 in the East, and 192 in the North Riding, and 48 in the City and Ainsty; and the population is separately given for 768 separate places in the West, 409 in the East, and 603 in the North Riding, and for 75 places in the City and Ainsty. The population, &c. of each hundred and borough, in 1841, for each division of the county, is shown in the following tables:—

West Riding.

WAPENTAKE, &c.	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BO	
	English Statute Acres.	Inhabited.	Uninhabited.	Building.	Males.	Females.	Total of Persons.	Under 20 Years. Males.	Under 20 Years. Females.	20 Years and upwards. Males.	20 Years and upwards. Females.	In this County.	[illegible]
Agbrigg . (Wapentake)	154,080	41,970	3,174	362	110,835	109,385	220,220	56,026	55,278	54,809	54,107	[illegible]	[illegible]
Barkstone-Ash ,,	84,640	5,517	303	39	13,434	13,572	27,006	6,157	6,157	7,277	7,415	[illegible]	[illegible]
Claro . . ,,	212,650	8,732	819	34	21,508	21,424	42,932	9,905	9,598	11,603	11,826	41,019	[illegible]
Morley . ,,	135 500	56,285	5,233	811	144,696	147,856	292,552	74,138	74,818	70,558	73,038	276,221	[illegible]
Osgoldcross . ,,	107,740	7,486	471	82	18,152	18,776	36,928	8,696	8,799	9,456	9,977	[illegible]	[illegible]
Skyrack . ,,	92,290	9,724	572	70	25,369	25,107	50,476	12,550	12,305	12,819	12,802	48,751	[illegible]
Staincliff and Ewcross ,,	428,860	14,001	1,191	55	36,818	36,145	72,963	17,961	17,522	18,857	18,623	[illegible]	[illegible]
Staincross . ,,	83,010	8,703	304	74	23,714	21,988	45,702	11,540	11,160	12,174	10,828	[illegible]	[illegible]
Strafforth & Tickhill ,,	254,840	38,122	4,072	388	94,112	94,426	188,538	44,798	44,383	49,314	50,043	[illegible]	[illegible]
Ripon . (Liberty)	35,440	2,623	217	4	6,056	6,475	12,531	2,869	2,956	3,187	3,519	[illegible]	[illegible]
Doncaster . (Borough)	1,610	2,240	252	6	4,781	5,674	10,455	2,153	2,328	2,628	3,346	[illegible]	[illegible]
Doncaster . . (Soke)	10,730	328	14	2	880	864	1,744	419	385	461	479	[illegible]	[illegible]
Leeds . (Borough)	21,450	31,626	2,276	366	73,765	78,289	152,054	35,745	36,490	38,020	41,799	[illegible]	[illegible]
Totals . .	1,622,840	227,357	18,898	2,293	574,120	579,981	1,154,101	282,957	282,179	291,163	297,802	[illegible]	[illegible]

East Riding.

'APENTAKE, &c.	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
	English Statute Acres.	In-habited.	Un-inhabited.	Building.	Males.	Females.	Total of Persons.	Under 20 Years.		20 Years and upwards.		In this County.	Else-where.
								Males.	Females	Males.	Females		
se . (Wapentake)	106,140	2,436	57	14	6,818	6,268	13,086	3,199	3,027	3,619	3,241	12,845	241
ng . „	109,980	4,079	165	29	10,319	10,121	20,440	4,656	4,551	5,663	5,570	19,602	838
l Wapentake:													
ton-Beacon (Division)	56,900	1,868	63	19	4,890	4,633	9,523	2,226	2,147	2,664	2,486	9,247	276
e-Beacon „	61,330	1,839	114	5	4,676	4,442	9,118	2,125	2,065	2,551	2,377	8,798	320
dley-Reacon „	64,740	5,774	249	77	13,503	14,936	28,439	6,061	6,253	7,442	8,683	25,042	3,397
on-Beacon „	46,600	1,525	83	10	3,901	3,648	7,549	1,755	1,677	2,146	1,971	7,263	286
ness Wapentake:													
dle . „	54,300	3,570	168	94	8,485	8,865	17,350	3,956	3,942	4,529	4,923	14,710	2,640
h . „	56,870	1,788	57	4	4,657	4,429	9,086	2,013	1,963	2,644	2,466	8,797	289
h . „	49,300	1,434	54	9	3,708	3,622	7,330	1,725	1,743	1,983	1,879	7,007	323
nshire (Wapentake)	31,730	1,920	85	3	4,582	4,767	9,349	2,088	2,187	2,494	2,580	8,776	573
nd Derwent „	52,710	1,929	86	14	5,084	4,738	9,822	2,229	2,095	2,855	2,643	9,111	711
y Borough and Liberties .	9,180	1,947	148	13	4,084	4,587	8,671	1,768	1,886	2,316	2,701	7,950	721
n-upon- Town	960	7,816	320	135	19,595	22,034	41,629	8,506	8,978	11,089	13,056	31,871	9,758
County of the Town . .	10,640	719	18	4	1,716	1,828	3,544	772	764	914	1,064	3,227	317
Totals . .	711,350	38,644	1,697	430	96,018	98,918	194,936	43,079	43,278	52,939	55,640	174,246	20,690

North Riding.

WAPENTAKE, &c.	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
	English Statute Acres.	In-habited.	Un-inhabited.	Building.	Males.	Females.	Total of Persons.	Under 20 years.		20 Years and upwards.		In this County.	Else-where.
								Males.	Females	Males.	Females		
nshire (Wapentake)	51,500	2,063	154	10	5,045	4,980	10,025	2,277	2,256	2,768	2,724	9,244	781
th . . „	97,010	2,962	101	12	7,274	7,110	14,384	3,342	3,164	3,932	3,946	13,761	623
r . . „	115,670	4,271	154	32	10,949	10,876	21,825	4,929	4,862	6,020	6,014	20,947	878
, East . „	49,910	1,645	90	8	3,773	3,974	7,747	1,807	1,813	1,966	2,161	6,792	955
, West . „	198,640	3,548	254	16	8,329	8,479	16,808	3,981	3,932	4,348	4,547	14,604	2,204
ld . . „	33,850	1,427	88	10	3,389	3,333	6,722	1,580	1,490	1,809	1,843	6,517	205
East . „	63,780	2,288	122	19	5,428	5,516	10,944	2,589	2,414	2,839	3,102	10,350	594
West . „	164,610	3,065	222	6	7,195	7,284	14,479	3,377	3,243	3,818	4,041	13,784	695
urgh, East sion . (Liberty)	116,330	3,576	282	17	8,064	8,486	16,550	3,686	3,675	4,378	4,811	15,610	940
urgh, West sion . (Liberty)	79,240	4,000	396	52	10,220	9,842	20,062	4,499	4,251	5,721	5,591	15,655	4,407
ing-Lythe (Wapentake)	142,570	3,384	166	43	8,604	8,292	16,896	3,965	3,757	4,639	4,535	16,373	523
le . . „	121,970	3,927	179	27	9,920	9,809	19,729	4,485	4,401	5,435	5,408	19,116	613
y-Strand . (Liberty)	43,320	3,251	305	17	6,059	7,840	13,899	2,920	3,302	3,139	4,538	13,098	801
ond . (Borough)	2,310	817	34	2	1,874	2,118	3,992	896	862	978	1,256	3,450	542
rough . „	2,160	2,161	105	19	4,359	5,701	10,060	1,989	2,150	2,370	3,551	9,183	877
Totals . .	1,282,870	42,385	2,652	290	100,482	103,640	204,122	46,322	45,572	54,160	58,068	188,484	15,638

City, and Ainsty of the City of York.

Y AND NSTY.	AREA.	HOUSES.			PERSONS.			AGES.				PERSONS BORN	
	English Statute Acres.	In-habited.	Un-inhabited.	Building.	Males.	Females.	Total of Persons.	Under 20 Years.		20 years and upwards.		In this County.	Else-where.
								Males.	Females.	Males.	Females.		
(City) . .	2,720	5,768	190	54	13,399	15,443	28,842	5,642	6,253	7,757	9,190	25,724	3,118
Ainsty of the City	49,720	1,942	85	12	4,774	4,705	9,479	2,150	2,024	2,624	2,681	9,059	420
otals . .	52,440	7,710	275	66	18,173	20,148	38,321	7,792	8,277	10,381	11,871	34,783	3,538
D TOTALS	3,669,510	316,096	23,522	3,079	788,793	802,687	1,591,480	380,150	379,306	408,643	423,381	1,462,966	128,514

e number of inhabited houses, &c. in 1831 was as
s :—

	W. Riding.	E. Riding.	N. Riding.	Ainsty. &c.
abited houses .	190,480	32,681	38,116	6404
nilies . . .	198,646	36,960	40,760	7704
uses building .	1,676	268	117	74
uses uninhabited	12,147	1,970	2,026	453

ween 1831 and 1841 the number of inhabited
s in the whole county increased from 19·5 to 19·8 per
habitants; and the number of persons to each house
ged 5·0 instead of 5·1. The total increase of houses
8 per cent.

County Expenses, Crime, &c.—Sums expended for the relief of the poor:—1748-49-50 (annual average), West Riding, 20,218*l.*; East, 4110*l.*; North, 5581*l.*: in 1776, West Riding, 50,688*l.*; East, 11,036*l.*; North, 12,702*l.*; in 1783-4-5 (average), West Riding, 66,695*l.*; East, 15,499*l.*; North, 18,866*l.* The sums expended in the following years and the rate per head are given in the subjoined tables:—

	W. Riding.	E. Riding.	N. Riding.
1801	£186,469	£41,388	£48,702
1811	328,113	83,752	70,860
1821	273,301	97,522	82,638
1831	274,586	100,976	83,931
1841	245,676	68,182	58,308

Rate per head :—

	W. Riding.	E. Riding.	N. Riding.
1801	6*s*. 7*d*.	7*s*. 5*d*.	6*s*. 1*d*.
1811	10 0	10 4	8 4
1821	6 9	10 6	8 9
1831	5 7	9 10	8 9
1841	4 7	6 3	6 0

In each of the following years ending 25th March, the expenditure for the relief of the poor was as under :—

	W. Riding.	E. Riding.	N. Riding
1834	£251,821	£95,111	£75,810
1835	226,425	81,265	68,861
1836	197,386	70,446	61,639
1837	179,610	66,339	56,013
1838	200,519	64,624	53,337
1839	203,912	67,539	53,642
1840	217,217	67,093	59,352
1841	245,676	68,182	58,308
1842	264,654	72,037	61,051

The total difference in the sum expended in 1834 and 1842 was 7135*l*. in the West Riding, 29,313*l*. in the East, and 22,748*l*. in the North Riding. From 1838 to 1842, there was a gradual increase in the expenditure for relief in the West Riding, the difference between 1837 and 1842 amounting to an increase of 85,044*l*.; but there was a saving in law charges of 6576*l*. on a comparison of 1842 with 1834. The fluctuation in the expenditure for relief in the other two Ridings, in the years ending Lady-day, 1834, 1837, and 1842, is shown in the table. The number of Poor-Law Unions is 18 in the West (population, in 1841, 790,751), 9 in the East (population 180,218), and 14 in the North Riding (population, 180,257); consequently there remain many parishes under local Acts, including Leeds, Hull, Ripon, and several rural districts. The population, &c. of each Union, and the expenditure for relief and maintenance, for the year ending 25th March, 1842, are shown in the following table :—

Name of Union.	Population in 1841.	No. of Parishes.	Area in Acres.	Expended in Relief of the Poor.
WEST RIDING.				
Bradford	132,164	20	36,486	£19,241
Dewsbury	60,713	11	24,165	11,367
Doncaster	32,400	54	107,340	8,847
Ecclesall Bierlow	31,645	7	26,850	8,367
Goole	12,535	18	36,874	3,239
Halifax	109,175	20	51,624	17,323
Huddersfield	107,140	34	68,640	16,927
Keighly	36,175	6	35,534	7,470
Pateley Bridge	7,999	11	73,569	2,993
Rotherham	28,783	27	50,220	7,248
Sedbergh	4,836	3	50,690	1,971
Selby	15,100	24	47,490	6,131
Settle	14,096	31	149,050	6,281
Sheffield	85,076	4	10,958	20,721
Skipton	28,736	47	125,829	9,775
Thorne	15,316	13	71,254	4,347
Wakefield	45,648	17	37,773	11,566
Wortley	23,214	12	73,640	5,057
EAST RIDING.				
Beverley	18,957	36	77,800	5,563
Bridlington	13,059	32	63,410	4,239
Driffield	16,829	43	104,820	5,421
Howden	14,265	40	67,121	4,797
Patrington	8,677	27	58,281	3,511
Pocklington	15,432	47	107,341	5,046
Sculcoates	36,207	18	36,115	9,663
Skirlaugh	9,013	42	63,010	4,175
York	47,779	79	65,998	10,597
NORTH RIDING.				
Bedale	8,596	23	41,640	3,097
Easingwould	11,323	29	60,710	2,932
Guisborough	10,543	27	80,090	3,490
Helmsley	12,010	48	119,881	3,027
Leyburn	9,957	41	92,570	3,534
Malton	21,949	68	113,329	7,233
Northallerton	12,575	40	60,736	4,040
Pickering	10,251	28	85,530	3,256
Reeth	6,758	7	71,940	2,799
Richmond	18,475	41	72,265	4,038
Scarborough	21,305	33	74,686	5,275
Stokesley	9,046	28	59,273	3,430
Thirsk	12,639	42	65,396	3,610
Whitby	20,100	22	72,471	4,794

The number of persons relieved in the county during the quarters ending Lady-day, 1841 and 1842, was as follows :—

	W. Riding.		E. Riding.		N. Riding.	
	1841.	1842.	1841.	1842.	1841.	1842.
In-door	4,000	4,685	1,260	1,465	1,075	2,054
Out-door	50,216	61,459	11,946	12,619	11,617	12,273
Total	54,216	66,144	13,206	14,084	12,692	14,327
Of whom were adult able-bodied poor	16,865	21,873	3,311	3,824	2,643	4,100
Expense of in-maintenance and out-door relief	£142,316	£157,641	£43,908	£45,350	£42,386	£44,028

The proportion in 1841 of the total number of to the total population was 8 per cent. in each which is 1 per cent. less than the average for In the West Riding there were 664 lunatics an chargeable on the poor-rate in August, 1842; in Riding 173; and in the North Riding 144. In there were 3879 bastard children in the West chargeable on the poor-rate; in the East Riding, the North Riding, 1506; being respectively 1 in 130; and 1 in 127 of the total population: in Eng proportion was 1 in 215. The number of ille births in 1830, in the West Riding, was 1534, or 1 the total number of births in that year; in the Eas 292, or 1 in 17; and in the North Riding 430, 14: the proportion for England being 1 in 20. Th ber affiliated in 1834-5, in the West Riding, was the East Riding, 233; and in the North Riding, 1835-6 there were 405 affiliated in the West, 200 East, and 184 in the North Riding. In 1839-40 number of illegitimate children registered in the Riding was 3382, or 3·4 to 1000 inhabitants: in and Herefordshire (which with Lancashire were th other counties that made a return) the proportion w 1000.

	W. Riding.	E. Riding.
Annual value of real property assessed to the property-tax in 1815	£2,392,406	£1,190,326

	Yorkshire.
Property assessed to occupiers	£3,555,281
Profits of trades, professions, &c.	£1,717,155

In 1825-6 the centesimal proportion of the vario scriptions of property assessed to the county rate wa

	W. Riding.	E. Riding.
Land	62·7	65·2
Houses	27·2	29·5
Mills, factories, &c.	8·1	2·1
Manorial profits, &c.	2·0	3·2

The net rental or annual value of real property ass to the poor-rate, the amount levied for poor-rates, were as follows in 1841 :—

	W. Riding.	E. Riding.
Landed property	£1,449,007	£760,942
Dwelling-houses	1,414,800	271,258
All other kinds of property	460,995	79,607
Total	£3,234,802	£1,111,807
Levied for poor-rates in 1841	£320,211	£83,018
Rate in the pound on the annual value of real property assessed	1*s*. 11*d*.	1*s*. 6*d*.
Total annual value of real property for each inhabitant	£2 17 7	£4 15 10
Annual value per acre	0 17 9	0 19 11

The county-rate levied at different periods, and principal disbursements of the same, are shown in the lowing table; though not much reliance can be placed some of the items in the earlier years :—

	1797.	1801.	1811.	1821.	1831.
Income :—					
West Riding	£8,353	£23,076	£27,037	£49,627	[illegible]
East Riding	1,858	5,371	8,340	9,115	6,074
North Riding	4,545	8,079	9,572	10,053	11,009
Expenditure :—					
Bridges—					
West Riding	6,758	8,316	9,772	6,101	[illegible]
East Riding	127	363	294	101	[illegible]
North Riding	2,831	3,586	4,872	2,331	1,618
Gaols—					
West Riding	793	3,118	2,200	14,000	12,454
East Riding	134	100	11,631	1,991	4,801
North Riding	542	532	909	1,300	6,823
Prisoners—					
West Riding	800	3,120	2,319	3,327	13,775
East Riding	109	174	594	1,355	2,060
North Riding	542	532	917	1,432	1,750
Prosecutions—					
West Riding	1,282	2,762	2,297	8,476	11,190
East Riding	69	191	174	790	[illegible]
North Riding	244	409	535	1,150	1,288
Constables and Vagrants—					
West Riding	743	1,566	1,085	5,335	[illegible]
East Riding	46	153	196	441	[illegible]
North Riding	150	261	799	1,338	[illegible]

e three Ridings contribute to the expense of improving Castle and to all assize expenditure in the following ortions for every 20*s*., namely,—West Riding, 12*s*.; Riding, 3*s*. 6*d*.; and North Riding, 4*s*. 6*d*.

e particulars of the county expenditure in 1834 are llows:—

	W. Riding.	E. Riding.	N. Riding.
ges, building, repairs, &c.	£6,170	£112	£5,875
s, houses of correction, and intaining prisoners	10,190	4,435	5,807
ecutions	8,030	1,203	1,231
of the peace	1,196	294	925
eyance of prisoners before al	4,748	240	363
eyance of transports	947	116	111
rants, apprehending and nveying	627	141	265
stables, high and special	2,361	583	525
oners	907	172	202
cellaneous	3,526	766	969
atic Asylum	752	143	20
rts of justice, building, re- airs, &c.	2,211	..	..
Total	41,670	8,210	16,297

he payments for or towards the county rate, in 1842, unted to 53,781*l*. for the West; 12,348*l*. for the East; 7897*l*. for the North Riding.

e length of streets and highways, and the expenditure on, were as under in 1839:—

	W. Riding. Miles.	E. Riding. Miles.	N. Riding. Miles.
ts and roads repaired un- local acts	102	38	26
pike roads	1,237	255	475
ther highways	4,228	1,657	2,493
	5,568	1,950	2,995
unt of rates levied	£128,470	£50,951	£29,739
nded in repairs of high- ys	127,476	30,721	30,019
and other expenses	1,749	81	105
Total expenditure	£129,225	£30,803	£30,125

e number of turnpike trusts in the whole county, in was 120; the income from tolls, 171,522*l*.; parish ositions in lieu of statute duty, 3651*l*.; and total ne, 201,438*l*. including 20,238*l*., borrowed on security e tolls. The total expenditure for the same year was 07*l*., including a debt of 11,424*l*. paid off, and 23,339*l*. mprovements. The bond and mortgage debts nted to 995,323*l*.; the sum of 163,543*l*. remained as d interest, making, with floating debts and balance treasurer, a total debt of 1,225,646*l*. In 1836 the debt qual to 5·9 years' income; for the whole of England roportion of income to debt being 4·5 years: the pro- on of unpaid interest to the total debt was 11 per ; in England 12 per cent.

e following is an analysis of the church-rate returns:—

	W. Riding. £.	E. Riding. £.	N. Riding. £.	City & Ainsty. £.
ch-rates	8,109	4,284	4,784	1,289
licable to the same ject, but derived om 'other sources'	2,206	2,170	616	731
pended for the pur- poses of the establish- nent	10,696	6,953	5,040	2,001
which for repairs of churches	4,020	3,839	1,992	1,187
bt secured on hurch-rate	1,985	1,197	456	2,255

rime.—Number of persons charged with criminal nces in periods ending 1819, 1826, 1833, and 1841.

	1813-19.	1820-26.	1827-33.	1834-41.
otal	3743	5663	9131	11,987
nnual average	534	809	1304	1,473

he numbers committed, convicted, and acquitted, in year from 1834 to 1842, were as under:—

	1834.	1835.	1836.	1837.	1838.	1839.	1840.	1841.	1842.
nitted	1434	1218	1252	1376	1324	1621	1867	1895	2598
tted	403	316	383	369	339	423	493	471	704
cted	1031	902	869	1007	985	1198	1374	1424	1894

In 1841 the proportion of persons committed, to the total population of the county, was 1 in 844; in England and Wales, 1 in 508. The commitments for 1842 are excluded from the average given above, as the numbers were swelled to the amount of 192 by the outbreak which occurred in the manufacturing districts; but even with this deduction the number of offenders in 1842 was nearly twice as great as in 1836. The increase of crime was consecutive in the four years from 1839 to 1842 inclusive, though the proportion is still below that of many counties. The commitments for each Riding cannot be given separately.

Of 2598 offenders (2218 males and 380 females) tried at the assizes and sessions in 1842, there were 155 charged with offences against the person; 273 with offences against property committed with violence; 1836 (including 1318 cases of simple larceny) with offences against property committed without violence; 8 with malicious offences against property; 56 were charged with forgery and uttering base coin, and 270 with various misdemeanours, including 192 for riot, sedition, &c. Of 1894 persons convicted, 2 were executed for murder; and of 9 others, against whom sentence of death was recorded, 1 was transported for a long term, and 8 for life; and 2 others were also sentenced to transportation for life; 1 for above 15 years; 75 for above ten and not exceeding fifteen years; 100 for above seven and not exceeding ten years; and 118 for terms of seven years; making 305 transported. None were sentenced to imprisonment for periods exceeding two years; 35 were imprisoned for a period not exceeding two years; 184 for above six months and not exceeding one year; and 1289 for six months and under; and 78 were whipped; 1 was reprieved. Of the 704 persons acquitted, 564 were found not guilty on trial; in the case of 111 no bill was found; and in 29 instances there was no prosecution. Of the total number of persons committed, 119 were under 15; 485 were between the ages of 15 and 20; 1162 were between 20 and 30; and 464 between 30 and 40 years of age. The degree of instruction was ascertained in all but 3 cases: 635 males and 141 females could neither read nor write; 1450 males and 228 females could read and write imperfectly; 95 males and 8 females could read and write well; and 7 males had received a superior education. The proportion of uninstructed criminals in the county, on an average of several years, was 93·8 per cent.; in England and Wales, 89·3 per cent.

Savings' Banks.—There are thirty-four of these institutions in the county: the proportion of depositors to the total population is 1 in 26; and there is 1 depositor under 20*l*. to 48 persons; the proportion in both cases being rather low. The average amount invested by all classes of depositors was 31*l*. in 1842: in England, 29*l*. The number of depositors and amount of deposits in each of the following years were as under:—

	1836.	1837.	1838.	1839.	1840.	1841.
No. of depositors	47,213	48,918	52,942	54,616	57,273	61,035
Am. of deposits	£1,546,664	£1,595,185	£1,700,852	£1,732,151	£1,790,317	£1,875,741

The distribution of the sums invested in 1830, 1834, and 1840 is shown in the following table:—

		1830.		1834.		1840.	
	£	Depositors.	Deposits. £	Depositors.	Deposits. £	Depositors.	Deposits. £
Not exceeding	20	14,170	114,278	18,436	145,437	29,895	222,875
"	50	9,270	285,978	11,939	364,449	16,347	501,069
"	100	4,208	283,972	5,015	344,834	6,974	480,515
"	150	1,504	178,153	1,718	205,177	2,400	286,460
"	200	668	112,324	904	151,364	1,336	227,302
Above	200	331	75,615	281	65,724	321	72,096
		30,161	1,055,005	38,293	1,276,985	57,273	1,790,317

The deposits of 747 Friendly Societies, not reckoned above, amounted, in 1842, to 100,116*l*.; and 31,254*l*. were invested by 604 charitable institutions.

Elective Franchise.—The actual number of county voters registered, in 1835, in the West Riding was 29,456; in the East Riding, 7965; and in the North Riding 11,767. And in 1839-40 the numbers of each class registered in the three ridings were as under:—

	W. Riding.	E. Riding.	N. Riding.
Freeholders of every class	20,839	4,192	6,577
Copyholders and customary tenants	1,491	608	539
Leaseholders for life or term of years	947	31	181
50*l*. tenants at will	6,225	2,485	4,507

	W. Riding.	E. Riding.	N. Riding.
Trustees and mortgagees .	78	14	41
Qualified by office . .	105	122	6
Joint and duplicate qualifications	..*	44	60
	30,122†	7,496	11,911

The constituency of the parliamentary boroughs in 1839-40 was as follows:—

	Voters.		Voters.
Beverley . .	1053	Northallerton . .	281
Bradford . .	1465	Pontefract . .	722
Halifax . . .	873	Scarborough . .	559
Huddersfield . .	865	Sheffield . .	4451
Hull . . .	4767	Thirsk . . .	327
Knaresborough .	240	Wakefield . .	809
Leeds . . .	6182	Whitby . . .	445
Malton . . .	558	York . . .	3326

At Beverley there were 635 freemen; at Hull, 1668; Malton, 10; Scarborough, 6; and York, 2497.

Education.—Summary of Returns made to Parliament in 1833:—Sunday-schools returned from places where no other school existed: in the West Riding 34, scholars 2145; East Riding 8, scholars 275; North Riding 6, scholars 161; in the City and Ainsty all children attending Sunday-schools had the opportunity of attending other schools also. Sunday-schools, which were also daily schools: in the West Riding 77, scholars 5392; East Riding 35, scholars 2724; North Riding 34, scholars 2223; City and Ainsty 11, scholars 814: in the case of these schools duplicate entry was known to have taken place. Boarding-schools in the West Riding 91; East Riding 18; North Riding 18; City and Ainsty 6: the scholars are included in the table below. Lending libraries were attached to 255 schools in the West Riding; 41 in the East Riding; 31 in the North Riding; and 13 in the City and Ainsty. The total number of children returned as attending both Sunday and daily schools was as follows; but except in the cases above mentioned the extent of duplicate entries cannot be ascertained:—

	W. Riding.	E. Riding.	N. Riding.	City&Ainsty.
Sunday scholars	140,491	15,251	17,373	4,029
Daily scholars .	73,932	20,406	22,825	4,324
	214,423	35,657	40,198	8,353
Number of children aged between 5 and 15, in 1841 . .	277,665	42,127	45,633	7,732

Maintenance of Schools.

	W. Riding.		E. Riding.		N. Riding.		Ainsty, &c.	
	Schls.	Scholrs.	Schls.	Scholrs.	Schls.	Scholrs.	Schls.	Scholrs.
Infant-schools	149	5,560	82	2,564	28	683	8	503
Daily-schools	1,853	68,372	592	17,842	755	22.137	114	3,821
Total .	2,002	73,932	674	20,406	783	22,825	122	4,324
Sunday-schools	10,054	140,491	220	15,251	286	17,373	38	4,029
Infant and daily schools maintained by—								
Endowment .	280	8,509	60	1,691	136	3,390	26	680
Subscriptions	67	4,710	33	2,133	31	1,191	4	185
Payments from scholars .	1,568	50,566	524	11,841	549	13,899	82	2,054
Subscriptions and payments from scholars	87	10,147	57	4,811	67	4,345	11	1,405
Schools established by Dissenters:—								
Infant-schools	3	333	..	..	2	29	1	185
Daily-schools	33	1,837	7	257	10	358	6	370
Sunday-schools	490	79,323	66	6,174	69	5,287	9	1,954
Schools established between 1818 and 1833:—								
Infant and daily schools . .	992	36,663	269	8,225	232	6,495	24	2,154
Sunday-schools	733	97,640	154	9,539	236	1.502	30	3,404

The recent Statistics of Education in York and Hull are given in the 'Journal of the London Statistical Society:' the inquiry at both these places was undertaken by the Manchester Statistical Society. In 1843 Mr. Edward Baines, junr., of Leeds, undertook an elaborate inquiry into the state of education in the manufacturing districts of the West Riding, the results of which he published in a short pamphlet. Mr. Baines's inquiry extended to parishes and townships comprising a population of 844,563, according to the census of 1841. The proportion of Sunday scholars was found to be 1 in 5¾ of the total population, and 55 per cent. of the scholars were capable of reading the Scriptures. The number of scholars in daily-schools is believed to be 5 to 10 per cent. under the number given below as attending such schools. The following is an abstract of Mr. Baines's tables:—

Sunday-schools.	Church.	Dissenters.	Total.
Schools .	180	635	815
Teachers .	5,801	30,386	36,187
Total scholars	40,499	119,059	159,558
Able to read the Scriptures .	20,238	64,331	84,569

	Schools.	Scholars.
Dame and infant schools .	..	17,785
Other private schools .	..	30,365
Factory-schools . .	135	4,080
Public schools . . .	..	26,286
Total . . .	..	79,115

On an average of three years ending June, 1841, the number of persons married who signed the register with marks was 32 per cent. for men, and 64 for women in the West; in the East 19 and 41; and in the North Riding 23 and 4; the average for England and Wales being 33 for men and 49 for women. The superiority in the East and North Ridings may be attributed to the greater proportion of children (more than one-half) attending daily-schools, while in the West Riding the proportion, according to the returns of 1833, was but one-third.

YOUGHALL, or YOUGHAL, is a sea-port, borough, and market-town, and a parish in the barony of Imokilly, county of Cork, and province of Munster, in Ireland, distant 94 Irish or 119 English miles south-west by south from Dublin, and 22 Irish or 28 English miles east by north from the city of Cork, both measured in straight lines; it is in 51° 57′ N. lat. and about 7° 52′ W. long. The town stands on the western shore of the mouth of the Blackwater, which here separates the extreme eastern extremity of the county of Cork from the adjacent county of Waterford.

Youghall is a town of remote antiquity, and is supposed to derive its name, which signifies 'a wooded place,' from its situation at the base of a range of hills which was formerly covered with a dense forest. As early as the year 1209 it is supposed to have received a charter of incorporation from King John, which charter, according to Lewis, is still preserved in the archives of Lismore Castle; but, according to the Report of the Commissioners of Municipal Corporations in Ireland, no traces of such a charter could be found among the records of the corporation, though it was supposed that there was a copy of it in the British Museum. If so, it is not noticed in the catalogue of charters in that collection. In 1224, according to the account given by Archdall, in his 'Monasticon Hibernicum,' Maurice Fitzgerald commenced building a castle there, but in consequence of an act of disobedience by his eldest son subsequently changed his design, and erected an abbey or monastery for Franciscan friars in its stead. This building was completed by Thomas, the second son of the founder, and it was the earliest foundation in Ireland for the order of St. Francis. Thomas Fitzgerald, and subsequently many other noblemen of the house of Desmond, were buried here. This friary, of which Archdall says there are no traces remaining, was on the south side of the town; and on the north side was founded, in 1268 or 1271, by another member of the same family, a Dominican Friary, called the Friary of St. Mary of Thanks, of which a few fragments yet exist. The town appears at that time to have attained some importance, as the customs paid at the port, in 13 amounted to 103*l.* In 1317 Sir Roger Mortimer landed there with a party of knights, who shortly compelled Edward Bruce to retire from the neighbouring county of Ulster. In 1579 the Earl of Desmond, on being proclaimed a traitor, plundered the town and carried off the spoil to his castles in Waterford; and though the Earl of Ormond sent a body of troops to take possession of Youghall, on hearing of this attack, they were speedily compelled to evacuate the town, with great slaughter, by the forces of the seneschal of Imokilly. The mayor was subsequently hanged for refusing to receive an English garrison

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* The number of joint and duplicate qualifications was estimated at 4518, or 15 per cent. on the total number.

† To this total number was added the following qualifications;—Freehold and copyhold 297; freehold and occupiers, leasehold and occupiers, freehold and leasehold, &c. 51; qualifications where the tenure was not mentioned 99.

ng to defend the town without it. During this
ı Youghall suffered so much that the inhabitants
it, but after the retreat of the insurgents in
y returned, and a garrison of 300 foot was planted
their defence. In 1582 the seneschal of Imokilly
the town, and scaled the walls, but his forces
n repulsed by the garrison. Youghall again be-
e scene of military proceedings in the reign of
. In 1641 it was defended against the insurgents
arl of Cork, and in the following year the princi-
rgents were indicted for high treason at a session
the town. In 1644 the native Irish were driven
e town, and their property was seized; and in the
g year, notwithstanding the weakness both of the
and of the garrison, the town withstood a siege
Castlehaven. In 1649 the inhabitants embraced
e of the parliament, and Cromwell made Youghall
l-quarters for some time previous to the siege of
, after which he embarked from this town for
. In 1660 the estates and franchises of the 'inno-
pist' inhabitants, which had been taken away
romwell's ascendency, were restored by virtue of
atent under the privy seal. In 1690, soon after
ction of Waterford, Youghall surrendered to the
William III.

opulation of the town of Youghall was returned
t 9608, and that of the remainder of the parish at
king a total for the parish of St. Mary, Youghall,
inhabitants. The area of the whole parish is
en as 4596 English acres; but in the fuller and
urate returns for 1841 the area of the rural portion
rish is given as 4489 acres, and that of the town
res, making a total of 4830 acres, to which is to be
e tideway, amounting to 656 acres. The popula-
number of houses in 1841 were as follows:—

	Houses.			Population.	
	Inhabited.	Uninhab.	Total.	Families.	Persons.
.	1283	77	1360	2118	9,939
rtion	334	23	357	362	2,115
	1617	100	1717	2480	12,054

vere, at the date of this return, no houses build-
town or parish. Of the above number of inha-
xcluding those under five years old, 2130 males
females could read and write; 669 males and
es could read only; and 1940 males and 3314 fe-
ld neither read nor write.

wn of Youghall is built along the western shore
ur of the same name, which is capable of receiv-
s of 400 or 500 tons at spring-tides, and which,
the southern end of the town, has an average
f about half a mile, but expands considerably
old ferry, about the middle of the town, which
recently, the only means of communication with
site shore, and the width of which, being reduced
, narrow promontory from the opposite or Water-
e, is not more than from 400 to 500 yards. The
is safe and commodious; but though vessels
2 feet water may float off the town, the entrance
ted by a bar, on which there are only 5 feet of
ow tides, and 13 feet at high-water of neap tides.
which bounds the town on the west approaches
the shore that the town can only extend itself
l south, its breadth from east to west nowhere
, and being in most places within, about a quarter
. The length within the present parliamentary
boundary from south to north-north-west is ra-
than one mile and three-quarters, but this is not
pon. The antient limits can be traced in several
remains of the wall, but the modern town extends
hem, and they did not, even before the passing of
Boundary Act, in the 2nd and 3rd of William IV.,
imits of any jurisdiction, the liberties of Youghall
extensive with the parish. The parliamentary
established by that act, which comprised 212
s not coincide with either the antient wall or the
undary. Though irregularly built, the town con-
e good houses. The streets are pitched, but not
ghted with gas, and cleansed under the provi-
n act of the 9th of George IV. A great part of
belongs to the Duke of Devonshire, who has been
enefactor to the place. Youghall is much fre-
or sea-bathing during the summer season, having a fine, smooth, and level strand extending nearly three miles along the western shore of the bay.

Although merely a creek to Cork, the port of Youghall has a considerable trade, for the accommodation of which there are extensive and commodious quays, and a custom-house. It consists chiefly in the exportation of agricultural produce, and the importation of coal, culm, timber, Staffordshire ware, porter, and groceries. The number of vessels registered as belonging to the port in 1835 was 28, and their aggregate burthen was 2998 tons; but of these all but two were employed in the coasting trade. The duties paid at the custom-house in that year amounted to 561*l*. 15*s*. 2*d*., and the principal exports were 156,653 barrels of oats, 12,827 barrels of wheat, 16,973 barrels of barley, 13,123 sacks of flour, 832 barrels of rye, 8593 firkins and 419 kegs of butter, 641 sacks of biscuit, 2190 bales of bacon, 6429 live pigs, 866 head of cattle, 434 sheep, 40 hogsheads of lard, 613 gallons of whiskey, and a considerable quantity of dried salmon. The number of vessels that cleared outwards was 420 with cargoes and 46 in ballast; and the number that entered was 459 with cargoes of coal, culm, and timber, and 26 in ballast.

Manufactures of woollen and porcelain were formerly carried on at Youghall, but now the chief manufactures are of bricks, coarse pottery, ropes, and malt liquors. There are also establishments for the purchase and exportation of salmon in ice, which, a few years since, exported to the annual value of 2500*l*.; and near the town is a quarry of good building-stone. Youghall is a Coast-guard station, under which are some subordinate stations in the neighbourhood. It has a daily market, but the chief market is on Saturday, and there is a fair on Ascension-day. The town contains convenient market-places for meat and fish; a public library, established in 1825 by subscription, and possessing upwards of 800 volumes; two reading-rooms; a literary and scientific institution; and a savings-bank. On an eminence to the north of the town are infantry barracks for 6 officers and 180 men. The borough courts were, prior to the dissolution of the corporation, held in a handsome building, called the Mall-house, erected in 1779, where also balls and concerts are held. The borough gaol is a lofty square building, erected in 1777, and called the Dock-gate.

The living is a rectory, formerly annexed to the wardenship of the college of St. Mary, Youghall, but now forming a distinct living. The tithes amount to 521*l*. 3*s*. 3*d*. The collegiate establishment was founded in 1464, by one of the earls of Desmond, and the collegiate church was a magnificent Gothic structure, of which the nave and aisles have been converted into a parish church; the north transept is used as a vestry, and the south transept, which is considered the property of the Duke of Devonshire, and contains monuments of the founder and of many of the earls of Cork and other members of their family, is fast going to decay; while the chancel or choir is a beautiful ruin. There is a small chapel-of-ease, built in 1817, near the south end of the town, on the cemetery of the antient Dominican friary; and the town also contains a handsome Roman Catholic chapel; a convent for nuns of the Presentation order, attached to which are a small chapel and female national schools; and places of worship for the Society of Friends, Independents, and Primitive and Wesleyan Methodists. The parish has numerous schools, affording instruction to near 1800 children, among which are the Youghall United Schools, which are self-supported and managed by a committee; a national school for upwards of 500 boys, supported partly by grants from the Board of Education and partly by collections at the Roman Catholic chapel; the convent school, above alluded to, for 600 girls: an infants' school, supported by subscriptions from Protestants; and an endowed school for 18 boys, founded by the Earl of Cork in 1634. Adjoining to the latter are some almshouses, founded by the same person and at the same time, but recently rebuilt. There is also a Protestant almshouse, established by subscription in 1834, and a parochial-poor establishment. Other almshouses, founded by Mr. Romayne, have fallen into decay, there being no endowment for their maintenance. Youghall has an infirmary, a fever hospital, a dispensary, a lying-in hospital, and other benevolent institutions, one of which has for its object the improvement of straw-plaiting, and the moral and religious instruction of persons engaged in that occupation.

According to the Report of the Corporation Commissioners, Youghall is supposed to be a borough by prescription. Besides the supposed charter of King John, previously mentioned, the town received, according to the above authority, three charters from Edward III., three from Richard II., one from Henry IV., two from Henry V., one from Edward IV., two from Richard III., one from Henry VII., three from Elizabeth, two from James I., one from Charles II., and one, which was not considered valid, from James II. The first charter of James I., granted in 1609, was the governing charter until the corporation was dissolved by the act 3 and 4 Vict., c. 108, for the regulation of municipal corporations in Ireland, in which Youghall was placed in Schedule B., or among towns which had the option of obtaining new corporations. The title of the dissolved corporation was, 'The Mayor, Bailiffs, Burgesses, and Commonalty of the town of Youghall;' and the annual income amounted to about 914*l*. 8*s*. 1*d*., of which 454*l*. 8*s*. 1*d*. consisted of rents of land and buildings; 400*l*. was an annuity from the Blackwater Bridge Company, being the interest on the sum of 8500*l*. for the purchase of the ferry, and about 60*l*. from tolls and customs. The right to the election of members of parliament, as well as the existence of the borough, appears to rest on prescription, but members have been sent ever since the year 1374. Two were elected until the Union, since which there has been but one. The constituency was altered and extended under the Irish Reform Act, and the number of voters registered at the beginning of 1833 was 333.

About a mile and a half north-east of the town, the Blackwater is crossed by a light and elegant timber bridge, which connects Youghall with the county of Waterford. It was erected in 1830, at an expense of 22,000*l*. exclusive of 8500*l*. to the corporation for the ferry. This bridge is 1787 feet long, including a drawbridge of 40 feet, and 22 feet wide between the railings; and it is supported by 57 sets of piers or pillars. It was formed by a company, to whom government advanced 10,000*l*. by way of loan; but the speculation has not proved remunerative. Among the interesting objects in the vicinity of the town is the house called Myrtle Grove, which some say was erected, and which doubtless was for a considerable time inhabited, by Sir Walter Raleigh, in 1586. Raleigh was mayor of the town in 1588, and here, according to tradition, the first potatoes brought by him from America were planted. In Hall's 'Ireland,' however, it is stated that the house, which is still standing, though somewhat modernized, is said to have been originally the residence of the wardens of the collegiate church, and to have been altered to the character of an English manor-house by either Sir George Carew or Sir Richard Boyle, both of whom resided there. Of the other residences in the neighbourhood may be mentioned College House, a handsome modern edifice, belonging to the Duke of Devonshire, on or near the site of an antient house built in 1464, which has been taken down. The gates of the town have been removed, excepting one which is very dilapidated, and another which has been rebuilt; and there are still one of the antient round towers, and considerable remains of the old wall, especially on the western side of the town. There are several antient houses in the town and neighbourhood, among which are Tynte's castle, in the main street, and the remains of Kilnatoragh castle, on the river Toragh, at the northern extremity of the parish. On the old Cork road are remains of a Danish fort, which appears to have been of great extent. Near the town are two chalybeate springs, which are but little used.

(*Reports of Irish Boundary Commissioners*, and of the *Commissioners on Municipal Corporations in Ireland*, *Population Returns*, and other *Parliamentary Papers;* Lewis's *Topographical Dictionary of Ireland;* Archdall's *Monasticon Hibernicum;* Hall's *Ireland*.)

YOUNG, SIR PETER, Latinized Petrus Junius, is said to have been born in Forfarshire in Scotland, on 15th August, 1544. He studied at Geneva and Lausanne, and became intimate with Beza, to whom his uncle Henry Scrimgeur made him known. Returning home in 1569, he was appointed co-tutor, along with Buchanan, of the young prince of Scotland, afterwards James I. of England. When the prince took the administration of the government, Young became a member of the privy council. In 1586 he was sent as ambassador to Frederic II. of Denmark, to conduct
the negotiations as to the possession of the Orkney
He afterwards attended James on his romantic jour
Denmark to bring home his queen, and was employ
various missions to that and the neighbouring states
ranks among the vindicators of Queen Mary. He
pared a short narrative of that queen's life and death
the view of meeting some opinions expressed again
by David Chytræus. This little work is incorporated
his Life by Smith. He settled in England, where h
knighted in 1614, and received a pension of 300*l*. In
he retired to an estate which he possessed in Sco
where he died on 7th January, 1628. (Smithius,
quorundam Eruditissimorum et Illustrium Virorum.

YOUNG, PATRICK, Latinized Patricius Juni
son of Peter Young, was born on his father's est
Seton in East Lothian, N.B., on 29th August, 15
studied at the University of St. Andrews, where he
the degree of A.M. in 1603. He lived for some time
Dr. Lloyd, Bishop of Chester, by whom his love of
was appreciated and encouraged. It was probably thr
the influence of Lloyd and other patrons that, in
he was by special favour incorporated in the deg
of M.A. at Oxford, without having followed any cou
of study in England. He took deacon's orders, and w
chosen chaplain of New College. He afterwards w
to London with the view of trying his fortune at the co
of King James, and through the influence of Montag
the Bishop of Bath and Wells, he obtained a pension of
a year. He was appointed keeper of the king's libr
and occupied himself for some time in classifying a
cataloguing the books. In 1617 he went to France an
other neighbouring states, partly with the view of mak
collections for the library. He carried with him re
mendations from Camden, and being able to speak se
languages, he soon formed an intimate acquaintance w
a large circle of learned men. His biographer Smith
collected such incidental notices of his person, or
works, as are afforded by contemporary continental w
and the collection shows his circle of admirers to
been both extensive and illustrious. From a very
age it had been his ambition to be a master of Greek, a
he carried on a considerable portion of his corresp
with his learned contemporaries in that tongue. His
thusiastic admiration of antient Greece extended
the modern inhabitants of that country, among
seems to have been anxious to resuscitate a knowle
the literature of their ancestors. He made the pe
acquaintance of several Greeks, whom he invited to E
land, supporting them there by his own funds, a
subscriptions of friends who sympathised in his views.
does not appear that more than one of these ever
by his subsequent exertions for the regeneration of
countrymen, the views of his enlightened patron. Y
has not left behind him many literary memorials of
high reputation for scholarship. He appears to have
an indolent man, and not anxious for literary fame. S
don dedicates to him the 'Marmora Arundeliana' in
flattering terms, describing himself, in drawing up that
as doing little more than collect and arrange the
tions which Young had the merit of suggesting. H
assisted his countryman Thomas Reid in translating
Latin the works of King James. On the arrival in 16
the Alexandrine MS. of the Bible in the royal library
which he had charge, he commenced a critical ex
tion of its contents, with the view of publishing an
of the whole contents of the MS. Of his exertions h
ever in pursuance of this project he left behind him
a few vestiges. Among these there is a collection of
down to the fifteenth chapter of Numbers, which are
lished in the sixth volume of Walton's Polyglot Bi
under the title 'Patricii Junii Annotationes quas pa
ad MS. Alexandrini Editionem, in quibus Codicem
antiquissimum cum Textu Hebraico et veteribus Eccl
Scriptoribus, aliisque Græcis Editionibus confert.'
published, in 1633, an edition of the Epistles of Clem
Romanus, from the same MS., which will be found in
first volume of the 'Sacrosancta Concilia' of Labbeus
Cossartus. In 1638 he published and dedicated to Bi
Juxon an 'Exposition of Solomon's Song,' written by
bert Foliot, bishop of London, in the time of Henry II.
is said that he was in the course of applying the trea
of the royal library to several other literary undertaki
when the supremacy of the Parliamentary party depr

of his appointment in that institution. In 1649 he
ed to Bromfield in Essex, where he lived with his son-
w Mr. Atwood. He died on the 7th September,
, according to a monumental inscription preserved in
nfield church.

mithius, *Vitæ quorundam eruditissimorum et illus-*
m Virorum; Biographia Britannica.)

OUNG, EDWARD, was born in 1684,* at Upham, a
ge about eight miles from the city of Winchester, in
pshire. His father, the Rev. Edward Young, was
in 1643, was educated at Winchester College, of
h he became a Fellow, was rector of Upham, was col-
in 1682 to the prebend of Gillingham Minor in the
edral of Salisbury, was afterwards appointed chaplain
illiam and Mary, and was finally preferred to the
ery of Salisbury. Dean Young died at Salisbury in
. He published a collection of his sermons in 1702,
mons on several Occasions,' 2 vols. 8vo., of which a
nd edition was printed in 1706.

dward Young, author of the 'Night Thoughts,' was
ed by his father on the foundation at Winchester Col-
, where he remained till he was nineteen without hav-
been elected to a fellowship in New College, Oxford,
ch he entered as an independent member, October 13,
. A few months afterwards, on the death of the
len, who was a friend of his father, and with whom he
led, he removed to Corpus Christi College on the in-
ion of the president, who was also one of his father's
ds. In 1708 he was nominated by Archbishop Ten-
to a law fellowship in All Souls' College, where he
s to have devoted himself to poetry in preference to
nd to have adopted those decidedly religious prin-
which he retained through life. Tindal, who fre-
ly visited All Souls', speaking of him, says, 'The
boys I can always answer, because I know whence
ave their arguments, which I have read a hundred
but that fellow Young is always pestering me with
hing of his own.'

ng published, in 1713, a poetical 'Epistle to George,
ansdowne,' who was one of the twelve peers created
een Anne in 1712. He also published, in 1713,
Last Day' and 'The Force of Religion, or Van-
d Love;' both of which are poems of considerable
'The Last Day' is in three books, and part of it
nted in 'The Tatler,' in 1710; so that he had been
poetry for some years before he published any.

the 23rd of April, 1714, Young took the degree of
and in the same year published a 'Poem on the
of Queen Anne,' London, folio. He was probably
e estimation for his learning as well as his poetry,
n the foundation of the Codrington Library was laid,
s appointed to deliver the Latin oration, which he
ed, 'Oratio habita in Coll. Omnium Animarum
acta sunt Fundamenta Bibliothecæ Chickleio-
gtonianæ,' Oxon., 1716, 8vo.

he 10th of June, 1719, he took the degree of D.C.L.
same year his tragedy of 'Busiris' was acted at
Lane with considerable success; and he published
aphrase on Part of the Book of Job,' 4to.; and a
al 'Letter to Mr. Tickell, occasioned by the Death
Right Hon. Joseph Addison,' folio.

ng had been tutor to Lord Burleigh, son of the Earl
eter, but having become acquainted with the Duke of
ton, he was, in 1719, induced by that nobleman to
quish this situation. This fact was proved in the case
s *v*. Attorney-General (Atkyns, *Chan. Rep.*, vol. 2,
), in which Lord-Chancellor Hardwicke was required
ecide whether two annuities, granted to Young by the
ke of Wharton, were for legal considerations. The
d for the first annuity was dated March 24, 1719; in
preamble of which the duke states, that, 'Considering
the public good is advanced by the encouragement
learning and the polite arts, and being pleased therein
h the attempts of Dr. Young, in consideration thereof and of the love I bear him,' &c. Lord Hardwicke decided that this was not a legal consideration. The annuity was 100*l*. for life; but the payments having fallen into arrear to the amount of 350*l*., the duke, in lieu of this debt, gave him a second annuity of 100*l*. in addition to the first: the deed for the second was dated July 10, 1722, and the duke afterwards charged both as one annuity of 200*l*. a year for life on certain property. The duke died in 1731, in Spain, in great poverty. His property had been in trust some years before his death, and the other creditors resisted Young's claims. Young stated, in his examination before the Master, Feb. 4, 1730, that he had been offered an annuity of 100*l*. for life if he would continue tutor to Lord Burleigh, but that he refused it in consequence of the Duke of Wharton having promised to provide for him in a much more ample manner. Lord Hardwicke decided that his refusal of this offer and the debt on the first annuity were both legal considerations, and he directed the 200*l*. annuities to be paid out of the trust-estates. It also appeared that, besides these two annuities, the duke gave him a bond, dated March 15, 1721, to remunerate him for the expense which he had incurred in standing, at the duke's request, a contested election for Cirencester, in which he was defeated. No doubt the duke thought that he had talents to qualify him for an orator, and in fact he afterwards became an eloquent preacher. Lord Hardwicke decided that this bond was not for legal consideration, and it was not ordered to be paid.

The tragedy of 'The Revenge' was brought out at Drury-Lane in 1721, but with less success than 'Busiris.' His Satires were published separately in folio, with the title of 'The Universal Passion,' which was afterwards expanded into 'The Love of Fame, the Universal Passion.' The first four, which are on men, were published in 1725-6; the two last, on women, in 1727-8. They were extremely successful. Herbert Croft says that Young acquired 3000*l*. by them, but leaves it uncertain how the whole sum was obtained, by stating, on the authority of Spence, that the Duke of Grafton gave him 2000*l*. for them. In 1726 he published 'The Instalment,' on Sir Robert Walpole being made a knight of the Garter.

In 1727 Young took orders, and was nominated one of the royal chaplains. He immediately withdrew his tragedy of 'The Brothers' from the players, who had it in rehearsal. In 1727 he published 'Cynthio, an Ode on the Death of the Marquis of Carnarvon;' in 1728, 'Ocean, an Ode, with a Discourse on Lyric Poetry,' to which was prefixed an 'Ode to the King, Pater Patriæ,' and 'A True Estimate of Human Life; in 1729, a Sermon, preached before the House of Commons, entitled 'An Apology for Princes, or the Reverence due to Government.'

On the 30th of July, 1730, the college of All Souls presented him with the rectory of Welwyn in Hertfordshire, valued at 300*l*. a year, and to which the lordship of the manor was attached. In this year he published 'Imperium Pelago, a Naval Lyric;' 'Two Poetical Epistles to Mr. Pope, concerning the Authors of the Age;' and 'A Sea-Piece,' addressed to Voltaire, with whom he seems to have been on terms of familiarity when Voltaire was in England.

In 1731 Young married Lady Elizabeth Lee, widow of Colonel Lee, and daughter of the Earl of Lichfield. By Lady Elizabeth Young he had a son, Frederic, who was born in 1733. Lady Young had a daughter by her former husband, who was married in 1735 to Mr. Temple, son of Lord Palmerston. Mrs. Temple died of consumption in 1736, at Lyon, on her way to Nice. She was accompanied by Young, and probably by her husband and Lady Young; for Croft says that 'after her death, the rest of the party passed the ensuing winter at Nice.' Mr. Temple died in 1740. Lady Elizabeth Young herself died in 1741. The Philander and Narcissa of the 'Night Thoughts' have been supposed to represent Mr. and Mrs. Temple. The authorities at Lyon refused to allow Mrs. Temple to be buried in consecrated ground, and this fact accords with Young's description of the funeral of Narcissa; but the dates just stated are inconsistent with the third of the following lines:—

> 'Insatiate archer! could not one suffice?
> Thy shaft flew thrice, and thrice my peace was slain,
> And thrice ere thrice yon moon had filled her horn.'

Lady Young's name in the poem seems to be Lucia. The Lorenzo could not have been Young's son, as has often been stated; for Frederic Young, having been born in

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his is the date given in the 'Biographia Britannica.' The date given by
t Croft, who supplied the biography of Young for Johnson, 'Lives of
ets,' is June, 1681, which has been followed by Watt, Chalmers, and all
er authorities whom we have seen, though Croft himself furnishes evi-
of the incorrectness of his own date; for he states that Young, having
ted his 18th birth-day, left Winchester College, and was entered of
ollege, Oxford, October 13, 1703. If he had been born in 1681, it is
that he would then have completed his 22nd birth-day, instead of his
According to the University Register, he was 19 years of age when he
New College. Croft's Life of Young is confused and ill-written, and
's criticism on Young's Works, which is annexed to it, has little of
al discrimination.

1733, was under ten years of age when the first books of the 'Night Thoughts' were published, while Lorenzo is represented as having been married to a lady whose name in the poem is Clarissa, and who died in childbed, leaving a son, Florello.

Young seems to have begun the 'Night Thoughts' soon after the death of his wife. They were published in London, 1742-6. In 1753 he brought out his tragedy of 'The Brothers,' the profits of which he intended to give to the Society for the Propagation of the Gospel, but the play having been unsuccessful, he gave the Society 1000*l*. His prose work, 'The Centaur not Fabulous, in Six Letters on the Life in Vogue,' was published in 1758. There is a letter from Secker to Young, dated July 8, 1758. Secker was then Archbishop of Canterbury, and Young, at that time 74 years of age, had been soliciting the archbishop to use his influence with the king to obtain some preferment for him. Secker's letter is characteristic. He excuses himself by saying, 'No encouragement hath ever been given me to mention things of this nature to his majesty;' and concludes by observing, 'Your fortune and your reputation set you above the need of advancement, and your sentiments above that concern for it, on your own account, which, on that of the public, is sincerely felt by,' &c. Young would understand, if he did not feel, Secker's allusion to the inconsistency between his 'sentiments' and his solicitations for worldly advancement. His 'Thoughts on Original Composition' were published in 1759. At last, on the 4th of January, 1761, his ruling passion received a slight gratification—he succeeded Dr. Stephen Hales as clerk of the closet to the Princess Dowager of Wales.

His poem called 'Resignation' was published in 1762, and in the same year he published a collected edition of his Works, 4 vols. 12mo., from which he excluded some of his dedications, as well as two or three of the smaller works. He died on the 12th of April, 1765. He had performed no public duty for two or three years, but retained his faculties to the last.

Young's son Frederic was educated at Winchester, whence he went to New College, Oxford, and then to Balliol College, from which, according to the 'Biographia Britannica,' he was expelled for misbehaviour. According to the same authority, Young was so much incensed at his son's misconduct that he refused to see him, even on his death-bed, but left him the bulk of his fortune, which was considerable. He left 1000*l*. to his housekeeper, and added a codicil, in which he requested that she would destroy all his manuscripts after his death, 'which would greatly oblige her deceased friend.' He had left another 1000*l*. 'to his friend Henry Stevens, a hatter near the Temple Gate,' but Stevens died before him. Young's son erected a monument 'pio et gratissimo animo' to his father and mother.

Young, from the commencement of his career as a writer almost to the termination of his long life, displayed an eager desire for place and preferment, and seems never to have let slip an opportunity of paying his court to those who had them at their disposal. Every work, whether in prose or verse, each separate satire of 'The Love of Fame,' and each separate book of the 'Night Thoughts,' was addressed to some person of distinction, including Queen Anne, George I., and George II., and generally in language of the most unscrupulous adulation. Place, after all, he never obtained, and, except the offices of royal chaplain and clerk of the closet, the only preferment which he ever reached was the rectory of Welwyn, and that was given to him by his own college of All Souls.

Young's private character has not been minutely described. Croft went to the residence of his housekeeper in order to obtain information from her, but she had died just before his arrival. After his marriage he lived much in retirement at Welwyn, 'the world forgetting,' and long enough to be almost 'by the world forgot.' He seems to have been visited by few, but Count Tscharner, a foreigner, who spent four days with him when he was very old, says that everything about him was very neat, his manners very polite, and his conversation lively and entertaining. He was strict in the performance of his religious duties, domestic as well as public. His accustomed walk of meditation was among the tombs of his own churchyard, but he does not appear to have been severe or gloomy; he was fond of gardening, and his parishioners were obliged to him for a bowling-green and an assembly-room.

The distinguishing characteristic of Young's intellect was the fertility of his fancy; but the imagery with which it was supplied and the manner in which that imagery was combined, were such as to qualify him for a wit rather than for a poet. He has apparently no taste for the beauties of external nature, but he has metaphors, similes, and laboured comparisons drawn from all kinds of sources, in extraordinary abundance. The combinations are always original, often beautiful, sometimes brilliantly acute, but too frequently introduced merely as ornaments, unnecessary for illustration and unsuitable to the circumstances in which they are used or the effect which he intended to produce. This want of skill in the adaptation of means to the production of a specific effect was perhaps the leading defect of his poetical character. But he has another defect, which, though of much less consequence, would have disqualified him from ever becoming a great poet. His versification is that of a versifier, not of a poet; correct in the adjustment of feet, but broken up into couplets, lines, and half lines, and almost utterly devoid of the melody of rhythm. His favourite form of language is antithesis, which may be suitable enough for the wit, but is little suited to the poet. It must be admitted however that his language is often very compact, and his lines have frequently a pregnant brevity which gives point and force to his illustrations.

'The Last Day' consists of a series of descriptions of the wonders which are to attend the destruction of the universe, of the terrors of the wicked, and the raptures of the virtuous. Sublimity is generally aimed at, but never reached; there is much of violence and extravagance instead of it. The versification is elaborately correct, yet not musical, and the effect of the whole is tedious. 'The Force of Religion' is a poetical dialogue between Lord Guildford and Lady Jane Grey previous to her execution. The pathetic is evidently aimed at in this poem, but pathos was never at the command of Young. Lady Jane is too heroic, and the thoughts and language too much unlike real feeling, to produce either interest or pity. 'The Paraphrase on a Part of the Book of Job' appears as if it had been written by a man of genius out of his senses. The Eastern imagery of the original is bold enough for most European tastes, but is tame compared with Young's paraphrase. The descriptions, when wrought out in detail, as they are by Young, instead of being, as no doubt he intended, specimens of magnificent imagery, are extravagant to a degree of absurdity which is absolutely without parallel in English poetry.

'The Love of Fame,' being a series of satires, requires a species of composition much better suited to the peculiarity of Young's talents than anything he had hitherto attempted. They have been described as a series of epigrams, and so they are, but epigrams so connected with character and manners as to have an interest which now belongs to isolated epigrams, such as those of Martial. They display no deep insight into character, no investigation of motives, but exhibit the surface of life by a series of sketches, often slight and generally superficial, but true, and spirited, and sparkling with illustrative touches; and though much of the manners which they describe has passed away, they are still perfectly intelligible and very amusing. In poems of this kind, even Young's peculiar taste for antithesis, and his short and broken style of versification, can hardly be regarded as objectionable.

The 'Night Thoughts' are a series of argumentative poems in blank verse, in proof of the immortality of the soul and the truth of Christianity, and, as a consequence, the necessity of religious and moral conduct. Young's exhibitions of life are those of a man who had mixed with the world, and had observed it well; and though they are generally somewhat gloomy, and touched with the exaggerating pencil of the satirist, they abound in important truths. There is no narrative, or next to none, but a slight degree of interest is give by the allusions to Narcissa and Philander and Lucia, and by the introduction of Lorenzo, who seems to be the poet's personification of the accomplished man of the world, whose infidelity was to be silenced by argument, and the erroneousness of whose conduct was to be made manifest by contrast with that of the Christian. In the descriptions, the false sublime is of much more frequent occurrence than the true. The blank verse is generally broken up into short sentences, and seldom satisfies the ear. The poem would have little attraction for the general reader if it were not for the ndance, superabundance we may say, of its illustrative ments. We have already described the nature of these ments in speaking of his poetry generally, but an nce or two may be given just to show his mode of cing them. Thus Narcissa is compared to a dew-drop :—

> 'Early, bright, transient, chaste as morning dew,
> She sparkled, was exhaled, and went to heaven.'

disappointment of human hopes :—

> 'Life to the last, like harden'd felons, lies.'

se and wit compared :—

> 'Sense is our helmet, wit is but the plume ;
> The plume exposes, 'tis the helmet saves.
> Sense is the diamond, weighty, solid, sound ;
> When cut by wit it casts a brighter gleam ;
> But, wit apart, it is a diamond still.'

advantages of conversation :—

> 'Thoughts shut up want air,
> And spoil like bales unopened to the sun.'

The Centaur not Fabulous' is a satire in prose, an exerated display of the life 'in vogue,' as he expresses The 'Remarks on Original Composition' were adsed in a letter to Richardson the novelist, and though ten when Young was very old, they are not only full good sense, but sparkle with illustrations as much as if had been written in the prime of life ; they are rather siping perhaps, but very entertaining.

oung wrote several Odes, some expressly 'in imitation indar's manner.' They are all signal failures. He has arded his ornamental illustrations, probably as unsuit- to the dignity of the ode, and he has nothing in the e of them. The thoughts are either common or bomic, and the versification is only fit for nursery rhymes. last of his poems, 'Resignation,' consists of a series of es written in a familiar style, and though subdued in , indicates no decay of his powers.

he three tragedies are all of the heroic class. The chaers are above nature or out of it, and their thoughts and uage being alike unknown to ordinary humanity, they ite no sympathy. 'The Revenge' however still keeps ession of the stage whenever an actor appears who is able of displaying the exaggerated but magnificent ion of Zanga. The plot is an imitation of that of ello ; it has more incident than either of the other edies, and the thoughts and language are nearer to e of actual life.

Croft's 'Life of Young,' in Johnson's *Lives of the ts ; Biographia Britannica* ; Young's *Works*.)

OUNG, ARTHUR. Few men have acquired such brity as agricultural writers as Arthur Young. His e is perhaps more generally known all over the Connt than even in England ; his situation as secretary to Board of Agriculture gave him a most extensive corpondence, and his zeal for the improvement of agriculture all over the world made him publish many works, in ich every new experiment and every theory suggested examined and discussed. 'To the works of Arthur ung,' says Kirwan (*Irish Transactions*, vol. v.), 'the rld is more indebted for the diffusion of agricultural owledge than to any writer who has yet appeared. If at zeal, indefatigable exertions, and an unsparing exnse in making experiments can give a man a claim to gratitude of agriculturists, Arthur Young deserved it re than most men. We will not assert that in all cases conclusions were correct, or his judgment unimpeachle ; but even his blunders, if he committed any, have ded to the benefit of agriculture, by exciting discussion d criticism.'

The history of the birth and education of Arthur Young be only so far interesting to the reader as they give ens of his peculiar tastes in after-life. His father was a ctor of Divinity, a prebendary of Canterbury, and chapn to Arthur Onslow, Speaker of the House of Commons. e subject of this memoir was his third son.

Arthur Young was educated at Lavenham school, where went in 1748, being then about seven years of age, hav- been born on the 7th September, 1741. He showed nsiderable talents at school, where he remained till 58, when he was apprenticed to the mercantile house of . Robinson, at Lynn, in the hopes of his becoming in e a thriving merchant ; but he had no genius for this fession, and the money, as he often lamented, which apprenticeship cost, would have maintained him at lege, and he might have become qualified to hold the rectory of Bradfield, which was then held by his father. As the rector of a large agricultural parish, there is every reason to suppose that his latent love of agriculture would have been fostered. He would probably have been equally zealous in this pursuit, without so great pecuniary sacrifices as he was called on by circumstances to make in the improvement of the several farms he occupied.

Having no taste for business, he took to reading at Lynn, and read every book he could procure. At seventeen years of age, he wrote a political pamphlet, entitled 'The Theatre of the present War in North America,' for which he got 10*l*. worth of books from the publisher, to him a great treasure. After his father's death, which happened in 1759, he was much tempted, by the offer of a pair of colours, to enter the army ; but his mother would not hear of it, and like a good son he gave up all thoughts of it. He began a periodical work, called the 'Universal Museum,' but gave it up after the sixth number, by the advice of Dr. Samuel Johnson. His whole fortune then consisted of a copyhold estate of 20 acres, worth annually as many pounds. His mother had a lease of a farm of 80 acres at Bradfield ; and on her renewing the lease, she gave him the management, and he commenced practical farmer, without any real practical knowledge of farming, and his head full of wild notions of improvement, as he afterwards himself confessed. In the following year he became a contributor to the 'Museum Rusticum,' the first agricultural work he tried his pen in. He married in the same year, 1765, Miss Martha Allen, of Lynn ; but from some peculiarities on both sides, this union was not very happy. In 1767 he undertook the management, on his own account, of a farm called Samford Hall, in Essex, consisting of 300 acres of land. There he was in his element, making experiments and carefully noting them down for five years, when he published the results in two thick vols. 4to. under the title of 'A Course of Experimental Agriculture, containing an exact Register of the business transacted during five years on near 300 acres of various soils,' Dodsley, 1770. The style in which this book, which, after all, is by no means instructive, was brought out, on fine paper, large type, and wide margin, proves that either the public were beginning to have a taste for agricultural works, or that Arthur Young had too favourable an idea of the value of his experiments. Whether any loss was incurred by the publication, and who bore it, it is not now easy to say ; we only know that we bought the book handsomely bound in calf at the price of waste paper. But this work was published after his 'Tour through the Southern Counties of England,' a work which became very popular, and of which several editions were sold. Young was a keen observer, and had a ready and lively mode of communicating his observations ; if he was sometimes rather hasty in his conclusions, or superficial in his remarks, he had the talent of enlivening them by an easy and sometimes imaginative style. An account of proceedings and experiments on a poor farm, not always very judiciously planned or executed, could not be very entertaining or instructive. After five years, in which he suffered great losses and disappointments, he was glad to give 100*l*. to a practical farmer to take the lease off his hands. Where the literary and scientific farmer had failed entirely, the plain practical cultivator saved a little fortune. It is amusing to read Young's invectives against the soil, climate, and everything about this horrid farm : but when it is considered that he only saw it from Saturday till Monday, and was occupied as a parliamentary reporter the remainder of the week, the wonder will cease, and the only surprise excited will be caused by the fact of his finding time to note down the results of his experiments so as to form two vols. 4to.

In the year 1768 he was induced, by the success of his 'Six Weeks' Tour,' to take another in the north of England, of which he published a minute account in 4 vols. 8vo., which had a very rapid sale. The activity of his mind could not be concentrated in agricultural writings, but embraced subjects of general political economy ; and the next year he published a work on the expediency of a free importation of corn, which met with great approbation in a high quarter. In 1770 he undertook his Eastern Tour, and published his observations in 4 vols. 8vo. These tours of Arthur Young excited the liveliest interest in all those who were connected with agriculture, either as proprietors or tenants ; and there is no doubt that his works, if they did not kindle the rising zeal for agricultural improvement gave it a strong impetus, and blew it into a vivid flame. Many tours had been made through every part of Britain, and many lively descriptions of places had been published; but in none were the agricultural and political circumstances of different districts accurately recorded. Wherever he went he was received by proprietors and farmers with the greatest frankness and hospitality. In his discussions on their different modes of cultivating the soil, he acquired extensive practical knowledge, and also imparted it to his hosts; by placing before them the more rational and economical courses adopted in other districts, he led them to make experiments; and if these, somewhat hastily conducted, did not always give a favourable result, they always tended to make men reflect and compare, and often led them to see their errors in management. By means of his publications distant parts of the country became acquainted with practices which were entirely unknown before beyond the small circle in which they had been gradually adopted. Even the failures, occasioned by adopting systems and rotations not suited to every soil, gave useful lessons, and pointed out the principles on which the most advantageous systems for different soils were founded. Wherever Young met with the cultivation of any peculiar plant, whether for the use of man or beast, and observed more than ordinary luxuriance in its growth, he became an enthusiastic admirer of it, and recommended it for trial to agriculturists. Of these lucerne was justly a great favourite, and he recommended its cultivation on every opportunity. Another plant which drew his attention was wild chicory (*chicorium intybus*), the feeding qualities of which he much exaggerated, thinking it so important, that in the questions sent round by the Board of Agriculture, when he was secretary, in order to ascertain the state of agriculture in all parts of the kingdom, one of the questions was, 'Do you sow chicory?' whereas this plant had only been tried by a few individuals, and soon lost its momentary reputation. We mention this circumstance to show how warmly he took up any apparent improvement and endeavoured to promote its general adoption. This zeal in the cause gave a charm to his works, which were written in a lively and even imaginative style, on a subject where before nothing was met with but dry details. If he sometimes led his readers a little out of the straight path of sober practice, they readily forgave him for the sake of his motives and his zeal. In 1771 he published that useful and well-known work entitled 'The Farmer's Calendar,' which has gone through innumerable editions, and is still a standard agricultural work. At the same time, as if to show the versatility of his genius, he published 'Political Essays on the present State of the British Empire,' and 'Observations on the present State of Waste Lands.' In order to increase his income, which, notwithstanding the profits of his publications, did not suffice for his expenses and experiments, he had become a parliamentary reporter for the 'Morning Post,' in which arduous task he was engaged for several years, much to the detriment of his farming operations, which he could only occasionally superintend.

In 1774 he published 'Political Arithmetic,' which work was soon translated into several foreign languages. In 1775 and 1776 he made his tour through Ireland, one of those which greatly increased his knowledge, if not of the perfections of farming, certainly of its most glaring defects in that fertile country. His decided disapprobation of the bounty then paid by the government on the land-carriage of corn to Dublin drew the serious attention of the ruling powers to this subject. In the next session of parliament this bounty was reduced one-half, and soon after entirely abolished. For this essential service to the prosperity of Ireland, Mr. Young only received the cold thanks of the Dublin Society. He warmly supported the claims of the Roman Catholics to the removal of every political disability owing to difference of religion, showing that the penal laws then in force were laws against the industry of the country.

In 1777 Mr. Young received a medal from the Salford Agricultural Society, inscribed 'For his Services to the Public.' After this he undertook the management of the estates of Lord Kingsbury at Micheltown, in the county of Cork, where he resided for two years in a house built on purpose for him. In 1779 he returned to his mother at Bradfield: it was then that he had the project of emigrating to America, which he relinquished in consequence of the objections of his mother. He therefore b[illegible] himself with renewed zeal to the practice of husba[illegible] ploughing with his own hands; while his head was o[illegible]pied in scientific pursuits, analyzing soils, and makin[illegible] merous experiments, for which he obtained the gold m[illegible] of the Society of Arts. In 1782 he entered into a [illegible] controversy with Mr. Capel Loft upon the expedie[illegible] the county of Suffolk presenting the government [illegible] 74-gun ship. This was carried on some time in the '[illegible] Post,' and drew the attention of the public to that p[illegible]

The fame of Arthur Young had now spread far and [illegible] and reached even the frozen regions of the North[illegible] empress Catherine of Russia sent three young Ru[illegible] be instructed by him in agriculture, and in the fol[illegible] year sent him a magnificent golden snuff-box, and t[illegible] ermine cloaks for his wife and daughter.

In 1784 he began the publication of his 'A[illegible] Agriculture,' which he continued till the work ext[illegible] 45 vols. 8vo., containing a great fund of agricult[illegible] formation. In this work all the contributions [illegible] names of their authors annexed, which adds mu[illegible] authority, even King George III. condescending [illegible] Mr. Young an account of the farm of Mr. Du[illegible] Petersham, under the signature of Ralph R[illegible] Among other important communications may be [illegible] the 'Letters on the present State of Agriculture [illegible] by Dr. Symonds, then professor of modern histo[illegible]ory in the university of Cambridge.

In 1785 Mr. Young's mother died; he always entertained the warmest affection for her, and in several instances, as we have seen, gave up favourite schemes in deference to her wishes. In the next year he lost his respected uncle, who was killed by a fall from his horse while hunting with George III.

In the spring of 1787 he received a pressing invitation to visit France, and to accompany the Comte de la Rochefoucauld to the Pyrenees, which he accepted with joy, and returned to England in the following winter. At [illegible] this time, a discussion took place about the Wool Bill, [illegible], and the farmers of Suffolk deputed Mr. Young to support a petition against it. He was joined in this affair by S[illegible] Joseph Banks, who was deputed from Lincolnshire for the same purpose. They did not however meet with comp[illegible]plete success, but they caused some of the most obnoxious clauses of the bill to be modified. The manufacturers, f[illegible]or whose advantage it had been brought in, burned Arthur Young in effigy at Norwich for his opposition to their [illegible] while he was complimented by the landed proprie[illegible] farmers. Thomas Day, Esq., the author of a well-[illegible] little work called 'Sandford and Merton,' addre[illegible] pamphlet to Mr. Young, which was highly compli[illegible] to his exertions.

The next summer he travelled on horseback thro[illegible] great part of France, and composed his 'Agricultur[illegible] vey' of that country, which the French agricultural w[illegible] acknowledge to have opened their eyes to the imperfe[illegible] of their systems of husbandry. He did not however [illegible] lish it till he had made a third tour through that exte[illegible] kingdom. During the interval of the two last tours [illegible] was occupied in introducing the collecting of grass se[illegible] by hand, for the purpose of producing artificial meado[illegible] and, among many other useful grasses, introduced t[illegible] cocksfoot (*dactylus glomeratus*) and the crested dog-t[illegible] grass (*cynosurus cristatus*). The style of his French t[illegible] is lively, and his descriptions amusing as well as interesting.

About this time he entered into a correspondence with General Washington, which was afterwards published in a pamphlet. Another circumstance on which he dwelt with pride and complacency, was a present he received from the king of a Merino ram. In 1793 he published a pamphlet, which met with great success, entitled 'The Example of France a Warning to Britain.' He received the thanks of several patriotic associations, while the opposite party accused him of apostacy, as he had hitherto been rather inclined to favour the liberal party and approve of the French revolution, but the horrors which it brought forth entirely disgusted him. In this pamphlet Mr. Young first recommended a horse militia, which afterwards was established under the name of the yeomanry cavalry, and in which he himself served as a private in the ranks, under Lord Broome, afterwards Marquis Cornwallis.

In order to put into practice his various schemes for the

ıent of waste lands, he purchased 4400 acres of
ted land in Yorkshire; but luckily for his purse,
uld probably have suffered much in the experi-
Board of Agriculture was established, and the
secretary was offered to him. This was exactly
his taste and activity, and the salary of 400*l.* per
ith a house rent-free, made the situation desirable
ore of income.

t compliment was paid to Arthur Young, in 1801,
ench Directory, who ordered all his agricultural
be translated and published at Paris, in 20 vols.
ler the title of 'Le Cultivateur Anglais;' and in
year M. Du Pradt dedicated to him his work
e l'Etat de la Culture en France.'

desire of the Board of Agriculture he drew up
ty Reports, beginning with that of Suffolk, to
re added, in succession, Lincoln, Norfolk, Hert-
ex, and Oxford. In 1795 he published two poli-
phlets, entitled 'The Constitution safe without
and 'An Idea of the present State of France.'

ath of his daughter, which took place in 1797, of
had a great influence on Mr. Young's mind. He
turn his attention to religious subjects, which in
of his secular occupations had not occupied
his thoughts before. He began now to read and
and to satisfy himself as to the most important
eligion. This did not prevent his other pursuits,
98 he published a letter to Mr. Wilberforce, 'On
of the Public Mind,' and, in 1800, a pamphlet
Question of Scarcity.' In 1804 the Bath and
ngland Society adjudged their Bedfordian medal
r an essay 'On the Nature and Properties of
In the same year he received the present of a
from Count Rostopchin, governor of Moscow,
turned by himself out of a block of oak, and
ded with diamonds, with the motto in Russian,
Pupil to his Master.' Over the motto were three
e in burnished gold, forming the cipher A. Y.

at the request of the Russian Ambassador, Mr.
nt his son to Russia, to make a survey of the
nt of Moscow, and draw up a report, for which
berally remunerated; and with the sum he re-
purchased an estate of 10,000 acres of very rich
e Crimea, and settled there.

Mr. Young received a gold medal from the
Agriculture 'for long and faithful services in
e,' soon after which his exertions were much
by the loss of his sight. No longer able to take
exercise, his digestion became impaired, which
led to the disease which terminated his useful
reer. His disease was not suspected till about
efore his death. He had always had a great
blindness, and of the stone in the bladder: the
the cause of his death, but he never was aware
by the care of his medical attendants his suf-
ere alleviated, and he was spared those acute
hich he had such a dread. He died on the 12th
0, in the 80th year of his age. He was buried
ld, in a vault in the churchyard.

en have acquired so great a reputation in the
the useful arts, especially in agriculture, as
oung. He began as a scholar and became a
If he was sometimes led on by a sanguine dispo-
l lively imagination into doubtful theories, he
this by the faithful details of his experiments.
t be said to have founded any new system of
e, but he has collected and brought forward all
vements made by different individuals, and thus
n immense mass of practical knowledge, which
scattered and isolated.

G, MATTHEW, D.D., Bishop of Clonfert, and a
ed mathematician of Ireland, was born in 1750,
nty of Roscommon, and he prosecuted his studies
College, Dublin, into which he was admitted in

a student he applied himself diligently to the
d modern languages, to divinity, and, in a par-
anner, to mathematics and natural philosophy.
cipia' of Newton constituted at that time the
-book for the latter subject in the British univer-
Mr. Young spent a considerable portion of his
strating it, with the view of diminishing for
he difficulties arising from the extreme conciseness of the investigations. He entered into holy orders, and, in 1775, he was elected a Fellow of the college, after an examination in which he distinguished himself by his profound knowledge of the important work just mentioned: the degree of Doctor in Divinity was subsequently conferred upon him.

In 1786 the professorship of natural philosophy becoming vacant, Dr. Young was immediately appointed to hold the office, and he applied himself zealously to the fulfilment of its duties. He greatly extended the course of instruction in that branch of science, availing himself, for the purposes of illustration in his lectures, of a valuable apparatus which had then been recently purchased for his college.

Dr. Young is said to have taken great pleasure in the society of literary and scientific persons; and early in life he became connected with several other young men who, like himself, were students at the University, for mutual improvement in theology: subsequently a more numerous society was formed, chiefly by his exertions, and this became the nucleus of the Royal Irish Academy, the members of which professed to have for their object the advancement of arts and sciences as well as polite literature and antiquities. They began in 1782 to hold weekly meetings for the purpose of reading essays on these different subjects; and the first volume of their 'Transactions,' which is for the year 1787, was published in 1788. The volumes have since come out regularly, and several of the earliest contain the mathematical and philosophical papers which were contributed by Dr. Young.

The reputation acquired through his literary and scientific attainments was the cause that Dr. Young was, without solicitation, appointed by Lord Cornwallis (the lord-lieutenant) to the see of Clonfert and Kilmacduach when it became vacant. A commentary on the 'Principia' of Newton, which the doctor had been long preparing in English, and which he afterwards, on the representations of his friends, translated into Latin, was completed a short time before he was raised to the episcopal bench; the publication was however unavoidably delayed on account of the new duties arising from this appointment, and before the bishop had leisure to carry out his intention a cancer began to form on his tongue. Under this painful malady he languished during fifteen months, and he died November 28, 1800, being then at Whitworth in Lancashire.

The principal contribution made by Dr. Young to the 'Transactions' of the Royal Irish Academy is a paper on the velocities of effluent fluids, which is published in the seventh volume. In this paper it is shown that when a tube of any length, open at both ends, is inserted vertically in a vessel so as to terminate on its bottom, and the vessel is filled with water to any level above the top of the tube, the velocity of the effluent water is increased, when compared with that of water issuing from the vessel through a simple orifice of equal diameter in the bottom, nearly with the square root of the length of the tube, the depths of water in the vessel being equal: and the cause of this remarkable circumstance is ascribed to the excess of the pressure downwards above the pressure upwards, within the tube, being greater than it is at equal depths of water when no tube is employed. Thus, a lamina of water at the top of the tube is pressed downwards by the weight of the atmosphere, together with that of the column of water above it, and upwards by the equal pressure of the atmosphere at the lower end of the tube, diminished by the weight of the column of water in the tube; therefore the resulting pressure on that lamina downwards is equal to the weight of a column of water whose height is equal to the entire depth of the water in the vessel. All the fluid in the tube descends with the same velocity; whereas, with a simple orifice at the bottom, each lamina of water in the vessel descends with a velocity depending merely on the weight of the column of fluid above it: the sides also of the tube prevent the lateral particles of water from converging towards the orifice, by which the discharge of the fluid through a simple orifice is diminished.

In the department of pure mathematics Dr. Young contributed a paper containing a demonstration of the rule for the quadrature of simple curves by infinite series; and one on the extraction of roots in general: this is printed in the first volume of the 'Transactions;' and in the same volume there is a paper by him containing a collection of antient Gaelic poems. An interesting paper by Dr. Young on the 'Origin and Theory of the Gothic Arch' is published in the third volume. In this paper the writer offers an opinion that the Gothic architects were induced to employ pointed arches in their buildings from a knowledge of their mathematical properties: from an investigation of their strength, on scientific principles, he comes to the conclusion that a pointed arch whose radius of curvature is equal to the span, or the distance between the supporting pillars, is the weakest of the kind, and also that the strength increases as the radius of the curve becomes, within certain limits, either less or greater than the span. In comparing low Gothic arches with arches of a semicircular form, he proves that, when the radius of the former is equal to three-fourths of the span, the strength is to that of a semicircular arch of equal span as 1000 to 1257; and when the radius is two-thirds of the span, as 1000 to 1210. In the fourth volume of the 'Transactions' there is a paper by Dr. Young containing demonstrations of Newton's theorems for the correction of the spherical aberration in the object-lenses of telescopes.

Besides these contributions to the Academy, Dr. Young published separately 'An Essay on the Phenomena of Sounds and Musical Strings,' 8vo., 1784. [ÆOLIAN HARP.] He subsequently published a short essay on the primitive colours in solar light, and one on the precession of the equinoxes. His last work was that which he entitled 'Principles of Natural Philosophy,' 8vo., 1800, and which contains the substance of the lectures which he had delivered at the University.

YOUNG, THOMAS. There are no trustworthy materials for the life of Dr. Young, and for some years past it has been known that a biography of him is in preparation by one who is highly qualified for the undertaking. With much regret at not being able to wait the appearance of this account, we must do the best we can with what is contained in the 'Gentleman's Magazine' and in the *éloge* read to the French Institute by M. Arago. This latter production does not give any authority for the facts which are mentioned, and the former is exceedingly meagre; so that we are obliged to warn our readers that the present article can only be of temporary use.

Thomas Young was born at Milverton in Somersetshire, June 13, 1773: his parents were of the Quaker persuasion. He received his first education at a dame-school at Minehead, where he resided with his mother's father, Mr. Robert Davies. It is said that he could read tolerably at the age of two years, and that his early memory was extraordinary, As six he was placed with a schoolmaster at Bristol, and, two years afterwards, the access which he gained to the instruments of a surveyor of his acquaintance seems to have decided his vocation: he applied himself immediately to mathematics. From nine to fourteen he was with Mr. Thomson, of Compton in Devonshire. M. Arago says that during this period he learnt, besides Greek and Latin, also French, Italian, Hebrew, Persian, and Arabic, the two former of the last five to find out the contents of some books in the possession of a schoolfellow, the third to read the Bible in the original, the two last to decide for himself a question raised in casual conversation as to whether the Oriental languages presented differences as decided as the European. Young's early acquirements are known to have been extraordinary, and his talent for languages unusual; but it is hardly safe to attribute his learning any one particular language to a conversation which probably, if it ever happened at all, was the consequence of his thoughts having dwelt on the subject, and not the cause. Moreover it is to be remembered that the friends and relatives of a boy of talent are very apt to exaggerate his early acquirements, particularly if he afterwards becomes a distinguished man.

At this time he was also much given to botany, and determined to make himself a microscope for the examination of plants. The algebraical formulæ which he met with had fluxional symbols, which arrested his progress: he accordingly set himself to study fluxions, that he might get the knowledge necessary to understand and construct a microscope to go on with his botanical pursuits. His close attention to these and other things had nearly proved fatal to him at the age of fourteen; symptoms of consumption appeared, which however were happily overcome by early attention.

Among the English, says M. Arago, it is rarely that a man of fortune, when he takes a private tutor for hi omits to find him as a *camarade d'etude* some youth own age who is particularly successful in his studie were not, we confess, aware of this nearly universal Young was admitted on this plan into the fam gentleman of Herefordshire, as companion to his the private tutor of both was Mr. John Hodgk afterwards published the 'Calligraphia Græca,' d to Young himself (1793), who suggested the furnished the writing. Mr. Hodgkin says that skill in the formation of the Greek letters was un On the day of Young's arrival at his destinatio desired to copy some sentences as a specimen o writing. Somewhat scandalized at being put test, he begged to retire into another room. of his absence excited some remark; but o he presented the sentences required, not onl written, but translated into nine different lan

At this time he drew up a synopsis of the losophical systems of the Greeks, from the o rities, according to his friends. M. Arago speaks of writing as still in existence, and states that du preparation Young's mind was gradually prepared for abandonment of the peculiar principles of the sect which he was brought up, which took place some afterwards. During journeys to London, also made this time with the family in which he lived, Young beca acquainted with, and was taught chemistry by, Dr. B Higgins. [ATOMIC THEORY, p. 39.] M. Arago stop a moment to advocate the claims of Dr. Higgins to material portion of the discovery of the atomic theory us the place of the allusion seems unfortunate; for the presumption is strong that if he had been able but a tolerable hint on the subject, Young would found the rest.

His maternal uncle, Dr. Brocklesby, now presented to Burke, Wyndham, and the Duke of Richmond. latter, then Master of the Ordnance, offered him the of assistant-secretary: the two former advised him to Cambridge. He would have done well to have their advice: the great drawback upon his scientific tions was the want of a sufficient knowledge of mathe All who can appreciate the truly extraordinary which he got on with what he had of those sc that a person so eminently qualified to exte power and their use should not have made roughly master of them in his youth. He d profession of medicine, and studied necessari Edinburgh, and Göttingen, at which last pl doctor's degree in 1795. He had been in year elected to the Royal Society, to which, before, he had sent the first of his well-kno the theory of vision.

As soon as Young had received his doctor's settled in London as a physician, and continued till his death,* which took place May 10, 1829. thorities here begin to cease giving dates, and plan is to mention the several prominent circums his remaining life in order.

As a professional man, Young was not successful. knowledge, and his power of tracing consequences, him, it is said, an undecided and wavering practitioner. had a keen perception that the practice of medicine lottery, and his idea of the advantage of skill, as avow his lectures at St. George's Hospital, was that it resemble advantage of a larger number of tickets in the lottery smaller: the holder of ten has a better chance of a prize the holder of five. Such doctrine is not that which stu of medicine like to hear, and his courses were accord not well attended: indeed it has been said that they above the students' comprehension. As a lecturer Royal Institution, it is also said that he was not succ in drawing audiences. With the effect of these and disappointments was combined the feeling that his p and successes were not properly appreciated, as w a long time most truly the case. On these points be it is hardly necessary to repeat what may be in part the comment merely of M. Arago.

In 1818 Young was appointed secretary of the Bo

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* M. Arago makes some strong remarks upon his remains not be terred in Westminster Abbey, and says they were carried to Farnbo The 'Gentleman's Magazine' avers that they lie in the cloisters of W ster Abbey. He has a monument in Westminster Abbey, but he w buried there.

ıde. and on the dissolution of that body he became
nductor of the Nautical Almanac. As the cha-
ıf that work had sensibly declined, and Young him-
ıose knowledge of practical astronomy was not as
that of other subjects, took no steps to restore it,
exposed not only to the strong but sober remon-
s of the calmer friends of astronomy, but also to
cks of others who were less inclined to pay proper
to his acquirements and true genius, and to whom
fame to measure themselves with Young on any
ı of argument. The general public hardly knew
time how distinguished a benefactor of human
lge was thus treated: it is now only to be wished
course he took had been as defensible as the
n which some of the objections were made was re-
ible.

impossible here to give an account of Young's
ious labours, many of which are yet as it were *sub*
Not a year passes in which something newly
to notice does not require the examination of his
s; it is frequently found that his hints are far from
xhausted. The points which should be most pro-
in a general recapitulation, are the amount and
of his knowledge, the remarkable manner in which
d make a small amount of mathematics go farther
nybody else, his discoveries in Egyptian hiero-
s, his theory of vision, his subversion of the New-
loctrine of light, and substitution of the undulatory
sis in its place. With regard to the hieroglyphics,
MPOLLION and HIEROGLYPHICS.

great change made in the foundation of optical
[UNDULATORY THEORY] by Young rested on the
probability which he was able to give to the un-
over the emanatory theory by his doctrine of *in-*
ces. His views are now generally adopted, and
en much enlarged.

g's writings are numerous, and we have no means
nting an authentic list. The 'Lectures on Na-
ilosophy' (1807, 2 vols. 4to.) are the best known.
k contains an immense quantity of research, with
d of Young imprinted on every part of it. The
volume contains a catalogue of writings on the
subjects of the first, which is bibliographically
able; and there is evidence enough that Young
a large number of the works there set down.

eling in this article is, that, not being able (from
materials) to make it in the least resemble what
to be, the less we add to the meagre sketch above
e better. Young's fame is not to be measured by
es of the subjects which can be placed in connec-
h it. To enumerate every point on which he
and wrote and gave new views, would be some-
ke going through the headings of all the sciences
ny branches of literature. To the world at large
oglyphics and the discoveries in light must always
first things which suggest themselves when his
s mentioned; but among philosophers he will
be held to be, as M. Arago styles him, one of the
of whom England has to boast in modern times.

ES (*Ypern*), a considerable and strongly fortified
the province of West Flanders, in the kingdom of
, is situated in 50° 50′ N. lat. and 2° 53′ E. long.
a very fertile plain on the banks of the little river
nd on a canal, by means of which, though an inland
has a communication with Bruges, Ostend, Nieu-
d the sea. The situation is unhealthy in con-
e of the marshes which surround it. In the four-
entury it was celebrated for its woollen manufac-
hich employed numerous looms, and its popu-
as very large. At present its manufactures
, linen, serge and other woollen articles, cotton,
and silk; it is however a flourishing town, and has
nhabitants; and has also many tanneries, dyeing-
bleaching-grounds, and soap manufactories. The
well built, and has an exchange, a royal college
r professors, a Beguinage, four hospitals, a cathe-
four parish churches. The principal buildings
he Cloth-hall, or town-house, a Gothic edifice of
inary size, with a tower in the centre: it was
1342; near it is—2, the cathedral, dedicated to
, a large edifice in the Gothic style, but not re-
e for the beauty of the architecture. It contains a
ulpit, and a picture, divided into compartments, which represents the Fall of Man. It is a very old picture, and attributed to Van Eyck, but this seems doubtful. A flat stone in the cathedral covers the grave of Cornelius Jansen, founder of the sect of the Jansenists, who was bishop of Ypres in 1638.

(Hassel, *Handbuch; Handbook of Holland, Belgium*, &c.; Stein, *Geograph. Lexicon.*)

YRIARTE, JUAN DE, was born at Orotava, in the island of Teneriffe, on the 15th of December, 1702. His father was a native of Navarre, and held a commission in the troops stationed in the Canaries. His mother was a native of Orotava. Juan was the first-born of a family of five sons and three daughters.

When Juan had barely completed his eleventh year, his father, who entertained a high opinion of French seminaries, sent him to France, under the charge of Pedro de Hely, French consul in the Canaries, who was returning to his native country. He sailed from Orotava on the 18th of December, 1713, and did not return to the Canaries till 1724. The year 1714 was spent in attendance at the public schools of Paris; in April, 1715, Hely transferred his residence to Rouen, whither his ward accompanied him. At what time Yriarte returned to Paris does not clearly appear, but he spent eight years in the college of Louis le Grand, where he distinguished himself by his acquirements in the classical languages and in the mathematics. Before returning to Teneriffe he visited London, apparently with a view to make himself master of the English language. His stay there was short: the intelligence of his father's declining health precipitated his departure.

On his arrival at Orotava, some time in 1724, he found his father already dead. It had been his wish that Juan should proceed from the Canaries to Spain, and study law in some of the Spanish universities. The young man remained some months at Orotava, seemingly irresolute to follow out the career designed for him by his father, and during this time he was busy extending the knowledge of the English language acquired during his short residence in London. At last he resolved to comply with the wishes of his deceased parent, and sailed for Spain about the end of 1724.

The reputation of the royal library induced him to visit Madrid, and the facilities afforded him by that institution for indulging his passion for reading detained him longer in that capital than he intended. The frequency of his visits and the class of works he used attracted the notice of the principal librarian, Don Juan de Ferraras, and of the king's confessor, Father Guillermo Clarke, who was director of the royal printing-office. The terms in which these officials spoke of the acquirements of the young stranger induced the Duke de Béjar to engage Yriarte as tutor for his son. Yriarte succeeded so well in this charge that he was successively engaged to give lessons to the son of the Duke of Alba and to the Infante Dom Manuel of Portugal, who visited Madrid about that time. His leisure hours were spent in the Royal Library, in which his first patrons at length procured him an appointment. On the 19th of April, 1729, Yriarte was appointed secretary to the royal printing-office; and on the 4th of January, 1732, a librarian in the royal library.

His extensive knowledge of languages and his passionate love of books alike qualified him for filling the latter post. During the thirty-nine years that he continued librarian he added two thousand manuscripts and upwards of ten thousand printed volumes to the collection. In 1729 he had published a catalogue of the geographical and chronological works contained in the library; in 1730, a catalogue of the mathematical works. In 1769 he published the first volume of a catalogue of the Greek MSS. in the royal library, illustrated with notes, indices, and anecdotes. A second volume was promised, but never appeared.

The linguistic attainments of the librarian were frequently put in request by the government officers, and so valuable were they found, that on the 21st of February, 1740, he was appointed official translator to the principal secretary of state. The secrecy observed in a ministerial cabinet renders it impossible to learn with certainty the exact qualifications he showed himself to be possessed of for this office; but during the whole twenty-nine years that he continued to fill it, he enjoyed a high reputation among Spanish statesmen for method, punctuality, and severe integrity.

The laborious duties of the librarian and official translator did not occupy the whole time of Yriarte. In 1743 he was elected a member of the Royal Academy, and continued till his death to take an active part in its labours. The chief labour of devising an improved system of orthography, punctuation, and accentuation for the Spanish language fell upon Yriarte: he was ordered by the king to compile a Spanish Latin Dictionary, in which however he proceeded no further than the letter A; and he published a Latin grammar in Castilian verse. He had also a hand in revising and improving the 'Hispania Nova' of Nicolas Antonio, and the 'Biblioteca Arabico-Hispana Escurialense' of Casiri, and was of material assistance to Abreu in his 'Coleccion de Tratados de Paz d'España.'

Yriarte composed elegantly in verse, both in Spanish and Latin. A collection of Spanish proverbs rendered into Latin verse, of epigrams in Latin, of translations from Martial, and of occasional verses both in Latin and Spanish, was published by subscription after his death.

Juan Yriarte died at Madrid, on the 23rd of August, 1771, in the sixty-ninth year of his age. In addition to the works already mentioned, he left in MS. 'Historia de las Islas de Canaria,' and 'Paléografia Griega.' He also contributed largely to the 'Diario de los Literatos de España.'

Three brothers of the name of Yriarte, nephews of Don Juan, have distinguished themselves in the public service, and in the literature of their country, but the materials for their biography are very scanty. We have been unable to ascertain even the baptismal name of their father, but as they appear to have been all born in Teneriffe, it is probable that their parents were settled there, and that the prosperous fortunes of Juan de Yriarte induced his nephews to try their fortune in the mother-country.

Bernardo, the eldest, appears to have been born about 1734. He rose to be a member of the Council of State, and of the Council of the Indies, and was created a knight of the order of Charles III. He was a member of the Royal Academy of St. Ferdinand, and nominated its patron by Charles IV. in March, 1792. When the French took possession of Spain in 1808, Bernardo Yriarte was appointed a Councillor of State by Joseph Bonaparte. On the return of Ferdinand VII., Yriarte fled to France, and died at Bordeaux, on the 11th of July, 1814.

Domingo, the second brother, was born in 1746, and entered the diplomatic service at an early age. After a prolonged residence, first at Vienna, and then at Paris, as secretary to the embassy and chargé d'affaires, he was sent as minister plenipotentiary to the king and republic of Poland. On the 22nd of July, 1795, he signed, along with Barthélemy, the peace concluded at Bâle between the king of Spain and the French republic. Returning thence to Spain in bad health, he died at Girona, on the 22nd of November of the same year, just after he had been appointed ambassador to France.

Tomas, the youngest, but most distinguished of the brothers, was born about 1750. Under the direction of his uncle Juan he made rapid progress in the antient and modern languages, and was appointed chief archivist in the office of the principal secretary of state. This appointment left him ample leisure for literary pursuits, and the approbation which his first essays met with procured for him the editorship of the 'Madrid Mercury.' This journal, which was previously little more than a translation of the 'Hague Gazette,' became in his hands a useful and amusing publication.

In 1769 a new theatre was opened in Madrid; and in the course of that and the three succeeding years a number of translations from the French drama by Yriarte were performed on its boards with considerable success. In 1778 an original comedy by Yriarte, 'El Señorito mimado' (the Spoiled Child), was favourably received by the Madrid public. In 1779 a poem in five books, entitled 'La Musica,' appeared from the pen of Yriarte: it is upon this work and his fables that his reputation is most likely to rest. 'La Musica' has run through five editions, and has been translated into most European languages. In 1781 he was a competitor for the prize awarded to the best Idyl by the Spanish Academy, but the poem of Juan Melendez Valdez was preferred. Yriarte vented his spleen in a severe criticism of his rival's work in the 'Mercury.' 'Fabulas Literarias' was published in 1782. Of these fables Bouterweck remarks that their style is pure, and their versification elegant, and that they are characterised by a graceful naïveté that reminds the reader of Fontaine, but without conveying any suspicion of imitation. In addition to these works Yriarte published epistles in verse, sonnets, critical miscellanies, a translation in verse of the four first books of the 'Æneid,' and of Horace's 'Art of Poetry.' He published a collection of his works in 1780, and an enlarged edition in 1787. His taste for French literature, or some other cause, occasioned suspicions of his orthodoxy; in 1786 he was subjected to an examination by the Inquisition, and his replies were so little satisfactory, that he was laid under a *quasi* arrest—confined within the walls of the city. Ultimately he was allowed to do penance privately, and was absolved. He did not long survive: he was attacked by epilepsy, and died of an inflammatory attack in 1690 or 1691.

A painter of the name of Yriarte, who was born in Biscay, 1635, and who died at Seville in 1685, was considered the best landscape-painter of his age.

Francisco Diego de Ainsay Yriarte, a native of Huesca, published, in 1612, 'Translacion de las Reliquias de San Orencio, Obispo de Aux;' and in 1619, 'Fundacion, Eccelencias, Grandezas, &c., de la antiquisima Ciudad de Huesca.' Antonio mentions that he was master of the grammar-school of Huesca, and died young, but without mentioning the year of his death.

(*Noticia de la Vida y Literatura de Don Juan de Yriarte*, prefixed to the collection of his works published at Madrid in 1774; *the Prefaces to the Collected Works of* Tomas de Yriarte, published at Madrid in 1787; Antonio, *Bibliotheca de Hispania Nova*; *Biographie Universelle*. Pignatelli published a eulogistic Narrative, and Joly a notice of the Life of Tomas de Yriarte, in the *Répertoire de Littérature*, neither of which we have seen.)

YRIEIX, ST. [Vienne, Haute.]

YSSENGEAUX. [Loire, Haute.]

YSTAD. [Sweden.]

YTTRIA. [Yttrium.]

YTTRIUM, a peculiar metal discovered in the state of oxide, or earth, and named *yttria*; it was found by Gadolin, in 1794, in a mineral from Ytterby in Roslagen, Sweden; this was at first called ytterbite, and afterwards *gadolinite*, by which name it is now generally known.

The metal was separated by Wœhler from the chloride; the decomposition is attended with a very vivid disengagement of light and heat. When the mass resulting from the decomposition is put into water, the yttrium separates in small brilliant scales, having a perfect metallic lustre; after being washed and dried, it is a brilliant blackish grey powder, composed of small metallic scales. This crystalline aspect and metallic lustre serve to distinguish it perfectly from aluminium and glucinium: when burnished it also assumes a much deeper metallic colour than aluminium. It does not oxidize either by the action of air or water, at common temperatures; but when heated to redness in the air, it takes fire, burns with much splendour, and is converted into yttria. Yttrium dissolves in diluted acids, with the evolution of hydrogen; when immersed into a solution of potash, it decomposes water, and oxidizes, though not with rapidity.

We shall now briefly describe the minerals which contain yttrium, or rather its oxide, yttria.

Gadolinite.—Occurs crystalline and massive. Primary form an oblique rhombic prism. Cleavage imperfect, so that its direction has not been ascertained. Fracture flat conchoidal, sometimes splintery. Hardness 6·5 to 7·0. Colour greenish black, very dark. Streak greenish grey. Lustre vitreous, inclining to resinous. Opaque, translucent on the edges. Specific gravity 4·238.

Massive Variety.—Amorphous, structure compact. Before the blowpipe it decrepitates, if not cautiously heated, and does not melt except in small splinters. If heated with precaution on charcoal, it incandesces at once, and its colour becomes paler. In nitric acid it loses its colour, and gelatinizes.

Gadolinite is found at Ytterby near Stockholm, and at other places in Sweden, and also in Greenland.

This mineral has been repeatedly analyzed, and with somewhat varying results: thus, it was examined by Ekeberg, Klaproth, and Vauquelin, without the detection of oxide of cerium, which was found by Berzelius, who gives the following as the composition of the mineral from Broddbo:—Silica, 24·16; Yttria, 45·93; oxide of cerium, 16·90; oxide of iron, 11·34; moisture, 0·60.

course of this river is very imperfectly known. On the south-west of Yucatán are the Mexican states of Chiapa and Tabasco, and here too it appears that the boundary is not exactly fixed. It is partly formed by the river Usumasinta, but lies mainly between the principal branch of that river and its arm which is called Palisada. It seems to terminate on the shores of the Gulf of Mexico, at the Heights of St. Gabriel (near 82° 10′ W. long.).

Coast and Harbours.—From the eastern extremity of the Heights of St. Gabriel a low, swampy, and wooded shore extends to the western entrance of the Laguna de Terminos. The Laguna is about 60 miles long from west to east, and more than 30 miles wide on an average. As it receives several large rivers, among which are the Rio Palisada and the Pacaitan or Batcap, its waters are salt only in the dry season, and hardly brackish in the wet season. It seems to be deep enough for the larger size of ships; but it is only navigated by vessels of from 15 to 30 tons, which are also flat-bottomed on account of the shoals at the mouth of the Rio Palisada, as the country contiguous to the banks of that river alone yields any article of commerce. The Laguna is separated from the Gulf of Mexico by two islands, of which the western is called Carmen and the eastern Puerto Real. Carmen is about 24 miles long, and Puerto Real 19 miles long, but their width is not stated. The western entrance of the Laguna, between the mainland and the western extremity of Carmen, constitutes the harbour of the town of Laguna. The anchorage is shoal, but safe, and easy of access for vessels not drawing more than 12 or 13 feet of water. Nothing is stated respecting the two other entrances of the lagoon, which are west and east of Puerto Real.

From the eastern extremity of the Laguna de Terminos to the mouth of the river Champoton the coast is low, swampy, and overgrown with high trees, but north of the river it is well defined, several feet above water-mark, and is composed of low limestone rocks. It runs in nearly an unbroken line to Punta Palma: on this coast-line, extending more than 100 miles, there are only two harbours, one at Campeachy and the other at a place called Boccas. The harbour of Campeachy is shallow, and vessels which draw more than six feet are obliged to anchor nearly three miles from the shore: that of Boccas is only visited by coasting vessels.

The western portion of the northern coast is low. It is mostly overflowed during the wet season, and even in the dry season is partly occupied by lagoons and swamps. The greater part of it is overgrown by low bushes. This low tract extends eighteen miles inland, at the back of the town of Sisal, so that a causeway has been made across it, leading from Sisal to Merida, the capital of the republic. The port of Sisal is only an open roadstead, and large vessels are obliged to anchor more than two miles from the shore. It would seem that along this coast as far east as 89° W. long. good anchorage is always found at the distance of between two and three miles from the land. At some distance east of 89° W. long. the coast is lined by sand-hills, which rise from 50 to 100 feet above the sea, and at a few places higher. These hills are partly overgrown with bushes. A series of such hills forms a tongue of land, which separates a narrow arm called Rio Lagartos from the main body of the sea. It does not appear that this narrow sea is navigable, nor is it stated whether there is safe anchorage along this coast west of Cape Catoche. In approaching this cape the sand-hills disappear, and are replaced by a low tract mostly covered with swamps and cut up by small lagoons. But in this part the low tract is overgrown with trees rising to 150 feet. The cape itself is low and lined by a succession of narrow and low islands, likewise covered with high trees. The distance between this cape and Cabo de S. Antonio in Cuba, where is the strait which connects the Gulf of Mexico with the Caribbean Sea, is nearly 150 miles.

The eastern coast of the peninsula from Cape Catoche to 20° 11′ N. lat. is well defined, and not quite so low and swampy. At some places there are sand-hills 20 feet high, which are here and there clothed with stunted bushes. At other places there is a sandy beach, backed by level ground thickly covered with trees attaining a height from 50 to 100 feet. At 20° 11′ the shore is lined for three miles by white perpendicular cliffs, about 80 feet high, which seem to constitute the termination of a ridge of high ground which traverses the interior. South of these cliffs are two wide and large inlets called Ascension Bay and Espiritu Santo Bay. They penetrate 12 miles into the country, and have barrier-reefs across the greater part of their entrance. They constitute two well-sheltered reef-harbours, but can only be entered by vessels drawing from 7 to 8 feet water. The surrounding country is low, and thickly wooded. From Santo Espiritu Bay a low unbroken coast extends southward to the channel north of Ambergris Cay. This Cay lies before the entrance of Ambergris Bay, a lagoon extending about 70 miles from south to north, with an average width of 10 miles. It has not more than from 5 to 12 feet water on a soft muddy bottom. The small vessels which navigate it are sheltered on their voyage to Balize by the numerous reefs which line this part of the coast of Yucatán, and thus the inhabitants of this tract are compelled to trade with the English settlement. The shores of this lagoon are low, thickly wooded with mangrove and other trees, and cut up by lakes, streamlets, and rivers. The largest river is the Rio Hondo, which constitutes the boundary between Yucatán and the English settlement. [BALIZE.]

South of Cape Catoche there are several islands. The [illegible] of Mugeres is 4 miles from the mainland, 5 miles long, and somewhat more than half a mile broad. It rises into a hill 80 feet high, covered with trees. Between it and the mainland is good anchorage with 2 fathoms water. The island of Cancun is a narrow slip composed of sand-hills, scarcely half a mile wide, and about 8 miles in its entire length, stretching out like two sides of a triangle, and enclosing a lagoon between it and the mainland, from which it is separated only by a boat-channel. The island of Cozumel is 26 miles long from north-east to south-west, and 7 miles wide. It is level, and covered with small trees, whose tops are about 70 feet above the sea. The channel between this island and the mainland is 10 miles wide and very deep, as its bottom was not reached with 200 fathoms of line.

Physical Description.—Yucatán contains two regions quite different in soil, fertility, productions, and cultivation. But as the country has only lately been visited by persons who have published their travels, we are unable to determine the extent of these two regions. It is, however, evident that the centre of Yucatán is not traversed, as Humboldt was led to believe, by a chain of hills running from south-west to north-east. [MEXICAN STATES, vol. xv., p. 150.] The low ridges of elevated ground which occur do not lie in that direction, nor are they in the middle of the peninsula.

From the few and isolated facts which have come to our knowledge, it appears that the line of demarcation between the two regions begins on the Gulf of Mexico, near the mouth of the river Champoton, and stretches across the peninsula to 20° 11′ N. lat., where the Bay of [illegible] lined with elevated cliffs. In the country [illegible] line there is neither river, rivulet, nor spring. [illegible] to be accounted for, as the subsoil consists of [illegible] of limestone intermixed with silicious matter [illegible] which covers the limestone is thin. Though [illegible] very abundant during the rainy season, the soil [illegible] whole quantity which falls, and prevents the [illegible] uniting and forming watercourses or springs. [illegible] depressions some water is collected in tempor[illegible] which however are soon dried up. This [illegible] would render the country unfit for the [illegible] man and beast if there were not many wells. [illegible] formed by openings in the surface, from 100 to 300 [illegible] and from 60 to 100 feet deep, which have more [illegible] circular form. At the bottom of these sonatos or [illegible] as they are called, is a pond from 10 to 20 feet [illegible] taining clear and pure water. According to the [illegible] of the inhabitants, these wells are fed by [illegible] rivers; but it does not appear that a current has [illegible] observed in any of them. These sonatos are more [illegible] mon in the interior of the peninsula than in the [illegible] the sea, where they are in most places replaced by [illegible] cial tanks. The surface of this region is a level [illegible] slightly undulating, and it is only in a few places [illegible] becomes hilly. There are two ridges of high ground. [illegible] lies at the back of the town of Campeachy, which is [illegible] base, and in extending northward it recedes from the [illegible] shore, and rises until it reaches the height of 500 feet [illegible] the Sierra Alta near Tecax. The other elevated [illegible] crosses 20° N. lat. obliquely, extending about 100 miles [illegible] from north-west to south-east. It rises in some places [illegible] *vacaros*, or tenders of cattle and horses, who are properly agricultural servants, and receive wages and a weekly allowance of maize; and *labradores*, or labourers, who are also called *luneros*, from their obligation to work for the master without pay on Lunes, or Mondays, in consideration of their using the water of the estate. These last constitute the great body of the Indians; and they are obliged, when they marry and have families, and of course use more water, to clear a certain extent of ground and to plant it with maize for the master. They are also obliged to work on other days of the week, but then they receive fixed wages. These Indians are however not to be compared with the glebæ adscripti of Europe, as they may leave their master whenever they please, provided they are not in debt to him, which however is rarely the case. When they owe a debt to the proprietor, the new master to whom they attach themselves must pay this debt before the Indians are discharged from their former master. This arrangement secures to the Indians good treatment from their masters, as the large landed proprietors are always striving to increase the number of labourers attached to their property. The Maya language is the only one which is spoken by the Indians, and all the whites have acquired it.

The aborigines of Yucatán had made considerable progress in civilization when the Spaniards arrived there in 1517. They wore cotton dresses, and lived in houses built of stone. It cannot yet be determined if the ruins of those extensive and sumptuous buildings, which have lately been discovered in several parts of the country, were erected by the race which still inhabits the country, or by a more antient one which has become extinct. The most remarkable and best preserved of the ruins which, up to 1842, have been discovered, are situated at Uxmal, south-west of Merida, and about 12 miles from the sea, and at Chichen, about 12 miles west of Valladolid. The present generation does not appear to be inferior in civilization to their ancestors at the time of the arrival of the Spaniards. They still generally live in houses built of stone, and wear a decent cotton dress.

Manufactures.—The cotton-cloth generally worn by the Indians and lower classes of whites was, till lately, only made in the families, but recently a cotton manufactory with steam-engines has been established at Valladolid. Other manufactures do not exist. In some places the Mayas make hats from the leaf of a palm, which are exported to the neighbouring countries from Campeachy, and in the United States are known as Campeachy hats. Sackcloth made by the country-people is exported.

Commerce.—The commerce of Yucatán is very limited. None of its agricultural products yield articles of export, except the Sisal hemp. The manufactured articles are Campeachy hats and sackcloth. The most important articles are derived from the forests, as logwood, deer-skins, wax, and honey. The imports consist chiefly of English and French manufactured goods, and spices brought from the East Indies.

Education.—The Yucatanos have shown some taste for literary pursuits. There are two colleges; one at Merida, called Minerva College, and another in Campeachy. The latter has six professors, and in 1842 there were 55 students, besides 13 more who were on the foundation. There are also schools for the lower classes, but we are not acquainted with their condition.

Political Divisions and Towns.—Yucatán is divided into five departments and eighteen districts, and contains 236 townships.

Merida, the capital, is 36 miles from its port Sisal, which is to the north-west of it, and is the seat of the government of the republic. It is about 25 feet above the sea-level, and built upon the ruins of an Indian town, which was destroyed by the Spaniards. The streets are of good width, and laid out at right angles to one another. The side-walks are four feet wide, and paved with rough stone. The houses are well built of stone, and uniform in their appearance. The roofs are flat and the exterior finished with stucco. The middle of the streets is lowest, forming a passage to carry off the water. After heavy rains the streets are flooded to the edge of the walks, and for some hours nearly impassable. There are five fine squares, the principal of which is in the centre of the town, and surrounded by the cathedral, the bishop's palace, government-house, and the dwellings of the wealthiest citizens. The cathedral is a vast structure, and built in the best style of the sixteenth century. There are also thirteen other churches within the city and the suburbs, and they are in general well built. None of the other public buildings are remarkable. The population is stated to exceed 20,000 individuals, the majority of whom are Indians and half-breeds. Sisal has about 1000 inhabitants, almost all Indians: from this port are exported hemp, sackcloth, ox-hides, deer-skins, and wax.

Valladolid is a considerable town in the interior, with more than 15,000 inhabitants. In the district north of this place the best cotton is grown, and lately (1834) a cotton manufacture has been established. It has a very beautiful cathedral. The climate is considered the healthiest in Yucatán.

Campeachy, on the Gulf of Mexico, is entirely built of a calcareous stone, and stands upon a foundation of the same substance, which contains subterraneous caverns of great extent, which have evidently been made by the hand of man. Probably they owe their existence to the building materials which have been got from them. The streets are narrow and irregular, and have not the clean appearance of those of Merida. Most of the private houses have one story. The public buildings in the square have two stories, and are tastefully ornamented [illegible] painted. There are five churches and five con[illegible] Campeachy exports large quantities of logwood, wax, and honey, and a number of vessels are built here, measuring a hundred feet in the keel. A handsome playhouse has lately been erected.

In the interior are several other towns, containing from 3000 to 10,000 inhabitants, among which [illegible] are [illegible] Sitax, and Zibackchen. The last-mentioned place is on the road leading from Campeachy to Merida. Laguna, built at the west end of the island of Carmen, is a thriving place, from which large quantities of logwood and timber are exported. The logwood is mostly brought from Palisada, a small thriving place situated on the banks of the Rio Palisada, an arm of the Usumasinta river.

Where the boundary-lines of Yucatán, Guatemala, and the British colony of Balize are supposed to meet, there is a large tract, probably exceeding 30,000 square miles in extent, which is entirely unknown. It is however certain that it is inhabited, and, according to some reports, it is populous. The inhabitants are known by the name of Lacandones, and are stated to avoid all intercourse with their neighbours, except that sometimes they bring to the neighbouring settlement tobacco, which is of the best quality, and is grown by them to a great extent. Some persons assert that they have seen in this country, but from a great distance, a very large and well-built town, and it is supposed by some travellers that when this country shall be known, we shall ascertain by what nation the immense buildings have been erected which occur in Yucatán, and the ruins of which have lately excited so much surprise.

History.—The Spanish historians mention, that [illegible] hundred years before their arrival, about 1420, a revolution had taken place in Yucatán, in which the town of Mayapán was destroyed. One of the [illegible] this revolution is mentioned as the head of the provi[illegible] Chi-chen-itza, a name which is still applied to one [illegible] most interesting and extensive groups of ruins. Yucatán was discovered in 1517, by Hernandez Cordova, who [illegible] been sent by Velasquez, the governor of Cuba, for the purpose of making discoveries. He sailed from Cape Catoche to the vicinity of the Laguna de Terminos, and landed twice: he found the inhabitants civilized, but warlike. In the following year Juan de Grijalva, following his track, arrived at the island of Cozumel, whence he sailed round the peninsula and along the eastern coast of Mexico as far north as the mouth of the river Panuco. He also experienced the warlike disposition of the inhabitants. When Cortes had subjected Mexico to the dominion of Spain, he sent, 1522, Bernal Diaz to conquer Yucatán, which he also accomplished, though not without an obstinate resistance. Yucatán remained under the sway of Spain up to the time when the Mexican States acquired their independence. Nor did it experience the evils of an internal war during the protracted struggle between the mother-country and the colonies (from 1810 to 1820), being situated out of the way of warfare. It always adhered to the government established in Mexico, and formed, after dependence had been obtained, one of the states of the exican Federation. In 1835 the federal government in exico was changed into a central government. This eated much discontent in those persons who had some pectation of governing the states of which they were izens, and they constituted a party called the Federalists. r some time they tried only to influence the choice of e representatives to Congress, but not succeeding, they gan to agitate, and they succeeded in Yucatán. In 1839 e Santiago Iman, a militia captain, set up the standard revolt in Tizimin, a small town in the interior of Yucatán, nd proclaimed the Federal Constitution of 1824: he attacked the town of Espita, but did not take it, and he was soon terwards driven from Tizimin. But he soon re-occupied e place, and gained the favour of the Maya Indians by fering them a discharge for the future from the contributions which they had to pay. The Indians probably ere already acquainted with the fact that in the neighouring republic of Central America the aborigines, under e conduct of an Indian, Carrera, had begun a successful r against the president of the republic, Morazan, and y flocked to the standard of Iman, and made him ir general. The government troops sent against were at first successful, but in the beginning of he succeeded in taking the important city of Valla- After this event Merida and the other towns sub- l, and declared in favour of the constitution of Nothing was left but Campeachy, the head- rs of the Mexican general Rivas, with a garrison of 000 men. This place was besieged, and surrendered month of June, 1840. In 1841 the legislature declared dependence of Yucatán on Mexico, and made a nstitution, which does not materially differ from the one. The legislature consists of two houses, a and a house of representatives, and at the head executive is a governor. It is very probable catán will maintain its independence. For the which lies between it and the other states of the a confederation is the plain of Tabasco, a watery ery thinly inhabited and extremely unhealthy all round. The attempt to cross this plain with an ould probably be followed by the destruction of by disease. To invade the country by sea would much larger navy than the Mexican republic has sposal. It is however to be feared that the In- o compose four-fifths of the population, and by ssistance the revolution has been effected, will arms against the whites, though the latter for the ave avoided such an event by readily acceding olution.

oldt's *Essai Politique sur le Royaume de la Nou- gne*; Juarros, *History of the Kingdom of Gua-* Allen's 'Sketch of the Eastern Coast of Central in the *London Geographical Journal*, vol. xi.; *Incidents of Travels in Central America, and Yucatán*, New York, 1841; and Norman's *n Yucatán*, New York, 1843.)

A, a genus of plants belonging to the section As- of the natural order Liliaceæ. This name is that the plants of this genus by the inhabitants of a, and was first published by Gerarde. It was d by Linnæus, although in opposition to his rule e scientific names of genera should in no case be me as the barbarous. The species of plants belong- this genus are handsome endogenous plants, more ess caulescent, with numerous long, simple, rigid or aceous, pungent leaves, and copious white panicled ers, which are extremely elegant, but entirely destitute odour. The following essential character of the genus given by Sir J. E. Smith:—corolla inferior, bell-shaped, segments without nectaries; stamens club-shaped; tyle none; berry hexagonal, of six cells; seeds numerous, lat.

Y. gloriosa, Common Adam's-Needle, is a caulescent plant, with lanceolate, straight, furrowed leaves, their dges smooth and entire. This handsome plant is a native f Peru and North America. It grows on the shores of arolina, where it blossoms in July and August, its panicle of elegant flowers attaining a height of 10 or 12 et. In British gardens the stem of this plant does not tain a height of more than two or three feet. The owers are white and drooping, and not much inferior in ze and beauty to those of the white water-lily; but they are more cream-coloured, and are tinged at the base and points with crimson.

Y. aloifolia, Aloe-leaved Adam's-Needle, has linear-lanceolate, even, straight leaves, with the edges bordered by fine callous notches. This plant is a native of North and South America. It was introduced into English and Dutch gardens a century since, where it is treated as a greenhouse plant. Its leaves are straight, and narrower and stiffer than those of the last. The panicle is also more dense and cylindrical. The flowers are white, and externally tinged with purple. It very seldom flowers in this country; and when this event takes place, the plant becomes branched, and no more flowers are produced.

Y. draconis, Drooping-leaved Adam's-Needle: the leaves linear-lanceolate, even, reflexed, crenate; the segments of the corolla spreading, somewhat recurved. This plant is said by Mr. Aiton to be a native of South Carolina, where it flowers in October and November. The leaves are longer than in the last species, and are an inch broad and above two feet long. Clusius says that the Indians use the fibres of these leaves for the purpose of making a fine kind of thread. Cordage was also made of them for tying the rafters of their huts together.

Y. filamentosa, Thready Adam's-Needle: stemless, with lanceolate entire leaves, coarsely filamentous at the edges. It is found on the shores of Virginia and Carolina, and flowers in July and August. It will grow in the open air in this country, and blossoms in the autumn. Its flowers are panicled and pendulous, and of a cream colour. The leaves have their edges beset with long recurved threads.

In the cultivation of these plants, they may be all propagated by offsets or suckers, which should be removed from the parent plant at any time during the spring and summer season. They should be laid aside in a dry place, for the wound caused by their separation to be healed; and when this is effected, they should be planted out separately in pots of light sandy compost, and placed in a shady situation till they have rooted. When propagated by seeds, those from abroad should alone be employed. The seed should be sown in spring in pots of light earth, which should be placed in a hot-bed, when the plants soon come up. When the plants are two or three inches high, they should be placed out in pots of light sandy mould, and still kept in the hot-bed, but hardening them by degrees to the open air, to which they may be exposed from June to October, when they should be placed in the house for the winter. They should occasionally have moderate waterings.

(Sir J. E. Smith, in Rees's *Cyclopædia*; Burnett's *Outlines of Botany*.)

YUNX. [Wryneck.]

YVERDU'N, a town of the Canton de Vaud in Switzerland, situated at the south-western extremity of the lake of Neufchâtel, which is sometimes called the lake of Yverdun, where the river Orbe, called also Thiele, enters the lake. Yverdun is one of the principal towns of the Canton de Vaud, and is the head of a district containing thirty-eight communes and about 12,400 inhabitants. The town of Yverdun had, in 1837, 3460 inhabitants, including its 'banlieue,' or communal territory. The town is well built, the streets are wide and regular, and there are some very fine promenades on the banks of the lake. Many families in easy circumstances reside at Yverdun, and the town carries on a considerable trade in cattle and agricultural produce. Fairs are held at various times of the year. A steam-boat plies between Yverdun, Neufchâtel, and Bienne. Yverdun acquired a sort of celebrity in the early part of the present century in consequence of the institution for education, directed by Pestalozzi, which was established in the castle of Yverdun in 1805. [School, p. 38.] After removing to Buchsee, Pestalozzi became connected with Fellenberg, whose attention was also turned to the subject of popular education. [Hofwyl.] In 1805 Pestalozzi removed his establishment to Yverdun, the town giving him the use of its old castle, where he developed his peculiar system of elementary education, which has been the subject of much inquiry and much discussion. For information concerning Pestalozzi's system, or 'method,' as he called it, we must refer the reader to the various works written on the subject: among others, to the 'Exposé de la Méthode élémentaire de H. Pestalozzi, suivi d'une notice sur les travaux de cet homme célèbre, son institut, et ses principaux collaborateurs,' par D. A.

Chavannes, Membre du Grand Conseil du Canton de Vaud, Vevey, 1805. Julien, the editor of the 'Revue Encyclopédique,' published at Paris a work in two volumes, entitled 'Esprit de la Méthode d'Education de Pestalozzi.' The establishment at Yverdun flourished more than twenty years. A traveller who visited it in 1822 gave an account of it in the 'Antologia' of Florence, for December, 1824. At that time there were about thirty-six boys, and as many girls, boarders in the institution. Some years after, in consequence of Pestalozzi's death, the establishment at the castle was broken up; but Niederer, one of Pestalozzi's disciples, set up a boarding-school for young ladies; and two other of his brother teachers, named Rank and Kreis, established a school for boys, in which they followed Pestalozzi's method. Professor Naef is at the head of the asylum of the deaf and dumb, which is supported by the government of the Canton de Vaud. Yverdun has also a college, free elementary schools, a middle school, an infant-school, several schools of industry, a library, a museum of natural history, and a savings'-bank.

Yverdun was a Roman military station, and was called Ebrodunum. Roman antiquities have been found in the neighbourhood. In the middle ages it was one of the four head towns of the barony of Vaud, subject to the House of Savoy. The castle of Yverdun, with its four towers, was built A.D. 1135, by Conrad of Zähringen. The mineral-baths at Yverdun, which have been lately restored, were known and frequented in the time of the Romans.

(Leresche, *Dict. Géographique Statistique de la Suisse.*)

YVERDUN, LAKE. [NEUFCHATEL.]

YVETOT, a town in France, capital of an arrondissement in the department of Seine Inférieure, 20 or 21 miles north-west from Rouen, and 97 miles north-west from Paris by Rouen, on the road to Lè Hâvre.

Yvetot was the capital of a lordship, the possessors of which in the middle ages had the title of king; and some have affirmed that they were in their own little territory really independent sovereigns. Their possession of the kingly title is unquestionable, and the inhabitants of the lordship were, even down to the French revolution, exempted from taxation. The town contains little worthy of notice. The houses are old, and chiefly surrounded by gardens: there is a handsome public walk called l'Etoile. The supply of water is deficient.

The population in 1826 was 9853 for the commune; in 1831, 7737 for the town, or 9021 for the whole commune; in 1836, 9213 for the commune. The townsmen are busily engaged in the manufacture of cotton-yarn, calico, dimity, bed-ticking, cotton-velvet, and other cotton goods, linens, flannel, hats, spinning-wheels, and machinery for weaving; the manufacture of hosiery has somewhat declined. There are four yearly fairs, and trade is carried on in corn and sheep. There are a tribunal of commerce and a subordinate court of justice, some fiscal government offices, an hospital, and a prison.

The arrondissement of Yvetot has an area of 447 square miles; the population in 1831 was 138,429; in 1836, 142,680. It is subdivided into ten cantons or districts, each under a justice of the peace.

(*Dictionnaire Géographique Universel*; Malte B *Géographie Universelle*; Dupin, *Forces Productives, de la France*; Reichard, *Road-Book of France*; Daw Turner, *Tour in Normandy*.)

Y'VICA, IVICA, IBICA, IBIZA, the name of the westerly of the Balearic Islands. It lies between 38 and 39° 8′ N. lat., and between 1° 25′ and 1° 38′ E. It is about 50 miles north-east by east of Cape Denia, nearest point of the Spanish mainland, and about south-west of the nearest point of Mallorca. It is in the form of an oblong parallelogram, having its side in the direction from south-west to north-east coast-line is indented with numerous small bays, and of considerable size—that of S. Antonio on the west the island, and that of Yvica on the east side, south-eastern angle. The general character of the is mountainous, intersected by numerous small The hills are well wooded with pines, firs, and The soil of the valleys is fertile, and produces flax, and hemp, the olive, the vine, and many fruits, especially figs and almonds. The number of in the island is inconsiderable. The coasts abound fish. It is said that there are no venomous reptiles island. There are a great number of salt-pans coasts. The climate is pleasant and salubrious; winter, while in summer the heat is tempered by breeze. The inhabitants are in general of the stature, and of a brown complexion. They are ficient in habits of steady industry, but make good and seamen. Their dialect, like that of Catalonia lencia, is a corruption of the antient Limosin, with a siderable admixture of words of foreign origin. They extremely tenacious of old customs, and live for the part in isolated habitations, not in towns or The only exports of the island are salt and timber. island forms part of the modern province of Baleares is divided into five districts, which the natives call tones, Llano de la Villa, Santa Eulalia, Balanzat, and El Cuarto de Salinas. Each district has (bayle) and assistant (teniente de bayle), who exercise the executive and judicial authority. They are every three years by the Real Audiencia. An appeal from their decisions to a judge (juez letrado), by the king, who resides in the chief town of the Yvica, the capital of the island, is in 38° 53′ N. (by observation) 5° 12′ 10″ east of Madrid. It is on the bay of the same name. The harbour is large, good anchorage on a clay bottom, and is secure winds, for, although open to the south and south-east, island of Formentera is sufficiently near to form a Miñano (in 1826) estimated the population of the 21,094 souls; of the capital, at 5720. Yvica is one of the two islands which Strabo (167, ed. Casaub.) calls the tyusæ, or Pine Islands. The Greek and Roman Yvica was Ebusus. (Pliny, iii., c. 5, and Harduin's

(Miñano, *Diccionario Geografico-Estadistico de Mapa de España y Portugal*, por D. Tomas Lopez, 1836; *Dictionnaire Géographique Universel*; smith's *Map of Spain and Portugal*, 1842.)

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Z.

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Vestern Europe. In the Greek series of letters it oc-
ied the seventh place, the sixth being the property of
subsequently disused Vau or F. Two questions then
e which deserve an answer: how was it that the
nans gave this letter a place so different from that oc-
ied by the Greek letter? and secondly, how are we to
ount for the Latin letter G occupying the place which
uld have been given to Z? We would first observe
t the Greeks were surrounded on the north by Slavonic
es, with whom an abundance of sibilants has always
n in favour, so that the early position in the alphabet
Z need surprise no one. In the second place, we
ongly suspect that the genuine sound of the Greek Z
early times was not, as is sometimes stated, that of *sd*
ds, for then it would have been a superfluous letter,
would scarcely have appeared so early in the alphabet.
would rather believe that the sound was similar to that
e English *j*, in which case the established interchange
and δι before vowels would be explained. For in-
e, the form Ζευς in that case would not surprise us
side of either Διος or *Jupiter*, *Jovis*, &c., or of the
Giove. [D; J.] Next looking to the Roman al-
t we are disposed to contend that the character G
riginally employed with the same power. At any
was not the equivalent of the Greek Γ, for the third
of the Roman alphabet, C, as it derived its form
he Greek Γ, merely changing its angle into a curve
nge not unknown to the Greeks themselves, see
les of the old Greek character under ALPHABET),
power was precisely the same, a fact for which we
bundant testimony among the Romans themselves.
Ausonius, for instance, says, 'Prius vice Gammae
est.' But if G originally represented a sound dif-
from the thick guttural Γ, what sound is more
o have belonged to it than that of our English *j*,
e know that the sound is still current in Italy,
h they want a single character to represent it, and,
y, when it is an undoubted fact that the two sounds
y apt to be interchanged. In our own tongue the
tter in question performs the two offices we are
g of, in *gender* and *get*, even before the same
and we once met with a child already ten years
whose ear and tongue could make no distinction
n *goose* and *juice*. In point of fact, the three
of *di* before a vowel, of an English *j*, and of our
y, are closely related. Those who read the ballads
y's 'Reliques' will find many words where a *z* is
with the power of a *y*, as is still the case in the
names *Dalzel*, *Mackenzie*, and the Scotch word
ailzie, for the English pronunciation of these words
orrect in giving to them the sound of our English *z*.
n words where an *n* precedes *z*, the sound *ng*
eard: thus *Menzies* is pronounced *Ming-es*. But
e Latin G and the Greek Z had originally the same
er, as well as the same place in the alphabetical series,
ecomes difficult to believe that the G alone of all the
in letters did not derive its *form* too from the Greek
nbol. Nor is the change so violent as would at first
pear. If the Greek Z be written with its oblique shaft
m north-west to south-east instead of from north-east to
uth-west (a supposition having little difficulty in it, if
ters were originally pictorial), then the ordinary change
m an angle to a curve would bring us to something
y near the true Roman G, which at times was not un-
the Arabic numeral 2, supposing it to look the other
. [ALPHABET, p. 384, pl. iv., col. 6.] The permuta-
s to which Z is liable have partly been spoken of
ve, and all of them anticipated in the other letters.
G; I; J; S; T; Y.]

AANDAM (frequently, but improperly, called SAAR-
M), a town in the province of North Holland, in the
gdom of the Netherlands, is situated in 52° 26′ N. lat.
4° 50′ E. long., on the river Zaan, not far from its
tion with the Y. It consists, properly speaking, of
great villages, called East and West Zaandam, containing together nearly 12,000 inhabitants, all Protestants, Lutherans, and Baptists, among whom are many very rich merchants. The town has a very considerable trade in timber, train-oil, and tar. They have extensive manufactures of cordage, snuff, tobacco, starch, and paper. At one time, in the flourishing days of Holland, Zaandam was accounted one of the greatest magazines of mercantile naval stores in the world. The most important branch of its industry was ship-building; this however declined very considerably: in 1780 the town possessed 30 large merchantmen, and 50 vessels employed in the Greenland whale fishery; in 1802, only 2 merchantmen and 12 whalers. Since the general peace, it has gradually revived, but no large ships are now built there.

The appearance of the town, as you approach it by land, especially from Bewerwyck, is extremely singular. It seems to consist of a line of windmills, some of them of gigantic size, with houses attached to them, extending along the banks of the Zaan to the neighbouring villages, and forming a street nearly five miles in length. Travellers differ about the number of these mills: Murray's 'Handbook' makes them only 400; but Stein and Cannabich say 700 and 1000 (Stein says there were formerly 2300); and the mills are not all for grinding corn, but there are oil, paper, and fulling mills, some for grinding colours, or the volcanic material brought from Andernach on the Rhine, which, being ground to powder and mixed with lime and sand, supplies the valuable cement called terrass, used in the construction of docks, dykes, and sluices.

It is not however to see mills, or to admire the curiously painted wooden houses, most of which, with their gardens, are surrounded with sections of canals, and look like so many little islands, that most travellers visit Zaandam; their object is to view the hut where Peter the Great of Russia, under the name of Peter Michaeloff, dwelt while working as a shipwright in the dockyard. It is a small cottage made of rough planks, consisting of two rooms, one above the other, the walls of which are covered with a multitude of names, among which is that of the Emperor Alexander, who visited it in 1814, and caused a marble tablet to be put up, with the inscription—'Petro Primo Alexander Primus.' The King of the Netherlands presented the hut to the Princess of Orange, now the Queen of the Netherlands, sister of the Emperor Alexander, who has had a sort of case built over it to preserve so memorable a relic.

(Hassel, *Handbuch (The Netherlands)*; Murray, Handbook, *Northern Germany; A Journey in North Holland*, translated from the French.)

ZAB, river. [PERSIA.]

ZABATZ. [SERVIA.]

ZACHARIAE, JUST FRIEDRICH WILHELM, a German poet, was born on the 1st of May, 1726, at Frankenhausen in Thuringia, where his father was employed in the service of the prince of Schwarzburg. After the completion of his preparatory education, he went, in 1743, to the university of Leipzig, professedly to study the law; but he devoted himself almost exclusively to belles-lettres, an inclination which had been cherished by his father, who had himself some name as a poet in his native place. Zachariae's first attempt at poetical composition created considerable sensation at Leipzig, and attracted the attention of Gottsched, then the critical oracle in matters of taste in Northern Germany, who induced the young poet, in 1744, to publish his comic epic 'Der Renommist' (the brawler) in the 'Belustigungen des Witzes und Verstandes,' a periodical edited by Gottsched himself. This poem was the first of its kind in German literature. The author had taken Pope's 'Rape of the Lock' for his model, but his imitation was not a very successful one. Zachariae, like all young men who had power and originality, soon emancipated himself from the pedantic tyranny of Gottsched, and in 1744 he joined the society of young men then assembled at Leipzig, who prepared a better taste in German literature by insisting upon the necessity of studying the antient Greeks and Romans, the early German poets, and especially the literature of England. The great success which the 'Renommist' had met with induced Zachariae successively to publish a series of comic epics, among which we may mention 'Phaeton,' 'Das Schnupftuch,' 'Murner in der Hölle,' the last two of which are the best among them. In 1747 he went to Göttingen, where he formed connections with men of congenial minds. In the following year he was appointed teacher at the gymnasium (Carolinum) of Brunswick, and the beneficial influence he exercised there on the development of the talents and taste of his pupils induced the duke of Brunswick, in 1761, to appoint him professor of poetry at the Carolinum. In addition to this office he was appointed, in 1762, to the superintendence of the printing and publishing establishments connected with the orphan asylum (Waisenhaus) of Brunswick, and of the Brunswick 'Intelligenzblatt,' to which he himself contributed a series of interesting and useful papers. In 1764 he resigned the superintendence of those establishments, which had prospered very much under his management, and confined himself to the duties of his professorship. From 1768 to 1774 he edited the 'Neue Braunschweiger Zeitung' (the New Brunswick Gazette), for which he himself wrote nearly all the literary articles and reviews. He died on the 30th of January, 1777.

Zachariae was one of the best poets of his time, and in the comic epic he has scarcely been surpassed by any more recent German poet. He is less successful in descriptive poetry. He also wrote a number of songs in a light and pleasing style, and he himself set many of them to music. He made a German translation of Milton's 'Paradise Lost,' in hexameter verse (Altona, 1760, 4to.; a second and improved edition appeared in 1762), but the translation is weak, and not always faithful to the original. His 'Fabeln und Erzählungen in Burkard Waldis' Manier' belong to his best poetical productions. His style is clear, plain, and correct. For the purpose of promoting the study of the earlier German poets, Zachariae began to publish a collection of the best specimens of the best German poets from the time of Opitz ('Auserlesene Stücke der besten Deutschen Dichter von Opitz bis auf gegenwärtige Zeiten,' Brunswick, 1766-71, 2 vols. 8vo.). This undertaking was continued after Zachariae's death, by Eschenburg, who published a third volume (1778, 8vo.). The first complete collection of Zachariae's works appeared at Brunswick, 1763-65, in 9 vols. 8vo. A second and cheaper edition, in which the translations from foreign languages are omitted, was published in 1772, in 2 vols. 8vo., and was reprinted in 1777. After his death, Eschenburg published a supplementary volume, which also contains a Life of Zachariae.

(Jördens, *Lexikon Deutscher Dichter und Prosaisten*, v., p. 575-598; Gervinus, *Geschichte der Poet. National-Literatur der Deutschen*, iv., p. 108, &c.)

ZACHARIAE, KARL SALOMON, a celebrated German jurist and political writer, was born at Meissen, on the 14th of September, 1769, and received his early education in the great public school (Fürstenschule) of his native place. In 1787 he went to the university of Leipzig, where at first he devoted himself almost exclusively to philological and philosophical studies, but afterwards he took up the study of jurisprudence. He left Leipzig in the spring of 1792, and, being recommended by persons of distinction, he obtained the situation of tutor to the young count Zur Lippe, whom he accompanied to the university of Wittenberg, where he continued his studies for two years longer. When the count entered upon his military career, Zachariae, in 1795, carried into effect his favourite plan of becoming an academical teacher. He had not been privatdocent for more than two years before he was appointed professor extraordinary, and in 1802 he was raised to the ordinary professorship of jurisprudence in the university of Wittenberg. He had distinguished himself as an author long before this time, and had acquired considerable reputation as a philosophical and political writer. In 1807 he received an invitation to a professorship in the university of Heidelberg, which he accepted because in his situation at Wittenberg his leisure time was almost wholly occupied with the practical administration of justice, which formed part of his office, and thus he had little time left for literary pursuits. At Heidelberg, he lectured on law in all its departments, among which we may mention the public law of Germany, canon law, feudal law, and comparative jurisprudence. He always treated his subject in a philosophical spirit. His merits were rewarded by the title of Geheimer Rath of the grand-duchy of Baden, and by other distinctions. For a time he was drawn away from his scientific and literary pursuits by being elected a member of the first and afterwards of the second chamber of the grand-duchy of Baden. In the capacity of deputy he has been charged with being an advocate of monarchy, or at least with the desire to throw more power into the hands of the government than it ought to have; but as far as his writings show, from which alone we are enabled to judge of him, he was a liberal royalist, with a strong leaning towards aristocratic principles. During his active career in the university of Heidelberg, he received two very honourable invitations, the one to Göttingen and the other to Leipzig, both of which he declined. He remained at Heidelberg until his death on the 27th of March, 1843, having shortly before been raised to the rank of nobility under the name of Baron Zachariae von Lingenthal. Zachariae was one of the ablest and most philosophical writers on law and politics in Germany, and few continental men have possessed a more comprehensive knowledge of the legal and political institutions of the various states of modern Europe than he did.

The following list contains his principal works:—1, 'Handbuch des Kursächsischen Lehnrechts,' Leipzig, 1796, 8vo.; a second edition was published by Ch. E. Weisse and F. A. Langenn, Leipzig, 1823, 8vo. 2, 'Die Einheit des Staats und der Kirche,' Leipzig, 1797, 8vo.; a sort of appendix to this work is his 'Nachtrag über die evangelische Brüdergemeine,' Leipzig, 1798, 8vo. 3, 'Handbuch des Französischen Civilrechts,' of which the third edition appeared at Heidelberg, 1827, &c., in 4 vols. 8vo. 4, 'Vierzig Bücher vom Staate,' Stuttgard, 1820-32, 5 vols. 8vo.; a new and much enlarged edition of this work was begun in 1839, and completed in 1843, in 7 vols. 8vo.; it is by far the best work on political philosophy in the German language. 5, 'Lucius Cornelius Sulla, als Ordner des Römischen Freistaates,' Heidelberg, 1834, in two parts, 8vo.; a very admirable treatise, the only fault of which perhaps is, that he assigns greater merits to the political reforms of Sulla than they deserve. He also contributed many valuable papers to the periodical which he edited conjointly with Mittermaier, entitled 'Kritische Zeitschrift für Rechtswissenschaft und Gesetzgebung des Auslandes,' and to the 'Heidelberger Jahrbücher.'

(Brockhaus, *Conversations Lexikon*; Gersdorf, *Leipziger Repertorium* for 1843, vol. ii., p. 39.)

ZACHARIAH. [ZECHARIAH.]

ZACHARI'AS, a native of Greece, succeeded Gregory III. in the see of Rome, A.D. 741. Liutprand, king of the Longobards, was then at open hostility with the duchy of Rome, in consequence of the support which the Romans and Pope Gregory had given to Trasmund, duke of Spoletum, and Gotteschalk, duke of Beneventum, who had revolted against Liutprand. Zacharias took a different course of policy: he used his influence with the patrician Stephen, who was duke of Rome, and with the leading men of that city, to induce them to give up the alliance of the rebellious dukes, and he sent messengers to Liutprand to sue for peace, which Liutprand willingly granted. The Romans then joined their militia with the troops of Liutprand, who invaded the duchy of Spoletum, and obliged Trasmund to surrender to the king, who ordered him to take clerical orders, and appointed Ansprand in his place. Zacharias, in his letters to King Liutprand, urged him to restore several towns or villages belonging to the duchy of Rome, which the king had seized during the former hostilities, and as Liutprand delayed the restitution, Zacharias went to meet him at Terni, when the king received him with great honours, and not only restored the towns in question to the duchy of Rome, but gave to the Roman see a patrimonium or estate in the Sabinum, and other estates in the districts of Ancona, Osimo, Numana and other parts. The peace between the Longobards and Rome was confirmed for twenty years, and Liutprand restored all the Roman prisoners without ransom.

In the following year, 742, Liutprand attacked the exarch of Ravenna with a powerful force. The exarch unable to make head against him, applied to the pope for his mediation. Zacharias proceeded to Ravenna, from whence he wrote to Liutprand, announcing to him his intention to visit him in his own capital, Pavia. This was a novelty in the relations between the popes and the kings of the Longobards, and the ministers of Liutprand endeaoured to prevent its being carried into effect. Zacharias owever proceeded to Pavia, where he was received by iutprand with great respect, and, after some debate, the ing yielded to the request of the pontiff, and restored to e Greek empire certain territories which he had seized om the exarch. The pope then returned to Rome, being onourably escorted, by order of King Liutprand, as far as e Po. In the following year Liutprand died, and was cceeded by his nephew Hildebrand, who, being deposed fter a few months for his ill conduct, Ratchis, Duke of iuli, was proclaimed king, A.D. 744. Ratchis confirmed e treaty of peace with the duchy of Rome and with the arch, but in 749, for some cause which is not stated, he id siege to the city of Perugia, and threatened the other ssessions of the Eastern emperor in the Pentapolis. charias, who was anxious for the peace of Italy, hastened the king's camp, and succeeded not only in making him sist from his attack, but, by his exhortations and remon- ances about the vanity of earthly greatness, he made ch an impression on the mind of Ratchis, that the king on after abdicated the crown, and repaired to Rome with s wife and daughter, where, at their own request, they ceived the monastic habit from the hands of the pope. tchis retired to Monte Casino, and his wife and daughter unded a nunnery in the neighbourhood of that convent. bout the same time Carloman, Duke of Austrasia, and cond son of Charles Martel, renounced his office in favour his brother Pepin, and proceeded to Rome, where he came a monk, and founded a convent on Mount Soracte.

Pope Zacharias, being informed that the Venetian traders ed to purchase Christian slaves in Italy, and even at ome, whom they sold to the Saracens in the Levant, for- de that traffic under heavy ecclesiastical censures, and nsomed many of those who had been sold, and restored em to liberty.

About the year 750, Pepin, who governed France, with e title of Maire of the Palace, in the name of King Chil- eric III., sent ambassadors to Rome to represent to the pe that Childeric was unfit to reign, and had never been ng except in name; that it was desirable for the Frankish tion to have a king capable of managing the affairs of e state; and that the leading men of France wished to oclaim him, Pepin, as their king, if the pope would re- ase them from their oath of allegiance to Childeric. charias is said to have answered that it was meet that he o had already the real power and the government of the te should be king, upon which the Frankish leaders and elates in a general assembly deposed Childeric, had his ad shaved, and obliged him to become a monk in the onastery of Sithieu, known afterwards as the abbey of Bertin, in the diocese of St. Omer. Childeric's son ierry was likewise shut up in the monastery of Fonte- lle in Normandy. Pepin was consecrated king of e Franks by Boniface, Archbishop of Mainz, A.D. 751. e assent of Zacharias (for the assent is certain, though e particulars of it are obscure) to this violent change of nasty is the only questionable act that we know of this pe, who in other respects appears to have been a lover peace and justice. Pepin himself felt uneasy in his science till he received absolution from Stephen II., the ccessor of Zacharias, and was crowned again by him at ris.

Pope Zacharias died in the year 752. He is said to have en very generous towards the clergy and the people of ome; he repaired the Basilica of the Lateran, and built veral churches. He translated into Greek the dialogues Pope Gregory I., or the Great, for the benefit of his untrymen. His epistolary correspondence with Boniface, rchbishop of Mainz, is found in Harduin's 'Collection of uncils.'

(Platina e Panvinio, *Vite dei Pontefici*; Muratori, *An- li d'Italia*.)

ZACHTLEVEN, CORNELIUS and HERMAN, bro- ers. Their name is sometimes written Saftieven. Cor- lius was born at Rotterdam in 1600: he excelled in ctures of boors and soldiers, in the style of Teniers and rouwer. His scenes, which were always sketched from ture, are full of truth and character, but as paintings they ant that brilliancy and transparency of colouring which stinguishes the works of many of his countrymen. He inted also landscapes, and made many spirited etchings ter his own designs. Some of Cornelius's foregrounds e particularly clever, being groups of various utensils or implements, characteristic of the occupations of the characters of the picture. The year of his death is not known, according to the Dutch writers, but in Pilkington's Dictionary 1673 is given.

Herman Zachtleven was an excellent landscape-painter. He was born at Rotterdam in 1609, and was the pupil of J. Van Goyen; but he lived the greater part of his life at Utrecht, where he died in 1685. Herman's landscapes, which consist generally of views in the vicinity of Utrecht and of the Rhine, are distinguished by great transparency, and in the distances are coloured like those of Wouverman. His earliest pictures are such simple views of nature as the various sites afforded, but in his later works he generally selected various picturesque points, which he composed into one picture; he sometimes introduced many small figures into his works. Herman made many studies from nature in black chalk, which are much valued by collectors: he executed also a few spirited etchings. D'Argenville says that Herman Zachtleven visited Italy, and spent some years there, but Houbraken makes no mention of any such visit, and a still greater reason for supposing the statement to be incorrect is that there are no traces of Italy in any of his studies or pictures.

(Houbraken, *Groote Schouburg*, &c.; D'Argenville, *Abrégé de la Vie des Peintres*, &c.

ZACYNTHUS. [Zante.]

ZAGROS, MOUNT. [Persia.]

ZAHLE [Syria, p. 472.]

ZAIDA. [Syria, p. 472.]

ZAIRE is the largest river in Western Africa south of the equator. It is called by the natives Moienzi Enzaddi, that is, the Great River, or 'the river which absorbs all others.' The upper part of the river has not been visited by Europeans. According to the information obtained from native traders, the principal branch runs from north to south, and its source is supposed to be one or two degrees north of the line. But it is certain that another great branch originates in the interior far to the east-south-east from its mouth, and this branch is called Coango or Cuango, and it is probable that from the name of this branch that of the country of Congo is derived. The river Zaire is also sometimes called the Congo.

Our positive knowledge of the Zaire begins about 280 miles from its embouchure. So far it was surveyed by Captain Tuckey. At that distance from its mouth the river expands to the width of two, three, or even more than four miles, and flows with a current of two or three miles an hour. This upper part of the river lies on an elevated terrace, which is probably in general more than 500 feet above the sea-level. The country is hilly, with the exception of some tracts of fine sandy beach, but the hills are of moderate elevation, and rise with a gentle ascent from the margin of the river. The hills are chiefly composed of clay-slate and limestone, and many rocky promontories of marble jut into the river. A considerable portion of the country is fit for cultivation on the summits and on the sides of the hills, as well as in the valleys. It is also much more inhabited than farther down, and villages are frequent. But vegetation is far from being so luxuriant as is usual between the tropics, and the hills are frequently barren, and destitute of trees, which only occur in the ravines and round the larger villages.

The Zaire begins to descend from this upper terrace about 200 miles from its mouth. The bed of the river gradually narrows to a mile, and then it falls over the Upper Sangalla or rapid, which is formed by a ledge of rocks running across the river, over which the current runs with great force. The Zaire now begins to flow with great rapidity between high rocky masses. Ten miles lower down is the Lower Sangalla, where the river is crossed by a great ledge of slate rocks, which leave only a passage close to the foot of the rocks on the left bank, about 50 yards wide, through which the stream runs at least eight miles an hour, forming whirlpools in the middle, whose vortices occupy at least half the breadth of the channel, and must be fatal to any canoe that should get into them. Below this rapid the river is filled with rocky islets; the great breadth, however, diminishes the velocity of the stream, so that canoes easily pass. About 15 miles below the Lower Sangalla begin the narrows, where the river, from more than a mile, suddenly contracts to less than half a mile, and in many places it is hardly 200 yards wide

These Narrows are nearly 40 miles long, extending from Inga to Sondie Point. Though the bed of the river is narrow, it is generally full of rocks. Before the river leaves the Narrows it forms a cataract called Yellala, where the river descends over a bed of mica slate, and falls about 30 feet perpendicular in a slope of 300 yards. A little above Sondie a ledge of rocks stretches from the northern shore about two-thirds the breadth of the river (which is here about half a mile wide), the current breaking furiously on it; but near the southern shore a smooth channel is left, where the velocity of the current is the only obstacle to the ascent of boats. The tide is perceptible as far as Sondie Point, where it rises about six inches, and from this point the river begins to be navigable. Between the Upper Sangalla and Sondie Point the general course of the river is from north to south, and from Sondie Point to the sea nearly due west.

The country extending on both sides of the Zaire from the Upper Sangalla to Sondie Point rises considerably higher than the general level of the upper terrace. Contiguous to the river's bed there are high hills consisting chiefly of mica slate. They are very steep, in many places precipitous, and destitute of all vegetation. In some spots, where the current has been turned aside by rocky points, the river has deposited its mud, and formed little strips of soil covered with reedy grass. In these places a small quantity of Indian corn is grown. The declivities of the rocky masses are intersected by several little valleys, which penetrate a few miles inland, and in which some plantations of mandioc and Indian corn are met with, and many wine-palm trees. The top of the rocky masses, which in general appear to attain an elevation of 1500 feet above the sea-level, presents an uneven plain, in general destitute of trees, but having a soil sufficiently deep for the cultivation of the common articles of vegetable food. On this plain there are numerous small villages surrounded by mimosæ, Adansoniæ, and palm-trees. The soil is of a hard clayey nature, and is incapable of being worked in the dry season, but is sufficiently productive when mellowed by the heavy rains and with the aid of a heated atmosphere.

From Sondie Point to Lemboo Point, a distance of about 15 miles, the river runs south-west. This part of the river is characterized by a succession of whirlpools, which are so violent that no vessel can approach them: even the eddies occasioned by them are so forcible as frequently to resist sails, oars, and towing, and twist a boat round in every direction. At Lemboo Point the river again widens to about a mile, and runs westward with a regular but swift current to Booka Embomma Island, about 15 miles distant. The country on both sides of the river between Sondie Point and Booka Embomma Island does not differ in its physical character from the rocky districts farther north.

At the Booka Embomma Island the valley in which the river flows widens considerably, the rocky masses receding so far from one another as to leave a space about three miles in width between them. This space is half occupied by the two arms into which the river divides, and half by the islands which lie between them. The bed of the river is here about a mile and a half across, and its current in the mid-channel varies between a mile and a half and two miles an hour, but in-shore on both sides it is often stagnant, and sometimes a small counter current is experienced. The depth in the mid-channel is 15 fathoms. The islands are composed of schistus, and are barren: but along their northern side is a strip of low ground of great fertility. The hills on both sides of the valley are rather high and rugged, partly barren, and partly covered with bushes and large trees which grow in the crevices of the rock. On their flattened summit, the under stratum, consisting of a compact clay, is covered with a black soil which seems capable of producing all kinds of grain.

Near 13 40′ E. long., or about 50 miles from its mouth, the Zaire enters a valley which is about 10 miles across, and which does not materially change in width to its embouchure. One-third of this distance, or less than 20 miles, the river flows between well-defined banks; but it is divided into three arms, of which the northern is called Maxwell's River, the middle one Mamballa River, and the southern Sonio River. The Mamballa River, also called the Boat River, because it is generally used by the vessels navigating the river, is filled with dry shoals, the channels between which are very winding. The depth of the channel north of the shoals varies from 1 to 5 fathoms, but the southern channel is from 7 to 10 fathoms deep close to the southern bank. The current does not exceed two miles an hour. The three arms of the river are connected by several narrow and shallow channels, which divide the tract between them into several islands from two to six miles in length. These islands are several feet above the level of the river, and their soil is formed by a stiff clay, which on the margin of the river is cut into perpendicular low cliffs. They are covered with high reedy grass and thinly scattered with palm-trees. But in many places near the banks of the river the land is low and of great fertility.

Near 13° 20′ E. long. the whole body of water is united in one channel, which in the vicinity of that part is about two miles wide, but by degrees it widens to three miles, which is its width at Fathomless Point: this cape is considered as being situated on the northern side of its mouth. In this part the river is distinguished by its great rapidity and depth. The current even at a short distance from the banks varies between four and six miles an hour. Though every afternoon a sea-breeze springs up, vessels trying to enter the river generally find their attempts frustrated for several days, and they only succeed with an uncommonly strong sea-breeze and by creeping close to the shore. The great body of water discharged by such a rapid current has scooped out a channel, narrow but very deep. Above Shark Point, which is at the southern side of the mouth of the river, it is seldom more than a mile across, but so deep that it was once considered unfathomable. Captain Vidal however ascertained that its depth varied between 200 and 45 fathoms. He observes also that the great force of the current is apparently superficial. The deep channel of the river is continued into the sea to a great distance, being still 45 fathoms deep 13 miles from Cape Padrão or Pillar. The sea on both sides of the channel varies from 18 to 23 fathoms in depth.

The immense volume of water discharged by the river into the sea, compared with the comparatively small quantity which passes over the rocks at the Yellala cataract, has been a matter of great surprise, especially as no river sufficient to turn a mill falls into the Zaire below the cataract: and this has suggested the supposition that a very considerable mass of water must find its way through subterraneous passages under the slate rocks, disappearing probably where the river contracts its bed and forms the Narrows, and rising again below the cataract near Sondie Point, where the regular current is disturbed by a great number of whirlpools.

The water of the Zaire appears to possess some peculiarities. Thirteen miles from the entrance it is perfectly fresh and of a dingy red colour. After being kept a few days it ferments, and for some time remains in a highly putrescent state. A silver tea-spoon being immersed in it for half an hour is greatly discoloured, and requires much cleaning to remove the stain. After being preserved in a bottle for four months, it lost its colour and became perfectly clear and devoid of any sediment.

It was formerly asserted that the tide did not make any impression on the current of the Zaire, but it has been ascertained that it causes the reflux of the stream very perceptibly as high up as the lower commencement of the Narrows at Sondie Point, where the rise of the water amounts to from 12 to 16 inches. But though it causes the water to be dammed up and a counter current on one or both sides, yet, strictly speaking, the current in the middle of the river is never overcome by the tide.

Like all other tropical rivers, the Zaire has its floods, but the quantity of its rise and fall is less perhaps than that of any other river of equal magnitude. According to the few observations which were made respecting this point, the difference between the lowest and highest water did not appear to exceed eleven feet, and in many places was not more than eight or nine. The river begins to rise about the 1st of September, but it is not known how long the flood lasts.

The lower course of the Zaire lies through a low and swampy country. It is principally covered with two different kinds of mangrove, the one a low bush, and the other a stately tree, resting on a mass of roots upwards of twenty feet above the ground, the trunk often rising to the height of one hundred more. Most of them are perfectly straight, and if the wood were a little lighter they would be admirably adapted for masts. The spaces between these lofty trees are filled by a variety of smaller growths, among which are many of the palm kind, and large patches covered with papyrus. The high lands beyond these swampy grounds appear to be more fertile than higher up the river, and are covered with clusters of trees. The slands, which are frequently seen floating down the river, ppear to be portions of the low swampy region from which they are detached by the force of the current. They are formed of rushes, reeds, and long grass, and frequently covered with birds. Occasionally they drift a long way o seaward, and vessels are sometimes deceived by them.

The southern side of the entrance is formed by a penin- ula, which terminates in two promontories, of which hat to seaward is called Point Padrão or Pillar, from a illar which was erected on it, as at several other places, y the early Portuguese navigators. The other cape, alled Shark Point, lies eastward, and constitutes with Fathomless Point the mouth of the river. The peninsula n which the two promontories are situated has evidently een formed by the combined depositions of the sea and iver, as the external or sea shore is composed of quartz and, forming a steep beach, while the internal or river ide consists of a deposit overgrown with mangrove.

(Tuckey's *Narrative of an Expedition to explore the River Zaire*; *Narrative of Voyages to explore the Shores f Africa, Arabia, and Madagascar, under the direction of aptain Owen*.)

ZALEUCUS (Ζάλευκος), the celebrated legislator of the pizephyrian Locrians in Southern Italy, is said to have een the first Greek that drew up a code of written laws. Marcian Heracleot., 313; Clemens Alexandr., *Strom.*, i., p. 309; Strabo, vi., p. 259. It has been supposed that e statement of the Locrians having had the first written ws among the Greeks must be limited to the Greeks of aly, since it is stated that Zaleucus derived many of his ws from the Cretans, Lacedaemonians, and the Areo- gus of Athens; but as it cannot be proved that the etans and Lacedaemonians had any written laws at that ne, we must acquiesce in the common traditions that leucus was the first of all the Greeks who composed a de of written laws. He lived in all probability about . 660, but his history, like that of all the early legis- tors, is mixed with fable. According to Suidas, who de- ribes him as a native of Thurii, Zaleucus was originally slave and a shepherd; whereas Diodorus xii. 20 calls m a man of good family. He is further said to ve been called upon by Minerva in a dream to le- slate for the Locrians; and when the Locrians ap- ied to the oracle about the means of getting rid of eir political disturbances, they received a command legislate for themselves. When Zaleucus announced them his dream, he was emancipated, and drew p a code of laws for them. Suidas; Scholiast ad Pindar. *lymp.*, x. 17; Valer. Maxim., i. 2; Ext. 4; Aristotle, pud Clem. Alexandr. *Strom.*, i., p. 352. A great por- ion of his laws was derived from the customs of other reek states, but he was the first who fixed punish- ents for the crimes enumerated in his code; whereas efore his time the punishment had always been left to the iscretion of the judges. His laws, of which several spe- imens are still extant, were according to the unanimous pinion of the antients very severe, but the Locrians erved them for a long period, during which they are alled the 'most observant of law and order' (*εὐνομώ- τατοι*) of all the Greeks. (Zenobius, iv. 10; Diogenianus, . 94; Apostolius, *Proverb.*, x. 30; Marcian Heracleot., 5, &c.)

The code of Zaleucus embraced the religious and moral s well as the civil and political duties of the people, d entered so much into the detail of private life at it regulated even the dress by which free women ould be distinguished from other females. Although aleucus, as has been shown incontrovertibly by Bentley, ust have lived before the time of Pythagoras, both Suidas d Diodorus call him a disciple of that philosopher, an achronism which arose out of the desire of the antients trace all practical wisdom to Pythagoras, as in the case the Roman king Numa Pompilius, who is likewise lled a disciple of Pythagoras. The common story about e death of Zaleucus is as follows:—One of his laws for- de the citizens of Locri to enter the senate-house in [illegible] Zaleucus [illegible] as a tra- [illegible] Zaleucus [illegible] Eusta- thius ad Hom. [illegible] But the same story is re- lated [illegible] whom Zaleucus is fre- quently confounded by the antients themselves (Valer. Max., vi. 5. Ext. 4; [illegible] and Suidas states that Zaleucus fell fighting for his country. The contra- dictions and fables [illegible] history of Zaleucus led some sceptical [illegible] among the antients, such as Timaeus, [illegible] Zaleucus ever existed. [illegible]

(Fabricius, [illegible] Graec. [illegible] Bentley, [illegible] Heyne, [illegible] where the fragments of the laws of Zaleucus are collected.)

ZAMA. [HANNIBAL; NUMIDIA.]

ZAMBEZI. [SENNA, [illegible]]

ZAMIA, a genus of plants belonging to the natural order Cycadaceae. The name Zamia is applied by Pliny to such cones of the fir-tree as split while they are upon the tree. It was first applied by Linnaeus to the present genus of plants. The species of this genus are trees with a single cylindrical trunk, increasing by the development of a single terminal bud and covered by the scaly bases of the leaves; the wood consists of concentric circles, the cellular zones between which are exceedingly loose, the ligneous tissue having the tubes marked by circular disks; the leaves are pinnated, not articulated, and have a spiral vernation. The flowers are dioecious; the male flowers are arranged in tessellated catkins with abrupt scales, the anthers oval, sessile at the under side of each scale. The female flowers are in tessellated catkins, the scales peltate, drupes two at the under side of each scale. The species are found in the tropics of America and Asia, and also at the Cape of Good Hope and in New Holland.

Z. spiralis has numerous leaflets, linear, very smooth, somewhat curved, with a few spinous teeth at the extremity; the catkins smooth, with pointed scales in the female, and wedge-shaped ones in the male flowers. This plant is a native of New South Wales. The cone is about half the size of a man's head, and composed of nuts about the size of a chestnut. These nuts are eaten by the New Hollanders, but on being tried by English settlers produced sickness. Their flavour is not unlike that of chestnuts.

Z. cycadis, Bread-tree Zamia, has lanceolate, spinous, smooth, entire leaflets tapering at the base; the scales of the catkins abrupt, obtuse, pointless. It is a native of the south-eastern parts of southern Africa. It grows on the sides of dry hills, especially where the ground has been cleared by burning. The stem is thick and scaly, and attains a height of 6 or 7 feet. Thunberg states that when the stems become old they are broken through by the Caffres and Hottentots, who collect the pith and tie it up in the skin of a sheep or calf which has been previously well rubbed with grease. It is then buried in the ground, and after remaining there till it becomes putrefied, it is taken up and bruised between two stones, and then formed into little cakes about an inch in thickness. These are baked in wood-ashes, and are esteemed by those who prepare them as a great luxury, though they are not at all palatable to a European taste.

Z. furfuracea, Broad Rusty-leaved Zamia, has elliptic-oblong pointless leaflets, copiously serrated from the middle to the extremity; striated and hairy beneath; common stalk spinous. This plant is a native of the West Indies, and is said to have been grown at Hampton Court in the time of King William. This plant is said by Herman to yield a white insipid gum. The stems of all the Zamias, like those of Cycas, abound in a mucilaginous juice, which has a nauseous odour and an unpleasant taste, arising from the existence in it of a peculiar proximate principle. This may be removed by boiling, roasting, &c., when some of them form a nutritious article of food.

About seventeen species of the old genus Zamia have been described. Eight of these are now placed in the genus or subgenus *Arthrozamia*, which is characterized by having the leaflets articulated with the rachis of the frond-like midrib; there is also a preparation in the rudimentary stamen to form a two-celled anther, while in Zamia the leaflets are confluent, and the pollen is not disposed in two-lobed masses.

The genus Zamia has many representatives in a fossil state. Of the sixteen species that have been discovered, twelve resemble so nearly the recent species that they have received the same designation. The remaining four differ in the exsertion and venation of their leaves, and hence they are placed under the fossil genus *Zamites*. The principal forms of these genera have been found in the lias and oolitic formations. Two fossil stems nearly resembling those of Zamia were found by Dr. Buckland in Portland stone. These are made by Brongniart to constitute the genus *Mantellia*, a name given in honour of Dr. Gideon Mantell. He has also included in the same genus a stem found in shelly limestone near Luneville.

In cultivation the Zamias require the treatment of all exotics. They may be propagated by seeds, brought from their indigenous countries, which may be sown in pots of rich light earth or mould, which should be plunged in the bark beds of hothouses or stoves.

(Burnett, *Outlines of Botany*; Lindley, *Natural System*; Sir J. E. Smith, in Rees's *Cyclopædia*.)

ZAMORA, the name of a town of Spain, and, both under the old division into kingdoms and the division into electoral districts decreed by the Cortes of 1822, the name of the province of which Zamora is the capital. The town of Zamora is situated on the right bank of the Duero, 110 miles north-west of Madrid and 43 miles west-south-west of Valladolid. The old town is surrounded by walls, in which there are eight gates. The suburbs have nothing to recommend them to notice. The streets of Zamora are narrow, the houses lofty, and the general aspect of the town sombre. The churches and the town-house are the finest buildings. The promenades are agreeable, and there is a fine bridge across the Duero. Zamora contains a cathedral and 22 parish churches. Before the suppression of the monastic orders there were 16 convents, 10 of which were for females. Zamora is the residence of a bishop, a suffragan of the Archbishop of Santiago. There is little trade or industry of any kind; but there are a few hatters, tanners, dyers, manufacturers of woollen-stuffs, and distillers. The ruins of the house of the Cid are shown at Zamora: the historian Florian de Ocampo was born there; and the Cortes have twice assembled in the town, in 1297 and 1302. Population, in 1833, 10,000.

The province of Zamora (under the antient division), in the kingdom of Leon, bordered on Portugal, and extended eastward on both sides of the Duero from the angle which it makes on the frontier where it turns southward to meet the Tormez. It was in length (from east to west) about 30 miles, and about 27 (from north to south) in breadth. The modern province or electoral dictrict of Zamora is composed of the antient province of that name, the western part of the district of Toro, and the greater part of the duchy of Benavente. It is about 86 miles in length (from north-west to south-east), and about 43 in breadth (from north-east to south-west). The Duero enters the province near the middle of the south-east border, and, flowing from a little south of east to a little north of west, nearly bisects the province. On reaching the north-western border it makes an abrupt turn to the south, and flows in that direction till it meets the Tormez at the south-west angle of the province. The Tormez forms, for a little way, the boundary between the provinces of Zamora and Salamanca. In its couse from east to west the Duero receives first the Sequillo and then the Esla, both from the north. Below Benavente the Esla receives from the west the Tera, a mountain-torrent, which issues from a lake near the borders of the province of Orense, and has the whole of its course in the province of Zamora. The bed of the Duero within the province, and the bed of the Tormez along its frontier, are too deep and precipitous to admit of their being used for irrigation. The north-west portion of the province is mountainous; the rest is a high plain intersected by deep ravines and river-channels. The plain is in general fertile; the mountains are well wooded. The climate is agreeable in spring and autumn, but the cold of winter is severe. There are some mineral-springs in the north of the province; turquoises are found in the vicinity of the town of Zamora, potters'-earth in the district of Toro, and saltpetre is collected from the soil in some places. Agriculture and every kind of industry are at a low ebb. A good deal of charcoal is prepared, and some wine of a low quality exported. But the roads are in so wretched a condition as effectively to prevent any extensive exportation of the surplus agricultural produce. The population of the province, according to the most recent estimate (1838), was 159,425.

Toro, the capital of the antient district of that name, is included in the modern province of Zamora. It is situated on the right bank of the Duero, about 13 miles east of the town of Zamora and 24 north-north-east of Salamanca. It has a wall and six gates. The streets are wide, but the houses mean. There is a collegiate and 18 parish churches. Before the suppression of the monastic orders there were 13 convents,—7 for females. There is a curious antient bridge of 22 arches across the Duero, and a fine esplanade on the south side of the town. The manufactures of Toro are unimportant, and nearly the same as at Zamora. The palace of the Dukes of Berwick, and the Alcazar, an old stone palace said to have been built by the Infant Don Garcia, are shown here. John II. of Castile, the poet Ulloa y Pereira, and Paul Morillo, who distinguished himself as a loyalist general in the South American war of independence, were born in Toro. The code known by the title of the Laws of Toro was promulgated here in 1505. Population, in 1833, 5190.

Benavente, the chief town of the antient duchy of the same name, great part of which, along with its capital, is now included within the electoral district of Zamora, is situated between the Esla and Orbigo, 31 miles north of Zamora and 42 north-west of Valladolid. It contains 9 parish churches. The palace of the Dukes of Benavente is an antient and extensive structure. Population, in 1833, 3000.

(Miñano, *Diccionario Geografico-estadistico de España*; *Map of Spain*, showing the modern provincial divisions, published, under the auspices of government, at Madrid in 1838; *Dictionnaire Géographique Universel.*)

ZAMORA. [Mexican States.]

ZAMOYSKI, or ZAMOSC. The Polish house of this name occupies a distinguished place in the annals of its nation. It is a branch of the family of Saryusz, and has given three eminently distinguished men to Poland.

John-Sarius-Zamoyski, grand-chancellor of Poland, was born at Skokow, of which his father was castellan, in the palatinate of Culm, on the 1st of April, 1541. John was sent to Paris to prosecute his studies, at the age of twelve years, and on his first arrival was received into the service of the dauphin, afterwards Francis II. Finding however that the duties of this appointment interfered with his studies, Zamoyski quitted the court, and went, to use his own expression, to hide himself in the *pays Latin*. His favourite pursuits in the university of Paris were mathematics, philosophy, and jurisprudence. At the request of his father he subsequently repaired to the university of Strassburg to perfect himself in the study of Greek, and to Padua to complete his legal studies.

At Padua the study of the canon law led him to pay considerable attention to the writings of the Fathers, and this pursuit is believed to have confirmed his devotion to the Romish church, to which his father's allegiance had been shaken. While at Padua he published several works which were favourably received at the time, and have maintained their reputation. In 1562 he published the funeral oration which he delivered on the celebrated Falloppio. In 1563 he published an essay on the constitution of the Roman Senate, 'De Senatu Romano Libri II.,' so learned and critical, that De Thou attributed it to Zamoyski's teacher Sigonius, and Graevius has inserted it in his *Thesaurus Antiquitatum Romanarum*. Having been elected rector of the university in 1564, Zamoyski caused a collection of its privileges to be made, and published a digest of them under the title 'De Constitutionibus et Immunitatibus almae Universitatis Paduae.' In the same year he published a treatise on the duties of the magisterial office, entitled 'De Perfecto Senatore syntagma.'

The reputation which he carried back with him into his native country obtained for him speedy preferment. Sigismund Augustus, then king, after admitting the young scholar to several private interviews, placed him under the direction of the chancellor, in order that he might be instructed in the practical details of public business. About 1569 he was employed to arrange the documents in the public archives, which had fallen into great confusion after the [illegible] his [illegible] be [illegible] MSS. [illegible] afterwards [illegible] career. In 1572 [illegible] powerful [illegible] not long [illegible] same time. The king [illegible] one of the crown [illegible] a mark of his [illegible] him, promised [illegible] pointed him starost of [illegible] been held by his [illegible] to fulfil his promise [illegible] commences the political [illegible] chequered career of more than [illegible] years.

The General Diet [illegible] moned to meet at Warsaw [illegible] In the mean time the [illegible] with a view to [illegible] by its [illegible] Zamoyski [illegible] as leader of this [illegible] the Diet to fall upon Henri [illegible] not devoid of weight [illegible] his first choice, but [illegible] for the crown [illegible] of more consequence to the [illegible] Zamoyski, fearing the consequences [illegible] turned his eyes [illegible] to the Emperor Maximilian [illegible] the Imperial [illegible] with the Turks [illegible] supportable to the Polish [illegible] was of a nation [illegible] the Porte, and [illegible] not bring a French [illegible] their Austrian [illegible] Zamoyski [illegible] archives of the kingdom [illegible] suggesting precedents [illegible] which the crown was [illegible] Henri [illegible] at the head of the [illegible] result of the election [illegible] made on the occasion [illegible] of its ideas [illegible] which the speaker [illegible] competitors. It was [illegible] new king appointed Zamoyski [illegible] starost of Knyszyn. [illegible] Henri's refusing [illegible] to him by the [illegible] moyski's popularity [illegible] by his defending the [illegible] He regained it [illegible] Henri from Poland.

Zamoyski and [illegible] eyes to Stephen Bathori [illegible] counterbalance the [illegible] The crown was offered [illegible] his marrying Anne, sister [illegible] sent of that princess [illegible] viously obtained. The Diet [illegible] January, 1576: Bathori [illegible] Austrians hesitated [illegible] a rapid march to Krakau and [illegible] fied his gratitude to Zamoyski [illegible] chancellor, a choice [illegible] that they rose in a body and [illegible] thank the king.

During the greater part of the [illegible] Zamoyski was his chief and [illegible] By his advice Bathori's first care [illegible] empty treasury and [illegible] kingdom. With this view [illegible] Austria, and envoys despatched [illegible] noble political emigrants [illegible] return. To the hostile [illegible] and Tartars, a sedi[illegible] a pretext for hostilities [illegible] against Danzig, which he [illegible] dictated the conditions.

In 1579 the storm [illegible] upon Livonia. Bathori convened the Diet, and [illegible]

[illegible]

[illegible] Zamoyski [illegible]

[illegible] and conducted to the Austrian frontier, which he no sooner crossed than he announced his resolution not to keep the promises he had made while a prisoner. This breach of faith elicited a pamphlet from Zamoyski, published in 1590, with the title 'Pacificationis inter Domum Austriacam ac Regem Poloniae et Ordines Regni Tractatae, Scripta aliquot.'

The next seven years of Zamoyski's life were consumed in a double struggle between foreign foes against whom he had to make head, and domestic factions from whom he had to wring a reluctant support. The king was not his friend, for Zamoyski thwarted his wishes on many occasions, but could not dispense with him. Amid all these difficulties the grand-chancellor baffled the Ottoman army in 1591-2; barred the retreat through Poland to the Tartars, who had made a predatory incursion into Hungary, in 1593; defeated the Turks in Wallachia in 1595, and again in 1596; and the Swedes in 1597. After the last campaign, conscious that his physical powers were giving way, he resigned the command of the army to his lieutenant, John Charles Chodkiewicz. From this time till 1605 Zamoyski remained in retirement, occupied with his colonies and literary pursuits. The fruits of the latter were given to the world under the title 'Dialectica Chrysippea.'

He emerged from his retreat in 1605 to attend the Diet, and there is a wild grandeur about this the closing scene of his public life. The first wife of Sigismund III., an Austrian princess, was dead, and he was bent upon marrying her sister. Zamoyski, who had opposed the first marriage, was still more hostile to this: he was firmly convinced that the interests of Poland required an intermarriage with the royal family of Russia. The debate became violent. The grand-chancellor, laden with years and infirmities, had resolved to take no part in it, but the contagious excitement of the scene rendered him incapable of adhering to his resolution. He caused his seat to be placed near the throne, and after apologising for this liberty on account of his debility, presumed to address the king in a strain that has rarely been heard by princes. He declared his opinion that the king should concentrate his attention on the Swedish war with a view to terminate it; he reminded him that he had often before sacrificed the interests of the state to his own private ends; he protested against the marriage with an Austrian princess as likely to be fatal to Poland. Nor did he stop here: he accused the king of intending to secure the crown for his son in violation of the constitution, and of corresponding clandestinely with foreign powers; and he reminded him in a tone of increasing asperity that the Poles had ere then deposed and banished kings with whom they were offended. Sigismund, irritated by such language, replied with equal violence, and at the conclusion of his speech laid his hand on his sword. At this the senate and deputies quitted their seats in a body with threatening murmurs; but the voice of the old chancellor was heard above all the din—'Withdraw your hand from your sword, prince; do not oblige history to record that we were Brutuses and you a Cæsar.'

At the close of the Diet Zamoyski retired again to his estates. On the 3rd of July, 1605, his attendants, who had fancied him sunk in meditation, found on approaching his chair that he was dead.

Zamoyski was an elegant scholar, an accomplished diplomatist, and a successful general. That he should have been able to keep himself at the head of affairs during a period of nearly thirty years, in so turbulent a state as Poland, is of itself a guarantee of the power and energy of his character. His writings, even at this distance of time, are calculated to please by their elegance, and by the knowledge of human nature that they display. His stern stoicism was the necessary consequence of a highly cultivated mind forced to combat during the better part of his life with the factions of a fierce oligarchical state. The part of his career upon which the mind feels most pleasure in dwelling, consists of the occasional retirements from public business, during which he devoted himself to colonising his estates and promoting literary institutions. About 1585 he laid the foundations of Nowy Zamosc, distant about two miles from Stary Zamosc (old Zamosc). He encouraged manufactures there, and fortified it so strongly, that it came to be regarded as one of the chief defences against the Tartars. He established a printing-press, which became celebrated for the beauty of its impressions. On the 15th of May he opened the university of Zamosc, to which he attracted the most eminent scholars of the nation, with a solemn inaugural oration. He granted lands in perpetuity to some of his vassals, and encouraged the adoption of improved methods of agriculture.

Interesting particulars respecting these labours of Zamoyski are contained in the narrative of two journeys made by Father Vanozzi to Poland to visit Zamoyski, published by J. W. Niemcewicz at Warsaw, in 1822, from a MS. in the Albani Library at Rome.

John Zamoyski II., born in 1626, was the grandson of the preceding. He was created, soon after he obtained his majority, castellan of Kalisch, and was present in that capacity, in 1649, at the coronation of John Casimir. He accompanied that king in his campaign against the Cossacks, in 1651, and earned by his bravery the appointment of palatine of Sandomir. He distinguished himself equally in the disastrous War of Succession, when Poland was devastated by Swedish armies: he stood a long siege in his hereditary fortress Zamosc; and it was to his vigilant keeping, as commandant of Warsaw, that Marshal Wittemberg, President von Ersk, and other important prisoners were intrusted. In 1659 he commanded the army raised to oppose the encroachments of the Czar in the Ukraine. In 1663 he was one of the nobles who remained faithful to John Casimir, and was mainly instrumental in allaying the discontent of the insurgents under Chwiederski. John Zamoyski died suddenly at Warsaw, on the 2nd of April, 1665, while attending the Diet at Warsaw. He left no family by his wife, daughter of the Marquis de la Grange d'Arquin, and called in Poland 'La belle Française,' who afterwards married the great Sobieski. Zamoyski dying without heirs of his body, his estates passed to his two sisters.

Andrew Zamoyski, a younger son of a descendant of these two sisters, who had inherited the fief of Zamosc, was born at Biezun in 1716. He received his education in the college of the Jesuits at Thorn, where he remained till 1732. In 1735 his father died, and Andrew left Poland to visit foreign universities. He passed two years in the university of Liegnitz in Silesia; in 1739 he visited Paris, where his favourite studies were mathematics and jurisprudence; and he returned home in 1740. Finding his brothers engaged in litigation about the division of their inheritance, he reconciled them by giving up his share, and entered the service of Saxony. In 1745 he obtained the command of Prince Albert's regiment. In 1754 he quitted the army and returned to Poland with the rank of major-general. He was appointed marshal of the palatinate of Smolensko, an office which put it in his power to reform many abuses which had crept into the judicial administration of the province. In 1760 he emancipated all his serfs; a few noblemen imitated his example, but the greater number declaimed fiercely against the innovation.

At the first Diet held after the death of Augustus III. (1763) Zamoyski contributed much to the passing of a law for the reform of administrative abuses. In 1764 the new king, Stanislaus Augustus, made him keeper of the great seal. The influence which this appointment enabled him to exercise over every branch of administration, he employed in giving a better organization to the army and the educational institutions of the kingdom. When the partisans of Russia, in the Diet of 1767, procured the banishment of Gaetan Soltyk and Zaluski, bishops of Krakau and Kiew, along with some other nobles, to Siberia, Zamoyski resigned the seals in disgust, declaring he would never receive them back till those illustrious victims were restored to their native country.

In his retirement he employed himself in promoting education, and completing the code he had undertaken to digest at the request of the Diet of 1776. He completed the work in less than two years. The matter is arranged under three heads: the first treats of persons; the second, of things; and the third, of courts of law and actions. It was printed at Warsaw, in Polish, in 1778: a German translation by Godfrey Nikisz appeared at Dresden in 1780. The code, when printed, was sent to all the palatinates in order that it might be discussed in their provincial assemblies before it was submitted to the Diet. The provision for a general measure of emancipation excited an almost universal hostility against it. The deputies were without exception instructed to oppose it in the Diet of 1780. When the marshal, as president of that assembly, named the reading of the new laws, he was met by a burst of opposition from all parts of the hall. It was decided that they should not even be read; some went so far as to propose a resolution that they should not be presented to any future Diet. Casimir Poniatowski, the king's brother, was the only member of the Diet who ventured to say a word in vindication of them.

Zamoyski, who had attained his 70th year when his code met with this rude reception, withdrew himself in consequence of it still more from public affairs. In 1790 he undertook a journey to Italy. At Bologna he received the intelligence that the Poles had proclaimed the constitution of the 3rd May, 1791, and adopted his code. He made haste to return to Poland, but did not survive long to enjoy his triumph, dying at Zamosc on the 10th of February, 1792, in the 76th year of his age. His widow, a princess Czartoryska, deservedly celebrated for her active benevolence, died at Vienna on the 19th of February, 1796.

(Bursius, *Vita et Dicta magni Joannis Zamoscii*; Moslowski, *Vie de Jean Zamoyski, Chancelier et Grand-Hetman de la Couronne de Pologne*; Thuanus, *Historia sui Temporis*; Moreri, *Dictionnaire Historique*; Jöcher, *Allgem. Gelehrten Lexicon*; *Biographie Universelle.*)

ZAMPIE'RI. [Domenichino.]

ZANCHI, a family of Bergamo in Lombardy, which produced several men of learning in the 16th century. Paolo Zanchi was a distinguished jurist, and also an antiquarian, and a collector of antient inscriptions. Three of his sons, Basilio, Gian Grisostomo, and Dionigi, entered the order of the Regular Canons of the Lateran.

Basilio Zanchi, born in 1501, went to Rome under Leo X., and was noticed at that court as an elegant Latin poet. After Leo's death he returned to Bergamo, and applied himself to theological studies, and entered the order of the Regular Canons in 1524. He wrote comments on the Bible, which are published. He was also well versed in Greek. His end was unfortunate. It appears that he had made free use of the liberty, then frequent among members of the monastic orders, of living out of his convent, and travelling about Italy. Pope Paul IV., in 1558, issued an order commanding all such persons to return to their respective convents under severe penalties. Zanchi, having endeavoured to elude the order, was put in prison at Rome, in which city he then was, and he died in prison at the end of that year. Serassi has written a good biography of Basilio Zanchi, which he has prefixed to the edition of his Latin poems in eight books, 'Zanchii Poemata,' Bergamo, 1747. Among other poems there is one entitled 'De Horto Sophiæ,' in which the author explains the principal dogmas of the Christian religion. Zanchi wrote also 'Latinorum Verborum ex variis auctoribus Epitome.' His brother Gian Grisostomo Zanchi published a work on the antient history of his country: 'De Orobiorum sive Cenomanorum Origine,' in three books, Venice, 1531, which he dedicated to Pietro Bembo. The work is deficient in historical criticism, but it may be useful on account of the numerous inscriptions of the town and territory of Bergamo which it contains. Gian Grisostomo, after filling the first dignities of his order, died at Bergamo, in 1566.

Girolamo Zanchi, a cousin of the preceding, was born in 1516, at Alzano in the province of Bergamo; he likewise entered the order of the Regular Canons of the Lateran, in which he lived for many years, and was a fellow-student of Celso Martinenghi of Brescia, a brother of his order. When the learned Pietro Martire Vermigli, who was a dignitary of the same order, embraced the doctrines of the Reformation, and was in consequence obliged to fly from Italy to Switzerland, in 1542, Zanchi and Martinenghi, who had become secretly imbued with the same doctrines, thought it prudent to emigrate also. Martinenghi was the first to leave Italy, and he went to Geneva, where he was placed at the head of the Italian Reformed congregation. Zanchi followed his friend's example, and after several vicissitudes he went to Heidelberg, where he taught divinity. He acquired so much reputation for theological science, that it was said by the learned John Sturm, that if Zanchi alone could be sent to dispute with the Roman Catholic divines assembled at Trent, he should not be afraid of the result. The Papal nuncio Zaccaria Delfino had private conferences with Zanchi in 1561, for the purpose of reclaiming him to Catholicism, in which however he failed. Zanchi's theological and controversial works were published in eight volumes after his death: 'Zanchii Opera,' Geneva, 1619, and they contain two books of letters, in which are particulars of his life. He died at Heidelberg in 1590. G. Gallizoli of Bergamo has written a biography of Girolamo Zanchi, published at Bergamo in 1785.

Francesco Zanchi, father of Girolamo and first cousin of Paolo Zanchi above mentioned, wrote a small historical work, 'Commentarius de Rebus à Georgio Hemo præclare gestis in primo adversus Maximilianum Romanorum Regem Bello a Venetis suscepto.'

(Tiraboschi, *Storia della Letteratura Italiana.*)

ZANCLO'STOMUS, Mr. Swainson's name for a genus of *Cuculidæ*, arranged by him in the subfamily *Coccyzinæ*. [Indicatorinæ, p. 459.]

ZANGUEBAR is a country situated on the eastern coast of Africa. It does not appear that this name is in use among the natives or neighbouring nations who visit the country, and it is probably a corruption of Zanzibar, the largest of the islands belonging to it. There is also some difference of opinion respecting the extent of the coast to which this name is applied. At present the mouth of the river Mozimba (11° 50′ S. lat.) is considered its southern limit, because south of that river the Portuguese colonies begin, which are considered to be situated on the coast of Mozambique. Ras Assoad (4° 10′ N. lat.) may be considered its northern limit, and as the point where it joins the coast of Ajan. The extent of the coast-line exceeds 1500 miles.

The country extending along the sea is the only portion of Zanguebar which is known, and that only imperfectly, as it is rarely visited by European vessels, except a few points to which slave-vessels formerly resorted, especially from the island of Bourbon. The interior is entirely unknown, and occupied by native tribes, which are always at war with the inhabitants of the coast, who are mostly foreign settlers.

The most northern portion from Ras (Cape) Assoad to the mouth of the river Juba (a few miles south of the equator) is called Barra Somauli, or the country of the Somauli, because occupied by that nation. The country north of Mukdeesha, or Magadoxo, as seen from the sea, exhibits a very small degree of fertility, presenting little variety, and being composed of sand cliffs and hills, either without or with very little vegetation. It appears also to be thinly inhabited. To the south of Mukdeesha the country improves considerably; it is far more fertile and more populous. There are several towns on the coast, as Mukdeesha, with 4000 inhabitants [Magadoxo]; Gezerat and Denana, with 1000 inhabitants; Havaly and Goondarsha, with 3000 inhabitants; Marka, with 2000 inhabitants; Mongooya and Torra, with 1500 inhabitants; and Brava, with 2000 inhabitants. This statement is probably under the actual population, but it may give an idea of their relative proportion. All these towns are built on rocky promontories, either entirely or nearly insulated, and their bee-hive construction gives them a singular appearance. The motive of the inhabitants in thus placing their houses is the salubrity of the air, the supply of water, of which the arid sandhills in the neighbourhood are destitute, and probably the facility of defence against the native Galla. Along the coast there are in most places dangerous reefs, which render it difficult of access. The river, called Juba by the Arabs, and by the Africans Wowweenda, is stated to be of considerable length, rising in Habeshy, or Abyssinia, and being navigable by boats for three months from its mouth. Across the mouth, which is not wide, there is a bar, but the bar is narrow and has plenty of water.

The country south of the river Juba is much more indented, and contains numerous fine harbours. The shore as well as the islands are formed of madrepore. Between the mouth of the river Juba and the Bay of Kwyhoo, a distance of 150 miles, is a labyrinth of islands and rocks. The number of those which are never covered with water amounts to nearly five hundred, of which many are from two miles and a half to two miles and a quarter in length, but the majority are of inconsiderable size. They rise abruptly from a narrow line of reefs. About two miles outside these islands is a coral bank, which renders the approach to the coast dangerous for large vessels. In this whole extent there is only one port which a vessel can enter at all times of tide. This is the mouth of Durnford River, but the channel which leads to it from the open sea passes between two coral islands not more than a cable's length apart. The islands themselves seldom rise above twelve feet, and generally overhang the rocky flats on which they stand. The summit of the heights is level, and from the constant decomposition of the coral it presents a surface of sharp points, over which it is difficult to pass. The country opposite this labyrinth of islands is a succession of hills covered with verdure and of well-wooded lowlands. These parts contain many antiquities, consisting of mouldering tombs, tottering obelisks, and other ruins, which were doubtless erected before the Portuguese got possession of this country. Though the soil of this tract is apparently fertile and the climate healthy, it is very thinly peopled, having been laid waste by the Galla, who have extirpated the former inhabitants, or obliged them to take refuge in the islands.

At the southern extremity of this region (near 2° S. lat.) begins a low coast-line, which however contains many excellent harbours, as those of Kwyhoo, Patta, Lamoo, Formosa, Melinda (Maleenda), and Mombas. There are only a few coral islands along it. The shores of the bays and harbours are low and mostly swampy; they are overgrown with mangroves, but at a short distance inland the country rises into low hills, between which are wooded levels of moderate extent. The surface presents a soil varying from red to a dark black, which appears to possess a considerable degree of fertility. In Formosa Bay is the mouth of the river Ozy, which is one mile wide at the entrance, and, although deep inside and a large river, it is difficult of access on account of a dangerous quicksand-bar, over which at low tide there is only four feet of water. According to the statement of the natives, this river rises greatly during the rainy season, and inundates the surrounding country for many miles, destroying innumerable wild animals, among the rest many elephants. At the distance of fifteen days' journey in a canoe there is said to be a large town, Zoobakey, beyond which the current is too strong for farther progress.

South of Mombas the general appearance of the coast is low, but not swampy, and well defined, having a sandy shore, and in some places a small intervening cliff of coral. But at some distance appear various insulated mountains of curious shapes, which present a remarkable contrast to the general flatness of the country. Except in one part, where the coast is a putrid marsh, the shores are lined with villages, rendered conspicuous by a grove of cocoa-nut trees, in the midst of which they are built. The country is apparently fertile. Parallel to the shores, at the distance of four or five miles, there is a line of sand and coral reefs with deep water between and inside, but to seaward nearly unfathomable. The bay of Lindy has a flat shore, which is formed by the alluvial deposit brought down by the river Lindy, which appears to be large, and at a distance of about eight miles from its mouth branches into several small channels, forming a complete archipelago of low swampy islets covered with mangroves. A few miles farther south is the river Rowoona, which, from the vast volume of water which it discharges, is considered as the most considerable river, next to the Zambezi, on the eastern side of Africa, but we know nothing of its course.

Opposite this country are the largest islands along the eastern coast of Africa, the islands Pemba, Zanzibar, and Monfeea. The most northern is Pemba, known by the Arabs as Al Huthera, or the Green Island, which extends from north to south thirty miles, and from east to west ten. It is about eighteen miles from the main at the north end, and twenty-five from Zanzibar. It is not in any part more than 200 feet above the sea, and rests on a coral foundation. It is one of the most fertile spots in the world, being covered with a very productive soil, from which luxuriant vegetation springs spontaneously, and it abounds in excellent ship-timber: but the largest part of the surface is cultivated, and produces, besides other plants, rice of the finest quality: it is in fact the granary of the neighbouring coast. Along its western side from Toudong to its southern extremity are several good and safe harbours, among which the best is that of Masal al Chack-Chack. Zanzibar is nearly twice the size of Pemba, and resembles this island in soil and fertility. Besides every kind of grain which grows between the tropics, it produces great quantities of sugar, which is exported to Arabia and the Red Sea, and even to Egypt. There are numerous harbours between Zanzibar and the main, formed by the islands and reefs which are dispersed over the channel which separates it from the continent, and which is about five miles wide. These harbours are safe, and not difficult of access; but within the shores of Zanzibar there is not one land-locked port, and in this particular this island does not resemble Pemba. The numerous inhabitants carry on one branch of manufacturing industry to a considerable extent, that of making round shields, about a foot and a half in diameter. These shields are used by the soldiers of the Imaum of Muskat as a protection against the fire of musquetry. They are manufactured from rhinoceros hides, which after being soaked or boiled are easily moulded into any form, and then embellished by turning. Monfeea is little known, being surrounded with a labyrinth of shoals and several islets, which render access to it difficult. It seems to be somewhat smaller than Pemba. It rises abruptly from an unfathomable depth, and is based upon a coral foundation. The surface is covered with trees, and it appears to be tolerably well peopled. The channel between the island and the main is about twelve miles across, but so thickly studded with coral shoals as to be impassable for vessels of any size without considerable danger.

Nearly opposite the mouth of the Mozimba river are the Querimba Islands, a numerous archipelago. They are of various sizes, but all low, and formed of coral, generally with long flat reefs extending seaward, and then rising abruptly from an immense depth. The harbours between these islands and the main are excellent, being sheltered on the west by the mainland, and in every other direction by islands and reefs: they afford perfect security to vessels in the heaviest gales.

The year is divided between the dry and rainy season. The rainy season generally commences four or six weeks after the sun has passed the zenith, and as Zanguebar extends on both sides of the equator, it commences at different times in different places. The rains are very abundant, and the rivers swell so as to inundate the adjacent countries to the distance of several miles. The heat in summer is very great, but as during the last century and a half no European has resided there for any length of time, no meteorological observations have been made. It is however certain that the climate is very unfavourable to Europeans, even where the country is not low and swampy.

The productions are various, but very imperfectly known, except those which are cultivated on the coast and are articles of commerce. Rice and millet appear to be the only kinds of grain which are grown. Dhol (a small species of peas), peas, and beans are the most common leguminous plants. Musk-melons, pumpkins, and the sugar-cane are grown: cocoa-nuts, bananas, and plantains are also common. The forests contain many large trees, of which some are used as timber. A plant which yields caoutchouc is frequently met with. Horses are not frequent, and rather small. Asses are of good size. But cattle abound, and they are mostly of the humped kind. The sheep are of the Tartar breed: they are very small, but their flesh is delicate and sweet. A few goats are kept. Fowls are very abundant. The larger wild animals in the interior are the elephant, rhinoceros, lion, leopard, and several kinds of antelopes. The rivers contain hippopotami and crocodiles, which are numerous south of the equator, but rare north of it. Fish are abundant, and many families subsist on the produce of their fishing. A kind of [illegible], salted or dried, is an article of commerce. There are several kinds of shell-fish. Cowries are collected in great quantities, and exported to Hindustan. Gold is brought from the interior, but not in large quantities.

Zanguebar is partly subject to native princes and partly to the Imaum of Muskat. North of the river Juba the inhabitants are Somauli, and their chiefs appear to be independent. From the river Juba to the bay of Kwyhoo the Galla have advanced to the shores of the sea, and keep possession of that tract. The country between Kwyhoo and Melinda is subject to the Imaum of Muskat. From Melinda to the river Pangany extend the territories of the Sheik or Sultan of Mombas, which in 1823 were placed under the protection of Great Britain. The remainder of the coast, as far south as Cape Delgado, is again subject to the Imaum of Muskat.

The inhabitants are either tribes of African origin or settlers from other parts of the world. The African tribes are the Somauli, Galla, Dowla, Wanyekas, and Sowhylese.

Somali occupy the most western parts of [illegible] and terminates [illegible] people. [illegible] of the [illegible] Arabia and the Red Sea. [illegible] the coast as far as Magadoxo [illegible] to the coast [illegible] by the Galla. The Galla are dispersed over a great [illegible] of country in Eastern Africa: they occupy the [illegible] portions of Abyssinia, and extend southward to the Bay of Kwyhoo. We [illegible] how far they have [illegible] into the interior of Africa: few Europeans [illegible] intercourse with this nation, and we know very little [illegible].

They seem to be what the Mongols are in Asia—a [illegible] living on the produce of their herds, roaming over a great extent of country, and terrifying their neighbours by their warlike disposition, ferocity, and cruelty. Bote[illegible] describes them as perfectly black, of large stature and fine make, wearing no dress except a small piece of cloth [illegible] round their loins. Their arms are bows and arrows; they have not yet conquered their aversion to fire-arms. [illegible] unite subtlety and want of faith with ferocity, and [illegible]quently the commerce between them and the Arabs [illegible] coast is carried on entirely in the towns of the latter. [illegible] is far from being important. The Dowla occupy the [illegible]ry at the back of Lamoo. They are far more [illegible] and settled in their habits than the Galla, and the[illegible] have uninterrupted commercial intercourse with [illegible]. We know nothing more of this tribe. The Waye[illegible] inhabit the country surrounding the Bay of Mombas [illegible] a large portion of the territories of [illegible] but appear to be only [illegible] seem to have attained a [illegible] some of their towns are large and populous and [illegible]ly defended by [illegible] and [illegible]tres. The women are better dressed, the men better [illegible] than even the Arabs, and there [illegible] in their domestic affairs than in other tribes. The [illegible] occupy nearly all the villages and towns of the south of Kwyhoo Bay, and at some places [illegible] to a great distance into the interior. They are not [illegible] as the other tribes, but approach in colour and [illegible]res to the Moors of North Africa. It seems that at [illegible] of the arrival of the Portuguese on the coast [illegible] Eastern Africa [illegible] differ in every [illegible] from the Arabs and the [illegible] Their [illegible] is still spoken from Kwyhoo to Mombas, [illegible] evidences of it exist [illegible] the confines of the Caffre [illegible]. Having [illegible] religion of Mohammed they are more closely united [illegible] Arabs than the other native inhabitants, and have [illegible] their arms and partly also their costume. They [illegible] industrious people, and mostly engaged in agri[illegible]re.

[illegible]ough the Portuguese had numerous settlements on [illegible] coast in the sixteenth and seventeenth centuries, it [illegible] not appear that at present there are any descendants [illegible] that nation. The religion of Mohammed had taken [illegible] in these countries before the arrival of the Portuguese. The Arabs had not settled there, except in small numbers and as merchants. But after the Portuguese had been [illegible] to abandon it, the Arabs appeared as conquerors. There are a considerable number of them at present in [illegible] large towns, especially in those which are subjected to [illegible] sway of the Imaum of Muscat. Several Banyans from [illegible]stan are settled at Mombas as merchants.

[illegible] ancient and famous towns of Magadoxo, Melinda, [illegible], and Quiloa [illegible]. Besides these the towns of Patta, Lamoo, and [illegible] deserve to be mentioned. They are of more recent [illegible]n. Patta is built on an island which [illegible] Bays of Kwyhoo and Patta, and is divided from the [illegible] by a [illegible] can pass. [illegible] Portuguese had a [illegible] [illegible] over [illegible] of [illegible] shed [illegible] is at present [illegible] of Africa [illegible]

of more than 5000. It is built on the southern shore of the Bay of Lamoo, at the foot of a sandy ridge [illegible]. The houses [illegible] standing east and west, and are made of reeds and staves well plastered with mud: the roof does not rest upon the walls, [illegible] projecting [illegible]. Their mosques are built with a flat roof supported by low clumsy arches, and of superior materials. The houses are crammed together [illegible] between them. [illegible] bottom of a deep [illegible] parts [illegible] miles [illegible]. The [illegible] sandy [illegible] town is situated. [illegible] of a great number of [illegible] groves of cocoa-nut and other trees. It carries on [illegible].

Commerce.—The [illegible] of Zanzibar [illegible] Arabia and the Red Sea, and [illegible] Hindustan. The exports to Arabia are [illegible] salted fish [illegible] gums, a kind of [illegible] and [illegible] made of [illegible]. The [illegible] imports are linen, arms, and some manufactured goods of India. The commerce with Hindustan is limited to the harbour of Mombas, from which the Banyans [illegible] settled there, send ivory, gum [illegible] and [illegible] articles to Bombay, whence they receive Indian and English manufactures. The French from the island of Bourbon send annually some vessels to Lamoo and Patta [illegible] slaves. Many vessels are employed in the coasting-trade, carrying [illegible] salted and dried fish [illegible].

Navigation.—The trade of this country is carried on by vessels constructed by the Arabs and Sowahelies. The vessels [illegible] of the most simple construction. They are generally very [illegible] fourteen [illegible] They are generally [illegible] except [illegible] when they [illegible] of long slender poles. They seem [illegible] The surprising [illegible] these [illegible] hard rocky [illegible] boats [illegible] They seem [illegible] going with the [illegible].

Education.—There are schools in the towns of [illegible] Lamoo and several in Mombas. The children are taught to read [illegible] Arab [illegible] in a very [illegible] the Koran, and [illegible] the masters they [illegible] them.

History.—It is evident from Ptolemy and the Periplus of the Erythraean Sea that nearly the whole of this coast was known to the ancients in the second century after Christ. Vasco de Gama, in his passage to India, sailed along this coast as far north as Melinda, where [illegible] Indian Ocean [illegible] Melinda [illegible] the Portuguese [illegible] teenth century, they certainly were in possession of numerous points of the coast. Most of the castles which are still found there, though partly in ruins, bear evident signs of having been erected by the Portuguese. The most northern place occupied by them was the promontory of Hafoon, on the coast of Ajan, near 10° N. lat., which they intended to convert into an island by a canal cut through the isthmus which connects it with the mainland, in order to make it more defensible. But having lost Muskat, and being pursued by the Arabs, they abandoned the enterprise, and soon began to lose one place after another, so that towards the end of the sixteenth century they were not in possession of a single point on this coast. The circumstances which brought about these changes are not known in Europe. After the Portuguese left the country, the Arabs of Muskat several times tried to occupy this coast, and more than once they succeeded in getting possession of some of its harbours, which however they generally lost after some time. It does not appear that they ever had in their possession so considerable a portion of it as at present, embracing all the countries from Khyhoo Bay to Cape Delgado, and the islands lying opposite this coast, with the exception of the territories of the Sheik of Mombas, who in 1823 placed them under the protection of the English, as already stated.

(*Narrative of Voyages to explore the Shores of Africa, Arabia, and Madagascar, under the direction of* Captain Owen.)

ZANNICHELLIA, a genus of plants belonging to the natural order Naiadaceæ. This name was given by Micheli in honour of John Jerome Zannichelli, a physician and botanist, who was born at Modena, in 1662. He published a work on the preparation of medicines, entitled 'Promptuarium Remediorum Chymicorum.' He made many excursions through all the states of Venice in the capacity of physician-naturalist, an office to which he was nominated by the Chamber of Health. He formed an extensive museum of natural history, and died in 1729. After his death his son published his various papers on botany, geology, &c., under the title of 'Opuscula Botanica posthuma.'

The flowers in this genus are monœcious. The male flowers have neither calyx nor corolla, with a single elongated filament surmounted by an oblong anther: the female flowers have a calyx consisting of a single leaf, no corolla, the germens four or more, the stigmas peltate, and the capsules sessile.

There is but one species of this genus, the *Z. palustris*, the Marsh Horned-Pondweed. It is a native of ponds, ditches, and rivulets in most parts of Europe. It is also found in Virginia near the Sweet Springs, according to Clayton and Rush. Koch, in his 'Flora Germanica,' records three varieties, *major*, *repens*, *stipitata*. These have been recorded as species by other writers.

ZANO'NIA, a genus of plants belonging to the natural order Cucurbitaceæ. This name was given by Rheede in honour of James Zanoni, who was superintendent of the Botanical Garden at Bologna, during the 17th century. He published, in 1675, a folio volume in Italian, entitled 'Istoria Botanica,' containing descriptions and plates of eighty new and rare plants. He died in 1682. An edition of his works was published by Monti, in Latin, in 1742.

The only species belonging to this genus is *Z. indica*, the climbing Indian Cucumber. The fruit is described by Rheede as obscurely triangular, and having the flavour of the cucumber.

ZANOTTI, GIAMPIE'TRO CAVAZZO'NI, distinguished alike for his paintings and his writings, was born of Italian parents at Paris, in 1674. He was however removed in his tenth year to Bologna, where he was placed in the school of Lorenzo Pasinelli, then one of the first painters of that city. Zanotti soon displayed great talent, and there are still several fine works by him at Bologna, in public and private buildings; he is however better known for his writings upon art, and few, says Lanzi, have ever handled pen and pencil so well as Zanotti. He published several poems, but the following are his principal works:—

1. Letters in Defence of Malvasia—'Lettere Familiari scritte ad un Amico in Difesa del Conte Carlo Cesare Malvasia, Autore della Felsina Pittrice,' Bologna, 1705, 8vo.

2. Life of L. Pasinelli—'Nuovo Fregio di Gloria a Felsina sempre pittrice nella Vita di Lorenzo Pasinelli, Pittore Bolognese,' Bologna, 1708, 4to.

3. History of the Clementine Academy of Bologna—'Storia dell' Academia Clementina di Bologna aggregata all' Instituto delle Scienze e dell' Arti,' vol. 2, fol., Bol., 1739.

4. Hints to a young Painter—'Avvertimento per lo Incamminamento di un Giovine alla Pittura,' Bol., 1756, 8vo.

5. Works of P. Tibaldi and N. Abbati in the Institute of Bologna, &c.—'Descrizione ed Illustrazione delle Pitture di Pellegrino Tibaldi e Niccolò Abbati, esistenti nell' Instituto delle Scienze,' &c., Venezia, 1756, fol.

He wrote also a Life of Eustachio Manfredi, and several volumes of poems by him were published at different periods in Bologna. He was secretary to the Institute of Bologna, in which his brother F. M. Zanotti held the chair of philosophy. Giampietro has written his own life in his history of the Academia Clementina. He died at Bologna in 1765, aged 91, and was buried in the church of Santa Maria Maddelena, where there is a monument to his memory, with an inscription beginning as follows:—'Joanni Petro Zanotto, Pictori egregio, Poetæ longe clarissimo,' &c.

(Zanotti, *Academia Clementina, &c.*; Fantuzzi, *Scrittori Bolognesi.*)

ZANTE (Ζάκυνθος, Zacynthus), one of the present Ionian Islands. The chief town, of the same name as the island, is situated in 37° 32′ N. lat. and 20° 54′ E. long. from Greenwich. The nearest headlands of the Morea (Cape St. Niccolo), and of Zante (the Point of Davia), are 21 English miles asunder.

From Cape Skinari, the most northerly point of the island, to Cape Geraka, its south-east headland, is in a straight line 23 English miles in the direction from north-west to south-east; from Cape Skinari to Cape Kieri, the south-west head, is 22 miles in the direction from north to east of south. Capes Geraka and Kieri are the headlands of the Gulf of Kieri, which measures in width from headland to headland 8 English miles. A perpendicular drawn from a straight line joining these points to the innermost bay of the gulf measures 4 English miles. The north-east coast is indented by two deep but open bays. The bays of Zante and the Salines curve inland to the south of the straight line joining the extreme points of this coast; and the headlands Vasiliko (south of the town of Zante) and Krionero (north of it) advance about a mile to the north of the same line. From Cape Kieri to Cape Yami, the south headland of Vromi bay, a distance of [illegible] English miles, the south-west coast extends nearly parallel to the line of the south-east coast; from the bay of Vromi the coast-line curves round to the north till it reaches Cape Skinari, a distance of 8 English miles.

There are two considerable chains of mountains in the island. The principal chain extends from Cape Kieri skirting the south-west coast in a curvilinear direction as far as Cape Skinari: the inferior chain extends from Cape Geraka nearly in a direct line along the north-east coast till it is lost in the spurs of the other range opposite the bottom of the bay of the Salines. The highest point in the second range is Mount Skopo (1509 feet) near its south-east extremity; the highest point in the principal range is Mount Vrachiona (2274 feet), nearly on the degree of latitude where the distinction between the two chains ceases to be discernible.

An extensive plain extends along the bottom of the Gulf of Kieri from Mount Skopo to the mountains which terminate at Cape Kieri. Along the shore the plain is nearly six English miles in breadth; it extends inland about ten miles, gradually narrowing towards its apex where the two mountain-chains of the island meet. Towards the sea the plain is marshy and unhealthy. At the south-west angle of this plain, near the shore of a deep bay of the Gulf of Kieri, are the pitch-wells mentioned by Herodotus and Pliny.

The only sheltered ports in the island are the Gulf of Kieri, between the main and the small islands of [illegible] and Maratonisi, but the malaria from the swampy plain renders them unavailable for the purposes of commerce. The bay in which the town of Zante is situated is a mere open roadstead. The Camura, the only running water in the island, falls into this bay on the south side of the town. The bay to the north-west of Zante, on the nearest [illegible] of which are situated the Salines of Calesturi, is full of shallows, and has at its entrance the reef of St. Nicholas.

Though there is only one stream of water in the island, there are plenty of springs. Some of them are hot, and those, along with the pitch-wells, would of themselves indicate that subvolcanic formation which the frequent and violent earthquakes to which Zante is liable would lead us to attribute to it. The climate is agreeable. The epithet 'woody' (ὑλήεσσα, 'nemorosa'), bestowed upon it by Homer and Virgil, is no longer applicable, the only wood on the island being the olive-groves in the great plain. In other respects it still merits its title of 'flower of the Levant,' abounding in olive-gardens, vineyards, and gardens, oranges, pomegranates, citrons, peaches, and melons. The principal article of export is currants. Little oil is prepared from the olives, and that of an indifferent quality. Some wine is made, of which nearly the half is exported. The wheat, maize, barley, and vegetables raised on the island are only sufficient to supply the inhabitants for three months of the year: the supplies for the other nine months are derived from the Morea. The mineral products are bitumen, of which 100 tons are annually extracted from the wells, and salt, of which any quantity might be manufactured, though the inhabitants make little more than serves to salt their olives.

The pitch-springs of Zante were visited by Herodotus in the fifth century B.C., and described by him (iv. 195). The pitch was then collected for economic purposes. Thus we have evidence of this supply of pitch having existed two thousand years ago, and it is probable that it has not been interrupted. Pliny describes it (xxxv. 15).

There are some inconsiderable manufactures of cloths, silks, and cotton thread, jewellery, liqueurs, and soap.

The population of the island was estimated, in 1833, at 40,000: of these 19,000 inhabited Zante, the only town in it. The rest are contained in 45 villages. Under the jurisdiction of the local governor of Zante are placed all the smaller islands around it, and along the shore of the Morea from Zante as far south as Cape Gallo.

Zante is the antient Zacynthus. According to Pausanias, Zacynthus, the son of Dardanus, of Psophis in Arcadia, colonized the island; Pausanias mentions this tradition by way of explaining the fact of the acropolis of Zacynthus being called Psophis (viii. 24). This legend, and the tradition attributed to Bocchus by Pliny (xvi. 79, ed. Hard.), that Saguntum in Spain was founded by emigrants from Zacynthus two hundred years before the Trojan war, implies that it was early distinguished among the Grecian islands. Livy (xxi. 7) and Strabo (p. 159, ed. Casaub.) also make Zacynthus the parent city of Saguntum. The Zacynthians themselves were a colony of Achæans from the Peloponnesus. In the Peloponnesian war Zacynthus sided with Athens, and was ravaged by the Lacedæmonians. (Thucyd., ii. 66.) The Zacynthians also joined the Athenians in their invasion of Sicily. (Thucyd., vii. 57.) The island remained independent till the war of the Romans against Perseus, in which its inhabitants embraced the Macedonian party. At the termination of the war it was declared a dependency of Rome, and placed under the praetor of Achaia. The island continued an integral part of the Roman dominions, and, after the partition of the empire, of the Eastern empire, till its subversion by the Turks. In 1499 Zante was taken by the Venetians from the Turks, but restored at the peace of 1501. In 1578, having again fallen into the hands of the Venetians, it was ravaged by the Turks. Since that period it has constantly remained one of the Greek dependencies of Venice, and has passed, with the other islands of the Ionian group, from Venice to France, and from France to England. [IONIAN ISLANDS.]

(Porter, *Progress of the Nation*; Arrowsmith's *Map of the Ionian Islands and Malta*; Daru, *Histoire de Venise*; Bory St.-Vincent, *Les Iles Ioniennes*.)

ZANTHOMI'ZA. Mr. Swainson's name for a subgenus of *Meliphaga*. [MELIPHAGIDÆ.] The proper form is XANTHOMYZA.

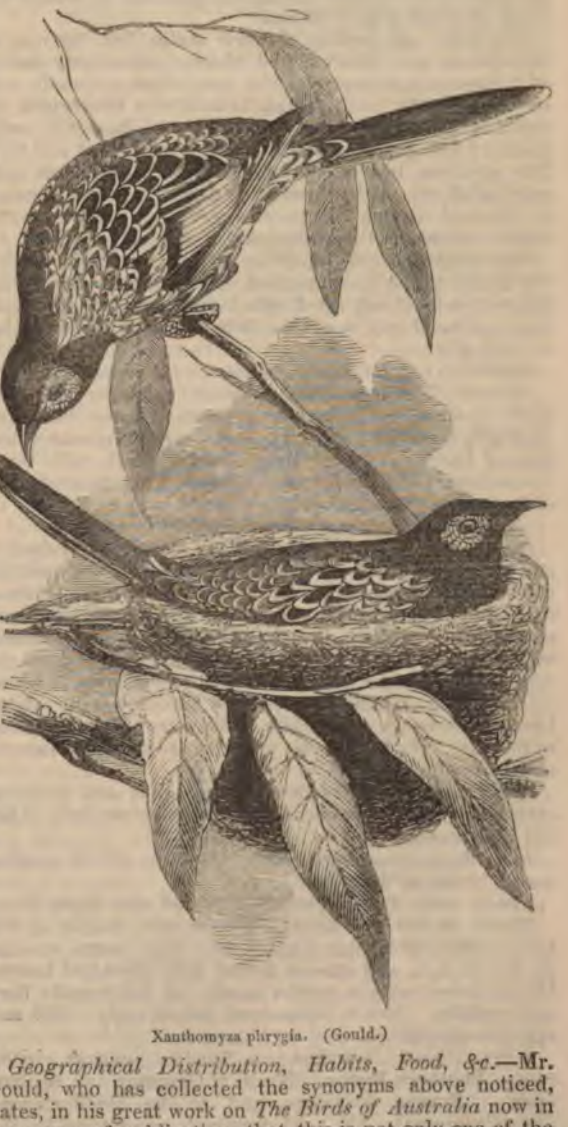
Generic Character.—Bill moderate, much curved; the culmen considerably arched. Face naked. Middle toe much longer than the hallux. The tenuirostral type. (Sw.)

Example, *Xanthomyza phrygia*.

Description.—*Sexes* nearly alike in colouring, but the *female* much smaller than the *male*. The *young* destitute of the warty excrescences on the face, that part being partially clothed with feathers.

Head, neck, upper part of the back, chin and chest, black; scapulars black, broadly margined with pale yellow; lower part of the back black, margined with yellowish white; upper tail-coverts like the scapulars; wings black, the coverts margined with yellow; spurious wing yellow; primaries black, with an oblong stripe of yellow occupying the margin of the outer and a portion of the inner web next the quill, which is black; secondaries black, broadly margined on the outer web with yellow; under surface black, with an arrow-shaped mark of yellowish white near the extremity of each feather; two centre tail-feathers black, slightly tipped with yellow; the remainder black at the base, and yellow for the remainder of their length, the black decreasing and the yellow increasing as the feathers recede from the two central ones; irides reddish brown; bill black; feet blackish brown; warty excrescences covering the face dirty yellowish white. (Gould.)

This is the *Merops phrygius*, *Black-and-yellow Bee-eater* and *Black-and-yellow Honey-eater* of Latham; *Embroidered Bee-eater* of Shaw; *Warty-faced Honey-eater* and *Meliphaga phrygia* of Lewin; *Le Merle écaillé* of Le Vaillant; *Philedon* of Temminck; *Philemon phrygius* of Vieillot; *Anthochæra phrygia* of Vigors and Horsfield; and *Mock Regent Bird* of the colonists of New South Wales.



Xanthomyza phrygia. (Gould.)

Geographical Distribution, Habits, Food, &c.—Mr. Gould, who has collected the synonyms above noticed, states, in his great work on *The Birds of Australia* now in the course of publication, that this is not only one of the handsomest of the Honey-eaters, but is also one of the most beautiful birds inhabiting Australia, the strongly contrasted tints of its black and yellow plumage rendering it a most conspicuous and pleasing object, particularly during flight. It is, he adds, a stationary species, ranging from South Australia to New South Wales; he also met with it in the interior nearly as far north as the latitude of Moreton Bay.

Although it is very generally distributed, its presence appeared to Mr. Gould to be dependent upon the state of the *Eucalypti* [Eucalyptus], upon whose blossoms the bird mainly depends for subsistence; and it is, consequently, only to be found in any particular locality during the season when those trees are in full bloom. 'It generally resorts,' says Mr. Gould in continuation, 'to the loftiest and most fully-flowered trees, where it frequently reigns supreme, buffeting and driving every other bird away from its immediate neighbourhood; it is in fact the most pugnacious bird I ever saw, evincing particular hostility to the smaller *Meliphagidæ*, and even to others of its own species that may venture to approach the trees upon which two or three have taken their station. While at Adelaide, in South Australia, I observed two pairs that had possessed themselves of one of the high trees that had been left standing in the middle of the city, which tree, during the whole period of my stay, they kept sole possession of, sallying forth and beating off every bird that came near. I met with it in great abundance among the brushes of New South Wales, and also found it breeding in the low apple-tree flats of the Upper Hunter. I have occasionally seen flocks of from fifty to a hundred in number passing from tree to tree, as if engaged in a partial migration from one part of the country to another, probably in search of a more abundant supply of food.'

The same enterprising observer states that the note of this species is a peculiar loud whistle not entirely devoid of harmony, and describes the nest, which is usually constructed on the overhanging branch of a *Eucalyptus*, as round, cup-shaped, about five inches in diameter, composed of fine grasses, and lined with a little wool and hair. The eggs are two in number, of a deep yellowish buff, marked all over with indistinct spots and irregular blotches of chestnut red and dull purplish grey, particularly at the larger end, where they frequently form a zone.

The stomachs and intestines of the specimens which Mr. Gould killed and dissected among the brushes of the Hunter were entirely filled with liquid honey only; insects however, he thinks, doubtless form a considerable portion of their diet.

ZAPORNIA, Dr. Leach's name for a genus of Rallidæ.

Generic Character.—Beak slender, shorter than the head, acuminated, compressed, acute; upper mandible gradually incurved. *Nostrils* linear, lateral, placed at the base of the beak. *Legs* long, slender, cleft, with three toes in front; the hinder toe elevated from the ground at its base; the tibiæ half naked. (Gould.)

Example, *Zapornia porzana, Spotted Crake.*

Description.—Adult and Old Male.—Forehead, eyebrows, and throat, leaden grey; sides of the head, ash marked with black; upper parts olive brown, but all the feathers black in the centre and variegated with small spots and stripes of pure white. Breast and lower parts olive, shaded with ash and marked with white spots; these spots are rounded on the breast, but disposed on the sides in transverse bands. Middle tail-feathers bordered with white; lower tail-coverts pure white. Bill greenish yellow, red at the base. Feet greenish yellow. Iris brown. Length about nine inches.

Adult Female.—Ash-colour of the throat and neck less extensive; sides of the head with brown spots; base of the bill with less red.

N.B. Both sexes, in autumn, have the bill of an olive green, brown at the point.

Young when first excluded.—Covered with black down.

Young before the Moult.—Throat and middle of the belly whitish ash, often whitish with small brown streaks. Eyebrows, face, and cheeks dotted with white and brown. On the lower parts a greater number of white spots than in the adults. Lower tail-coverts bright rusty. Bill and feet greenish brown.

Geographical Distribution.—Sweden (summer visitor, rare). Southern Russia. North of Germany and Holland (rare). France, Provence, and to the Mediterranean (more common). Of most frequent occurrence in the South and East of Europe. Has been seen at Smyrna in the winter, and is stated to extend to India. England, Scotland, Wales (summer visitor, but not common). Ireland (occasional summer visitor).

This is the *Petit Rale d'Eau, Cauchouan*, and *Marouette* of the French; *Porcellana, Porzana, Grugnetto, Porciglione*, and *Gallinella* of the Italians; *Punktiertes Rohrhuhn* and *Kleines gesprenkeltes Wasserhuhn* of the Germans; *Speckled Water Hen* and *Skitty* of the modern British; and *Dufriar fannog* of the antient British.

Habits, Food, &c.—Slugs and other small mollusks, worms, water-insects, and tender vegetables form the food of the Spotted Crake, which arrives in this country about the middle of March, and stays as late as nearly the end of October. In those countries (maritime principally) where it seeks congenial haunts in marshes or morasses, the sportsman finds a good dog necessary to force it from the reeds, rushes, or tangled rank grass which border the lake or sluggish stream. Colonel Hawker gives the best directions for managing them in the field, and, as in most of his valuable hints, in a few words. 'In shooting all kinds of rails, press them very hard, or you will have difficulty to get them on wing. If they are in a hedge, go a-head of your dogs, and shake it *before* them. Having once driven them up, you should fire, if there is any chance, as the difficulty of springing them a second time is tenfold.'

Although the Spotted Crake is not common in these islands, there is no doubt that it breeds here, the eggs and young having been found in the Norfolk marshes and in other localities. Mr. Selby, accompanied by a shrewd dog that was up to their tricks, sometimes flushed as many as six in the large Northumbrian morass in his neighbourhood, just before their autumnal migration, and the majority were young birds of the year.

The nest is generally formed in some reed- or sedge-grown marsh on the plashy soil, and often on the brink of the pool or stream, with a bottom and outside of rank water-plants, accommodated with a finer lining within. The six, seven, eight, or ten reddish white eggs are dotted and speckled with dark rusty brown, and, as soon as the young Crakes quit the shell, Montagu says that they take to the water.

The fine flavour of this bird is well known and appreciated in France. Few, if any, of the aquatic, or indeed of any tribe can match it in autumn as a rich morsel for the table, especially if it be young. Colonel Hawker, speaking of the Common Water-Rail and this species, truly says, 'Notwithstanding these two are seldom regarded by sportsmen, yet there is scarcely a greater delicacy than either the one or the other.' Both are indeed first-rate, but the Spotted Crake for choice.

The Spotted Crake.

There are two other European and British Zapornia, viz. *the Little Crake* or *Olivaceous Gallinule, Zapornia pusilla*, and *Baillon's Crake, Zapornia Baillonii*: of both these M. Temminck says that the specimens found in Japan are the same with those killed in Europe.

Two species, *Zapornia notata*, Gould, and *Zapornia spilinota*, Gould, are figured and described in 'The Zoology of the Voyage of H.M.S. Beagle,' edited and superintended by Charles Darwin, Esq.

The habitat of the first of these, which was shot on board the Beagle, is stated to be the *Rio plata;* of the second, the Galapagos Archipelago.

The following is Mr. Darwin's description of the habits and locality of the last-mentioned species:—'This bird frequents in large numbers the high and damp summits of the islands. It lives in the thick beds of *Carex* and other plants, which, from the condensed vapour of the clouds, are constantly kept rather humid. It is tame, but lives concealed; it often utters a loud and peculiar cry. The female is said to lay from eight to twelve eggs. It is, I believe, the only bird in this archipelago which is exclusively confined to the upper parts of the islands.'

ZARA, one of the four circles of Austrian Dalmatia, is composed of the most northern portion of the continental part of the province, of the Quarnero islands Arbe and Pago, and of some adjacent islets. Its area is 2360 square miles, with 125,000 inhabitants, of whom about 88,000 are Roman Catholics, and the remainder Not United (*i.e.* Schismatic) Greeks. [DALMATIA.]

ZARA, the capital of the circle and the kingdom, situated in 44° 8′ N. lat. and 15° 15′ E. long., lies in the form of an oval, on a narrow tongue of land which is divided from the continent by a deep moat, over which there is a drawbridge. The city is divided by a straight main street and a cross street into four quarters; the other streets are straight, but narrow, ill paved, and without sewers. It has two large squares, and, including the suburbs (*Borgo intorno* and *erizzo*, or Albanian village), 1050 stone houses and 8000 inhabitants, most of whom speak Italian. Of the six churches (in which there are many good paintings) the most worthy of notice are the Gothic cathedral, founded by Henry Dandolo, doge of Venice, and that of St. Simeon, the patron saint of the city, whose mortal remains are deposited in it. Zara is strongly fortified; the harbour is excellent, and capable of containing a large fleet. It is the seat of the government of the province, of a court of appeal, and various subordinate offices; the residence of a Roman Catholic archbishop, and his chapter. Among the public institutions and establishments are a lyceum, a gymnasium, an archiepiscopal seminary, a normal high school, a public school for females, a school of midwifery, a lying-in and a foundling hospital, a civil and military hospital, a naval and military arsenal, a theatre, a casino, &c.: the Pellegrini Museum is a private collection of works of art and antiquities. There are several distilleries of rosoglio, which is highly esteemed, especially that called Maraschino. Most of the inhabitants however derive their subsistence from the fishery among the neighbouring rocky islets (*scoglie*), on several of which a little flax is grown. The trade of the city is limited to the supply of the capital and the immediate neighbourhood. A very great inconvenience is the want of a sufficiency of fresh water, which is felt almost every year during the heat of summer, notwithstanding the four cisterns which contain 40,000 tons of water. On some occasions, for instance in 1828, the inhabitants have been obliged to obtain a supply from the waterfalls of the Kerka, nearly 50 miles distant.

(Blumenbach, *Neuestes Gemählde der Oesterreichischen Monarchie; Die Oesterreichische National Encyclopädie; Umriss der Oesterreichischen Monarchie;* Hörschelman; Hassel; Cannabich.)

ZARIA. [SOUDAN.]

ZARLI'NO, GIOSEFFO, the most celebrated of all the Italian writers on the speculative and practical theory of music, and in voluminousness exceeding all, of whatever age or country, who have treated on this subject, Mersenne and Kircher excepted,—was born at Chioggia, an episcopal city in the Venetian States, in 1519, and little more is known of his personal history. Judging from his erudition and mathematical knowledge, it would appear that, though entered as a boy-chorister at St. Mark's, Venice, he was educated for one of the learned professions, and the *reverendo* prefixed to his name, which seems to have escaped the observation of musical historians, shows that he was of the ecclesiastical order. It is stated by Sir John Hawkins, as an established fact, though he does not name his authority, that Willaert, his master in the cathedral, prevailed on him to devote himself chiefly to music, which information he most likely found in Salinas. He is styled, in the best edition of his works, that of 1589, *Maestro di Cappella della Serenissima Signoria di Venetia;* or, in other words, he was director of the music and organist of the state church, St. Mark's, at Venice, in which office he succeeded Willaert. Bayle therefore, in his translation of this title, is not in error, as Hawkins alleges, who possibly may not have examined the original with his usual attention.

Zarlino published his first work, *L'Istitutioni Harmoniche*, in 1558, from which period, Dr. Burney tells us (who however is in this instance incorrect in his dates), 'he was continually revising and augmenting his works.' The same author further remarks, that 'the musical science (*i.e.* its practical part) of Zarlino may be traced in a right line from the Netherlands, as his master, Willaert, the founder of the Venetian school, was a disciple of John Mouton, who was a scholar of the great Josquin.' [WILLAERT.]

The works of Zarlino, in the edition before mentioned, are in four volumes or parts (*quattro volumi*), bound up in one thick folio, of which upwards of a thousand pages are devoted to music, and one hundred and forty to the essays. Their titles are—1. *L'Istitutioni Harmoniche*, divided into four parts. 2. *Le Demonstrationi Harmoniche*, contained in five dialogues. 3. *I Sopplimenti Musicali*, in eight books. 4. *Un Trattato della Patienza*, &c.: A Treatise on Patience, most useful to such as would lead a Christian life. *Un Discorso*, &c.: A Discourse on the true year and day of the death of Jesus Christ. *Un' Informatione della origine dei R. P. Capuccini*: Information relative to the origin of the order of Capuchins. *Le Risolutioni d'alcuni Dubij*, &c.: All doubts removed concerning the correction of the Julian year, as made by Pope Gregory XIII.

It is evident that Zarlino supplied all subsequent writers on the subject of antient music with very valuable materials. He was most laborious and indefatigable in his researches, and successful in their results. But it must be admitted that he was ostentatious of his learning, and might have compressed his three first volumes into half the space, with great advantage to himself and his readers. His prolixity has, no doubt, deterred many from proceeding far with him; nevertheless, an experienced person, one who knows how to make the best use of a well-informed but verbose and tedious writer, will not regret having looked through, and occasionally studied, the works of Zarlino.

ZEA (called Κέως by the Greeks, *Cea* by the Romans), an island in the Ægean, about 13 English miles south-east of Cape Colonna: the island of Makronisi is nearly in the mid channel. The capital, Zea, is situated in about 37° 38′ N. lat. and 24° 20′ E. long., on the northern declivity of Mount St. Elias. The island is 14 English miles in length from north to south, and 10 in breadth from east to west. It is one broad-based hill rising from the low shore-line to the central peak of Mount St. Elias. 'The greenness of the shore,' says Mr. Addison, 'made us hope for more than the usual cultivation, but we were disappointed. There is only one miserable town built on a mountain. There are some remains of the antient Iulis to be seen, consisting chiefly of the ruins of a temple. Most of the Ægean islands, which are so beautiful at a distance, are nothing but bare, scraggy, uninhabited rocks.' Notwithstanding this dismal description, the capital, which is situated on the brink of a ravine between 2 and 3 miles inland from its port Raphtilimani, which has a sufficient draught of water for vessels of the largest size, contains about 3000 inhabitants; and the whole island about 5000. The climate is healthy. The products are barley, fruits, tolerable wine, cotton, sheep, and silk-worms. Zea is the antient Ceos, but it does not appear that there are any relics of antiquity beyond the temple mentioned by Addison, and the antient walls of the capital. A survey of this island has been executed by direction of the British Board of Admiralty, but the plan has not yet been executed, nor the materials so arranged as to be accessible.

Strabo (486, ed. Casaub.) states that Ceos had originally four cities, of which only Iulis and Carthæa existed in his time: Poiessa had been united with Carthæa, and Coressia with Iulis. Stephanus Byzantius, by mistake (v. Καρθαία), or by the error of copyists, calls Carthæa a town of Cos. Simonides was a native of Iulis, and also the poet Bacchylides, Erasistratus the physician, and Ariston the Peripatetic philosopher. The people of Ceos were Ionians from Athens, and they supplied seven vessels to the Greek fleet at the battle of Salamis, B.C. 480.

(C. G. Addison, *A Journey to the East*: Arrowsmith's *Map of Greece*; *Dictionnaire Géographique Universelle*.)

ZEA, a genus of plants belonging to the natural order Gramineæ. This name is identical with the Greek *Zeia* (*Ζειά*), but the Greek plant was a species of Triticum or Hordeum, and not at all agreeing with the present genus, which is entirely American.

The plants belonging to this genus are monœcious. The male flowers are in distinct spikes: the calyx consists of a 2-flowered blunt glume; the corolla of a blunt glume: in the female flowers the calyx is a 2-valved glume; also the corolla; the style is single, filiform, pendulous; the seeds solitary, immersed in an oblong receptacle. There are two species.

Z. Mays, Common Maize, or Indian Corn, which is known by its entire leaves. It is a native of America, and is cultivated there, as well as in most countries of Southern Europe. Like the species of Triticum, those of this genus present almost innumerable varieties, from the cultivation to which they have been submitted. As an article of food, the fruit is much inferior to that of the Triticum, nor will it ripen its fruit fully in high northern latitudes.

Z. Caragua, Chili Maize, or Valparaiso Corn, is distinguished by its serrated leaves. It is a smaller plant in all its parts than the foregoing, and is a native of Chili. A sort of religious reputation is attached to this plant on account of the grains when roasted splitting into the form of a cross.

A new application of the maize has been lately proposed. It is found that previous to the ripening of the fruit the sap of the maize contains a large quantity of sugar. If this sap is collected at the proper season of the year, the sugar may be easily obtained from it, and in such quantities, it is stated, as would render the cultivation of the maize for this purpose much more profitable than that of the sugar-cane. Professor Croft, in a paper read at the Linnean Society in February, 1843, states that experiments had been made on this subject in Indiana, from which it appears that the sap of the stalks of the maize contains more than three times as much sugar as that of the beet, and five times as much as that of the maple, and frequently exceeding in quantity that of the ordinary sugar-cane as grown in the United States. The preparation of the sugar is also stated to be much more easy than of that obtained from the sugar-cane. Another advantage also is the rapidity with which the maize comes to perfection, as the juice may be obtained from seventy to ninety days after the planting, whilst with the sugar-cane it requires eighteen months. The refuse from the stalks is found to make an excellent fodder for cattle. The quantity of the sugar is said to be increased by destroying the ears of the corn during its growth.

(*Cyclopædia of Plants*; *Reports of Linnean Society*, in 'Gardener's Chronicle.')

ZEA MAYS. [MAIZE.]

ZEALAND is a province of the kingdom of the Netherlands, situated between 51° 11′ and 51° 45′ N. lat. and 3° 13′ and 4° 7′ E. long. It is formed of the antient province of that name, of the tract called Dutch Flanders, and of a group of islands formed by the several arms of the Schelde. It is bounded on the north by two branches of the West Schelde, which separate it from the islands of Overflacke and Goeree, belonging to the province of Holland; on the east by the provinces of North Brabant and Antwerp: on the south by Flanders; and on the west by the German Ocean. Its area is 580 square miles. The population, according to the official return, was, on the 1st of January, 1842, 155,593 souls. The surface is low, only a few feet higher than the sea, and the monotonous plain is only broken here and there by artificial mounds. Not being sufficiently protected by downs from the encroachments of the sea, it is necessary to secure the country by numerous dykes, which run along the coasts and the sides of the rivers: yet different parts of the province have been exposed at times to severe calamities from the breaking of the dykes in storms at high tides, particularly in the years 1302, [illegible], 1522, 1532 and 1548. Whole towns and districts have been overwhelmed and abandoned: and though parts of them have been subsequently recovered, several of the islands have been considerably reduced in extent. That of Schouwen, for instance, once, it is said, 60 miles in circumference, is now only 25. The soil is a rich black mould, and very fertile. The climate is oppressive, damp, and unsettled, and very unfavourable to foreigners, though the natives enjoy good health. They are among the richest in the kingdom, robust, and especially good sailors. They are much attached to their antient manners, customs, and costume; and for their mode of life and language, they are a medium between the Dutch and the Brabanters. Their chief means of subsistence are derived from agriculture, the breeding of cattle, and the fisheries. Agriculture is extremely productive, and furnishes a large surplus for exportation. Zealand wheat, especially that of the island of Schouwen, is very highly esteemed. The province produces likewise fine rye and malting barley. Kidney-beans and peas, rape-seed and flax, are important articles of exportation, and the island of Schouwen alone produces 20,000 cwt. of fine madder annually. The sheep are small, and the wool of indifferent quality. The horses are large and strong, but heavy and awkward, and fit for hard labour. There are all the common domestic animals, poultry, especially great numbers of rabbits, ducks, wild-fowl, and fish. Besides grain and pulse, the people cultivate potatoes and other culinary vegetables, melons, fruit, and teazles. The inhabitants are for the most part Calvinists, but there are many Lutherans, Roman Catholics, and some Jews and Baptists. In their industry, perseverance, and phlegmatic temper they resemble the inhabitants of the United Provinces in general. They have a considerable export trade in the productions of the province, and some manufactures of linen, woollen, and fine yarn; distilleries, breweries, salt-works, and dockyards for ship-building. The following are the islands:—

I. WALCHEREN, in which are the following towns:—1, Middelburg, the capital of the province, a fortified town, connected with the West Schelde by a navigable canal half a league in length. It has a seaport, and 15,000 inhabitants. The chief public buildings are—the Gothic town-hall, a synagogue, and twelve churches, the principal of which are St. Peter's Church, and the abbey church, which contains the monument of the German king William, who died in 1256, and of his son Florence. There are a gymnasium and an academy of sciences; a society for the cultivation of painting, sculpture, and architecture; and a society for the study of natural history. 2, Flushing, a town with 9000 inhabitants, celebrated for its fine harbour, capable of containing eighty men-of-war. [FLUSHING.] 3, Veere, or Terveere, a fortified town at the mouth of the East Schelde, has 1350 inhabitants. 4, West Cappelion, where there are very extensive dykes. In this town Willebrod, the converter of the heathens, destroyed in 694, the statue of Wodan.

II. SOUTH BEVELAND, in which is the town of Goes, with a population of 5000 souls: it has some fortifications and a port.

III. WOLFERSDYK, with the village of Oosterland, separated by the Zuyd Vliet from

IV. NORTH BEVELAND.

V. SCHOUWEN, separated by the East Schelde from North Beveland. In this island are the towns of—1, Zierickzee, with 7000 inhabitants, who derive their subsistence from the fishery, salt-works, trade in madder, &c. They have fifty ships of their own: they have beds of oysters, which they obtain from Colchester: there are six churches in this town. 2, Brouwershaven, mostly inhabited by seamen and fishermen.

VI. DUIVELAND, separated from Schouwen by the P[illegible]

VII. THOLEN. This island produces the finest flax, and it manufactures the finest thread, of which one pound costs 300 florins (nearly 25*l.* sterling). The town of Tholen has 2000 inhabitants, and is partly fortified.

VIII. ST. PHILIPSLAND.

Besides these islands, the province of Zealand contains, as we have said, the northern part of Flanders called Staats-Flanderen, or Dutch Flanders, in which are the following towns:—1, Sas de Gand, a well-fortified town, with 1200 inhabitants, situated on a canal which leads from Ghent to the West Schelde. 2, Sluys, or l'Ecluse, a well-fortified place, situated on a bay of the North Sea, at the mouth of the Schelde, and on a canal to Bruges. It has a good harbour and some trade. The population is 1200. 3, Ardenburg, on a canal which joins the Zwin, has 1400 inhabitants. 4, Cadsand, on an island of the same name, which is divided into the eastern and western parts. It is five leagues in length and four in breadth: it has rich pastures, and is famous for its cheese. The population of the village is about 800. 5, Axel, on an island in the Schelde, on a canal from the West Schelde, has 2300 inhabitants. 6, Hulst, a fortified town, with 2000 inhabitants, with a harbour communicating with the Helle Gat, a creek of the West Schelde.

(Hassel, *Handbuch*, vol. ix.; Cannabich, *Lehrbuch der Geographie;* Stein, *Lexicon;* Masselin, *Dictionnaire de Géographie.*)

ZEALAND, or SEELAND (in Danish *Sjalland*), is the largest and most important island of the Danish monarchy. It lies between 55° 2′ and 56° 8′ N. lat. The area is 2768 square miles (according to other estimates only 2600). It is bounded on the north by the Cattegat; on the east by the Sound, which separates it from Sweden; on the west by the Great Belt, which separates it from the isle of Fünen; and on the south by the Baltic, which separates it from the islands of Moen and Falster. The surface of this island resembles the other Danish islands in having no mountains; but it is not, like them, a uniform flat; it is diversified with low hills, and contains many beautiful spots adorned with fine beech-forests, which present a variety of scenery, the appearance of which, when the air is clear and vegetation in its perfection, has been compared with that of Lombardy.

The soil is very rich; it yields abundant crops of corn, especially barley. The pastures too are excellent, and the breed of oxen and horses very good; the latter are small, but spirited. In the middle of the island turf is used for fuel, wood not being so plentiful as in the other parts. The bays and creeks, with which the island is indented on all sides, abound in fish of many different kinds. Most of the manufactures and trade of Denmark are concentred in this island, the population of which is 400.000 souls. Zealand contains the capital, Copenhagen, the fortress of Cronenburg, which commands the entrance of the Sound, and where all ships passing through that strait pay the Sound duties, the towns of Elsinore and Rotskild, and several royal palaces and country-seats. [DENMARK; COPENHAGEN; ELSINORE.] The bishopric of Zealand, 3000 square miles in extent, with 450,000 inhabitants, includes, besides Zealand, the islands of Bornholm, Moen, Samsoe, Amok, Omoe, and some smaller ones.

(Stein, *Geographisches Lexicon;* Stein, *Handbuch der Geographie*, by Hörschelmann; Cannabich, *Lehrbuch der Geographie;* Brockhaus, *Conversations Lexicon.*)

ZEALAND, NEW, is the name of a group of islands situated in the Pacific, and in the southern hemisphere. This group consists of two large islands and several smaller ones. The northern of the two large islands is called Eaheinomauwe, and the southern Tavai-Poenammoo, and they are separated by a wide strait, called, from its discoverer, Cook's Strait. The meridian line drawn through Greenwich, if prolonged to the other side of the globe, passes less than 70 miles east from the most eastern point of Eaheinomauwe, East Cape, or Wai-apou. The prolongation of the meridian of Falmouth (5° W. long.) passes through Cook's Strait, and thus the larger portion of Eaheinomauwe is 180 degrees of longitude distant from the western parts of England and from Scotland. Tavai-Poenammoo lies farther to the west, and its north-eastern portion is 180 degrees of longitude from Ireland (6° to 10° W. long.), but its south-western part extends to 166° E. long., or four degrees farther west. But though New Zealand is the antipodes of Great Britain in longitude, it is not so with respect to latitude, for the most southern part of it, or Stewart's Island, is three degrees farther from the antarctic than the southern point of England, Cape Lizard, from the arctic pole, or 47° S. lat. The Reinga, or most northern headland of Eaheinomauwe, is in 34° 27′ S. lat., or about 30 miles farther from the pole than Cape Theodia, the most southern promontory of Candia, which island is the most southern country belonging to Europe. The main body of New Zealand lies between 46° and 38° S. lat., and is as distant from the antarctic pole as Italy is from the arctic.

The area of the whole group, according to a rough estimate, is about 86,000 square miles, or nearly equal to that of Great Britain, including the islands.

Eaheinomauwe.—This island lies between 34° 20′ and 41° 40′ S. lat., and between 172° 30′ and 178° 40′ E. long. That portion of it which is south of 38° S. lat. constitutes an extensive body of land, which in its widest part (between 38° and 39° S. lat.) is more than 150 miles across, and contains about 28,000 square miles. From this great mass of land, whose direction is from south-west to north-east, a long peninsula stretches out to the north-west, which extends from 38° to 34° 20′. It is comparatively narrow, being in several places only a few miles wide, though at two points it is about 50 miles wide. The area probably does not exceed 8000 square miles. The area of the whole island is therefore about 36,000 square miles, or 9000 square miles more than Ireland.

Surface; Soil; Rivers; Harbours.—The most northern portion of Eaheinomauwe is a narrow tongue of land about 40 miles in length, but hardly anywhere more than eight miles across, except at the most northern extremity, where it expands in the form of a dove-tail, and where it is more than 20 miles from west to east. This northern extremity is called by the natives *Muri Wenua* (Land's End), and is chiefly occupied by a ridge of hills of moderate elevation, which extend from the western cape, called Cape Maria van Diemen by Tasman, to the North Cape or Cape Otou. Cape Maria van Diemen consists of rocks of a hard conglomerate composed of water-worn pebbles of basaltic lava, amygdaloid basalt, greenstone, and Lydian stone; but the contiguous hills are covered with sand. They are intersected by swampy valleys, from which streamlets run into the sea, and which are overgrown partly by rushes, and partly by fern and flax. A few native families raise sweet potatoes, water-melons, and pumpkins. There is little vegetable earth mixed with the sand, but the moisture of the climate and the reflection of the sun from the dazzling white sand-hills, together with the northern situation of this tract, render the vegetation productive, and the fruits ripen almost a month earlier than in the Bay of Islands. About four miles from Cape Maria van Diemen begins a cliff which rises almost perpendicularly from the sea, and continues for six miles. It is inaccessible from the sea side, and is called by the natives the Reinga, or Flight, because the natives fancy that at its base there is a hole by which the souls of the deceased descend to the regions below. From this place the ridge of hills recedes from the shore, and runs inland towards the harbour of Parenga-renga on the eastern coast; but it sends short offsets to the north and south, so that it is intersected by several small valleys. These hills consist of a stiff clay, white or reddish from the admixture of oxide of iron; they are covered with a scanty vegetation of fern, mosses, the flax-plant, or a coarse grass. In the valleys however the vegetation is more luxuriant, and consists of various trees, such as Fuchsia excorticata, and Vitex litoralis, interspersed with fern-trees and cabbage-palms. North Cape is high and bold, presenting steep sides to the northern and eastern coast, but a flat and swampy tract about three square miles in extent runs from the northern to the eastern shores, separating the promontory from the hilly tract, which terminates on the eastern coast in perpendicular cliffs of volcanic conglomerate. The hilly tract at the northern extremity of the island is about eight miles in width, and the short valleys opening towards the south are more fertile than those towards the northern shore. This is especially the case with those which open into Parenga-renga Bay. This æstuary has a narrow entrance, but it is two fathoms deep at low-water, and the tide rises ten feet. It covers from six to eight square miles, and several inlets branch off from it to some distance inland; all of them are navigable for boats at high-water. Good land occurs at the heads of these inlets, but it is not of great extent. The whole of the hilly tract just described appears to be best adapted for sheep-walks, as the herbage is low and the ground very dry.

The *Narrow Isthmus*, which joins the Muri Wenua to the broader part of the peninsula, is more than 30 miles long. It is covered with low hills or swamps, and is almost barren on the eastern shore, where it is lined by a long sandy beach, here and there interrupted by bluffs of basaltic rocks, which are green with groups of Metrosideros tomentosa. The hills are overgrown with fern (Pteris esculenta) and manuca (Leptospermum scoparium). Along the western shore the land is much better. The shores consist of cliffs about 30 feet high, in which lignite is observed. Between them and the sea is a sandy beach. The natives have many plantations here, and they get good crops. Towards Cape Wara, where the isthmus joins the broader peninsula, the land is of great fertility. On the eastern shores of the isthmus is an isolated hill, called Mount Camel, or Houhoura, which rises 500 feet above the sea. On its southern side is a harbour capable of receiving the largest vessels, with anchorage close to the eastern shore; but the entrance is not more than 40 or 50 yards wide. The southern declivity of Mount Houhoura is partially cultivated. Where the isthmus terminates on the south there is an extensive alluvial district, which stretches from the western to the eastern coast, and follows the serpentine course of the Awaroa, a river which empties itself into the æstuary of Rangauni. This tract is of great fertility, and, when cultivated, produces very abundant crops of wheat, Indian corn, and other grain. In its natural state it is perfectly open in many places, and only covered with Coriaria sarmentosa, fern, high flax, and here and there some spots of grass. In other parts it is overgrown with a jungle of Dracæna australis. The æstuary of Rangauni is an extensive arm of the sea, bnt it is shallow, and the intricate channel admits only moderate-sized vessels. The Awaroa, though a small river, is nagable for boats at high-water to the distance of about 10 miles; the tides rise 10 feet, and the river has little fall in its lower course. Canoes ascend it nearly to its source, which is at the foot of Maunga Taniwa, a remarkable pyramidal peak 1500 feet high, and rising considerably above the surrounding hills. The upper valley of the river is here and there clothed with groves of large trees. The whole valley of the Awaroa contains about 120,000 acres of arable land. With respect to the quality of the soil, the facility of cultivation, as well as of water-communication, the abundance of excellent wood and of other building materials, this tract is one of the most favoured in New Zealand. There are several European settlements. The natives amount to more than 8000. They have made more progress in civilization than in other parts of the islands; they cultivate, besides Indian corn and sweet potatoes, wheat, potatoes, vines, and various fruit-trees and vegetables; they also keep horses and cattle. They have made roads to the shores of the sea and for internal communication.

On the south of the valley of the Awaroa extends a *hilly region* from sea to sea. Its upper surface is a continual alternation of descents and ascents, but the slopes are usually gentle. It must be considered as a table-land of moderate elevation and very uneven surface; for the watercourses do not traverse valleys, but lie in ravines considerably depressed below the general surface. It is only where they approach the sea that the ravines widen sufficiently to be called valleys. The hills do not form regular ridges, but lie dispersed over the surface. Their general height is less than 1500 feet, which elevation is only attained by the Maunga Taniwa. The whole of this region is clothed with a thick forest, except at the bottom of the ravines, which are filled with swamps, and a few tracts towards the coast, where no trees occur, and which are overgrown with fern. The forests consist especially of rata (Metrosideros robusta), totara (Podocarpus totara), rimu (Dacrydium cupressinum), and pukatea (Laurus pukatea)—some of which trees are of immense dimensions. In the interior, and also on the hills east of Rangauni Bay, abundance of kauri (Dammara australis) is still found, though many trees have been cut down. The coast on both sides of this region is indented by several inlets, and some of them contain good harbours. On the eastern coast are Doubtless Bay and Wangaroa harbour, and on the western coast Hokianga.

Doubtless Bay, called also Lauriston and Oudou Oudou Bay, is a wide open inlet, across the entrance of which a reef of rocks runs in a north-eastern direction. On the eastern end of the reef, near Cape Surville, there is a channel, not above 100 yards wide, but very deep. The basin itself has good anchorage in five fathoms water, about a quarter of a mile from the mouth of the river Pu-te-kaka, where a small number of vessels are perfectly sheltered. The rest of the bay is occupied at low-water by mud-flats, furrowed by channels deep enough for large boats, which lead to the mouths of two other small rivers. The country surrounding the basin is open and undulating, the elevations alternating with large swamps, which might be easily drained, and would form good land. In this bay are several European settlements, and the natives have much improved in the cultivation of their lands.

Wangaroa Harbour is a narrow inlet, similar to the fiords of Norway, and several miles long. The entrance is between towering perpendicular rocks, and only about 150 yards wide; but it is of great depth close to the shore, and there are no sunken rocks or other hidden dangers. The harbour is very spacious and deep, has anchorage for the largest fleet, and is sheltered from all winds. As a harbour it is among the best in New Zealand, but there is little land fit for cultivation in the neighbourhood, as it is surrounded by high and steep hills, on which there is a forest containing kauri-trees. The natives have their cultivated spots mostly on the sides of the hills, and they are in a fair state of improvement, which is to be ascribed to the missionaries.

Hokianga Bay, on the west coast, is a narrow inlet, or rather the æstuary of nine or ten small rivers, which thus reach the sea. It is a bar-harbour, but there are three and a half fathoms of water on the bar, so that it can be entered by large vessels. The æstuary is from one to two miles wide, and stretches about ten miles inland: but nearly all the rivers which fall into it may be navigated by boats from four to ten miles from their mouth. The æstuary is almost entirely bounded by steep hills, which are nearly covered with forests containing many kauri-trees; and this circumstance has attracted European settlers. But the largest trees are nearly all gone; those that remain are fit for logs, but not for spars. In the immediate vicinity of the æstuary there is only a small proportion of land fit for cultivation, but on all the small rivers which fall into the æstuary from the north, large tracts of alluvial soil occur in the upper valleys, and they are well cultivated by the natives. More than 200 Europeans have settled on this æstuary, chiefly for the purpose of obtaining spars and logs of kauri-timber.

The steep hills which surround Hokianga, and the fertile tract at the back of them, extend to about the middle of the island, or 25 miles from the western shores. Between them and the Bay of Islands the country presents a different aspect, being open and slightly undulating, but marked by numerous conical hills, which are of volcanic origin, having craters, and their sides and bases covered with lava and basalt. The country is covered with fragments of a slate-coloured basaltic rock, often more than 15 feet in diameter. They are without vegetation, but the spaces between them are covered with fern and flax, and only isolated patches are planted with Indian corn and potatoes. The greater part of the plain has a singularly desolate and barren aspect, the soil being a light dusty volcanic earth. The fields which were cultivated by the missionaries have been abandoned because their produce was small. The natives have no large plantations on the plain, but prefer the ravines that intersect it, or settle near the bases of the hills which bound the table-land, where the soil is more substantial. The good land bears only a small proportion to the bad, and the plain is nearly destitute of trees. The vegetation consists principally of fern, tupakihi (Coriaria sarmentosa), Dracæna australis and indivisa, and Gaultheria. There are several lakes of great depth on the table-land, which appear to be volcanic craters, and near one of them there are four mineral-wells. From one of these wells a strongly sulphuretted hydrogen gas rises. The temperature of the well is 133° Fahr.

The *Bay of Islands* lies on the eastern coast: it is open to the north and north-east, and the entrance between Cape Pococke and Cape Brett is 11 miles wide. It extends south-west about 12 miles, and is studded with several islands, whence it has received its name. There is deep water close to the shore, and there are several good anchorages, even with northerly and north-easterly winds behind the rocky and elevated islands. It is one of the best, if not the very best harbour in New Zealand, and is resorted to by many vessels, especially whalers. But the country surrounding the bay contains no great proportion of cultivable land. It is very hilly, and the hills come down to the water's edge, and alternate with ravines, which stretch far inland. The hills were formerly wooded, but the forest has disappeared, and is now only found some miles inland. The hills are too steep and have too little soil for cultivation: in the ravines there is a little fertile soil. The hills advancing to the beach form several diminutive harbours, but they are inaccessible from the land side. The only exception to this general description is the valley of the Kawa-kawa, an arm of the sea stretching to the south, which is entered by a small river, which is navigable for several miles from its mouth. This valley contains a considerable amount of excellent land, and is very extensively cultivated by the natives. In this bay is the small town of Kororarika and the projected towns of Russell and Victoria. Many Europeans are settled on the shores of this bay and in the valley of the Kawakawa.

Between Cape Brett on the east and Hokianga River on the west the island is about 60 miles wide. From this line proceeding southward it narrows continually, but irregularly, until it is only 3 miles wide near 37° S. lat., between Auckland and the Bay of Manukau. Nearly all the rivers which drain this extensive tract find their way into Kai-para Harbour, a large æstuary on the western coast. The coast between Hokianga and Kai-para is uninhabited: it runs in a continuous line, not interrupted by any indentation. Along the shores is a beach from 100 to 150 yards wide, which is partly covered with soft sand and partly by large fragments of pudding-stone. At the back of it rise sandstone cliffs to the height of 100 feet, and a tract of land from four to six miles wide consists of sandhills covered with a carex, and farther inland with a scanty vegetation of fern. Among these hills, and close to the sea-shore, rises Mount Manganui, an isolated mass whose elevation is supposed to be 2500 or 3000 feet above the sea. Farther inland the country is a table-land some hundred feet above the sea-level. The highest part of this region frequently extends in a level plain for several miles. The soil is generally arid, resembling the heaths in England, and the vegetable mould is often only a few inches in depth, and rests on tough argillaceous earth. It is overgrown with fern, and in many places with shrubs, especially elderberry bushes: there are however many tracts which are depressed below the surface of the plain, and these after the rains are converted into swamps, which are generally overgrown with the flax-plant, and traversed by deep and narrow gulleys. Where the plains approach the river-valleys and decrease in height they are covered with forests, which also extend over the slopes which enclose the valleys. These forests contain many large timber-trees, and in no part of the island is the kauri-pine so abundant or attains such a size as in this region. The natives are mostly employed in felling and squaring the timber. The bottoms of all the rivers are bounded by hills of no great height, which do not generally reach to the banks, and are often more than a mile from them; the bottoms are level, and have a somewhat clayey but fertile soil, being mostly composed of the detritus brought down by the rivers. The bottoms are also covered with a thick forest of timber-trees of all descriptions, especially the kauri-pine, except the alluvial tracts of recent formation and those lands which have been cleared by the natives for cultivation. They raise all the common productions of the island in abundance, and have a surplus for sale. This circumstance, added to the profits derived from the timber, renders them more wealthy than the native inhabitants of other districts.

Kai-para Harbour is a large basin. The entrance is between five and six miles wide. Before it is an extensive sand-bank, which runs to sea six or eight miles, and extends from north of the northern head to south of the southern head, so that it appears, when seen from the westward, to form a complete bar right across the entrance: but inside this bank there is a deep channel at least two miles broad in the narrowest part, which affords a safe passage for large vessels. The tide rises ten feet at full and change, and rushes with great violence into the harbour, which renders its access sometimes very dangerous. Westerly winds, which blow without intermission during some parts of the year, and increase the current which sets into the harbour, are also a great drawback from the utility of this harbour, as they prevent vessels from leaving it. But this inconvenience is met with in all the harbours on the west coast of New Zealand. In the channel itself there is a sand-bank, but on both sides of it a considerable depth of water. The length of the basin from north to south is about 30 miles, and its width varies generally from 3 to 5 miles. There are numerous anchorages at which a vessel is protected from all winds. Besides several smaller streams, three large rivers fall into the bay, the Wairoa, Otamatea, and the Kai-para. The Wairoa is the largest of these rivers. It falls into the most north-eastern corner of the basin, and the whole of its course is probably not much short of that of the English Thames. The remotest branches rise in the country between Hokianga and the Bay of Islands, and its whole course is perhaps not less than 200 miles, measured along the windings. At the distance of 130 miles from the head of the harbour it resembles in breadth and depth the Thames at Richmond, and it is navigable for canoes about eight miles above that place, but farther upwards their progress is prevented by rapids. Farther down it receives several large affluents, and the volume of water is so increased by them that 85 miles from the head of the harbour its depth is 12 feet, and so far small vessels can ascend. Fifteen miles farther down the river has water sufficient for large vessels, the channel is clear, and the anchorage is close in shore. The bottom through which it flows is generally two miles wide, and of great fertility. The Otamatea rises in the hills in the neighbourhood of Wangari Harbour, and runs probably less than 100 miles. The bottom is also fertile, but of smaller extent than that of the Wairoa. It falls into Kai-para Harbour nearly opposite its entrance: it is navigable for many miles from its mouth. The Kai-para river, which falls into the most southern inlet of the basin, has a very winding course in a moderate-sized valley bounded by the hills which extend along the sea-coast between Kai-para and Manukau Harbour, and it is separated from an inlet of the harbour of Auckland in the Gulf of Shouraki by a neck of land about three miles wide, consisting of low hills, across which the natives frequently dragged their canoes in time of war. The tide ascends the Kai-para for several miles from its mouth, and so far it is navigable for large vessels. On the hills which bound the valley there are extensive forests containing many kauri-pines, the timber of which is floated down the river.

When the extent of the Kai-para Harbour, the quantity of timber-trees in the valleys of the rivers, the length of their navigable course, the extent of the available land on their banks, and the neighbourhood of the seat of government, Auckland, are taken into account, it is evident that this part of the island offers greater advantages than any other. The natives are numerous, and many Europeans are settled among them.

On the eastern side of the island, between the Bay of Islands and Shouraki Gulf, the shores of the sea are bounded by high precipitous cliffs, in which several small indentations occur; but none of them will receive ships above the size of coasting vessels, except Wangari Bay, which is formed by the mouth of the Wangari river. The harbour is about half a mile in width and four miles long, and has good anchorage in from six to ten fathoms, and is completely sheltered from all winds. There is not much cultivable land on the shores, which rise in steep but low hills, covered with woods, which contain much kauri-timber.

Shouraki Gulf, formerly called Thames Gulf, and now frequently the Frith of the Thames, is a gulf which, from its most northern point, Cape Rodney, to its most southern inlet, which terminates at the mouth of the river Thames, is about 70 miles long. The entrance is from the north, where it is 40 miles wide, between Cape Rodney and Cape Colville. It preserves this width to half its extent, or to the parallel of Auckland; but farther south it grows rapidly narrower, and terminates with the æstuary of the Weiho, which is about 12 miles long, with an average width of five miles. Before the entrance of the gulf is the rocky island of Shoutourou, and east of it, opposite Cape Colville, is the Island of Otea, or Great Barrier Island. The last-named island is nearly 80 miles in circumference: it is hilly and rocky, and contains much kauri-forest. There is an excellent harbour, called Great Barrier Harbour, at its most north-western extremity. There are also several islands in the wider portion of the gulf, of which those of Rangitoto and Waiheke require notice. Rangitoto is a cone, rising slowly from the sea, and terminating in three cones, the middle one being the highest. This cone contains a very perfect crater, about 150 feet deep: the highest point of it rises 920 feet above the sea-level. The island is a heap of scoriæ, which surround it in large hard masses at its base and the greater part of its height; only towards the top there are a few bushes. Between Rangitoto and the mainland is the best channel into Waitemata Harbour.

which leads to Auckland. Waiheke is about 30 miles in circumference, wooded and hilly, and contains kauri-trees; but it has also many sheltered and cultivable small valleys. It has a harbour for small vessels, and there is anchorage for larger vessels in the channel which separates the island from the mainland.

The tract of country between the Kai-para, on the west, and the northern part of the Shouraki Gulf, is nearly covered with hills or small table-lands overgrown with fern; but their declivities towards the gulf are covered with fine timber, which is exported from the harbour of Mahurangi, situated about 20 miles from Waitemata Harbour to the north which is easy of access, and has depth of water sufficient for every description of vessels, and there is secure anchorage. Though the land available for cultivation is not of great extent, a town has lately been laid out on the shores of the harbour.

Some miles north of Waitemata Harbour the hills sink down, and the narrowest part of the island, which is between this harbour and the Manukau Harbour on the western coast, has a slightly undulating surface, on which several isolated hills rise to some height. The soil is of good quality, and fit for all kinds of horticultural and agricultural purposes. The harbour of Waitemata, on the southern shores of which the capital of New Zealand, Auckland, is built, lies at the western extremity of the gulf, and stretches its ramifications towards the harbour of Manukau. The navigable channel by which the harbour is entered is only three-quarters of a mile wide, being narrowed by a reef; but within the channel widens to an average breadth of a mile, with a depth of from six to nine fathoms in the mid-channel, and three and three and a half at the sides. It extends ten miles to the westward, and branches off at its western extremity into two arms, of which the southern, running towards the harbour of Manukau, is a river-like inlet, but advances so far inland, that between its upper part and the harbour of Manukau there is only a portage of one mile and a half. This inlet however is only navigable for boats. Near the harbour of Waitemata is that of Tamaki, at the innermost corner of which a portage of only a quarter of a mile brings the traveller to the harbour of Manukau. At the entrance of the harbour is a bar, with six feet of water at low tide, but vessels of 200 tons can enter it, and large barges can go to the portage.

Where the Gulf of Shouraki grows narrow, opposite the Island of Waiheke, the country rises to a higher level, and presents towards the gulf a hilly ridge, in which several narrow valleys open to the æstuary of the Waiho: they have a fertile soil, and contain settlements of natives. This hilly ridge continues southward, where it separates the valley of the Waiho and of the Piako from the basin of the Waikato river; but it sinks lower as it proceeds towards the source of the Waiho, or rather the general level of the country rises higher. Between the upper course of the Waiho and the Waikato only isolated hills are dispersed over the table-land. This chain of hills is mostly composed of basalt, and wood is only found in some small valleys and ravines. There are kauri-trees, but they are rather scarce.

The valley of the river Waiho, which lies to the east of this hilly range, and begins at the most southern branch of the Gulf of Shouraki, is the largest known plain in New Zealand. It extends about 60 miles south, terminating in the low hills of Horohoro, where the river Waiho originates. At its northern extremity it is about 20 miles wide, but grows narrower as it runs southward, but probably in no part does it fall short of 10 miles in width. The surface is a dead level, and large tracts, especially towards the gulf, are converted into swamps for the want of necessary drainage. It is entirely destitute of trees, with the exception of the banks of the rivers, where the kakikatea-pine (*Dacrydium excelsum*) grows to great perfection. The plain, in its natural state, is covered with fern, flax, and manuka, except where water has gathered, and there it is covered with a kind of rush (*typha*). These swamps are not frequent in the upper part of the valley, nor large, but they increase in number and extent towards the mouths of the rivers, where the country is very low and subject to inundations. In these parts the soil is alluvial and rich, and the swamps might easily be drained. Higher up the soil is chiefly composed of a stiff clay, and is less fertile; but to all appearance nearly the whole plain could be converted into fields, and would produce all kinds of grain. The natives have begun to cultivate wheat. In the lower districts there are some tracts which produce soft grass, rather a rare thing in New Zealand.

This plain is drained by two rivers, the Waiho and the Piako. The Waiho, which is also called the Thames, drains the plain in its whole extent, rising in the Horohoro Hills on the border of the table-land of Rotu-rua. Its course is stated to be about 100 miles, of which 90 are navigable for large boats. Small vessels have gone up the river nearly 50 miles, where it is about as wide as the Thames at Richmond. The Piako rises on the hills bordering the western side of the plain, is much smaller, and runs only about 30 miles. At low water, only boats can enter it. There is no harbour properly speaking in the æstuary of the Waiho and Piako, and large vessels cannot approach, as a mudbank stretches before their embouchure; there is however a channel across this bank opposite the mouth of the Waiho, with a minimum depth of one fathom and a half at dead low-water; farther up the depth increases to three fathoms and a half.

The Plain of the Waiho is separated from the Bay of Plenty by a ridge of rocky hills, which begins at Cape Colville, at the entrance of the Gulf of Shouraki, and continues without interruption for more than 100 miles to the Horohoro Hills at the source of the Waiho. They are called the Ahora (Love) Mountains, and rise about 1500 feet above the sea. North of the mouth of the Waiho they fill up the whole extent of the peninsula terminating with Cape Colville, but farther south they are a few miles distant from the banks of the river. Their western declivity is very steep, and rises like a wall over the Plain of the Waiho; but towards the Bay of Plenty they descend with a gradual slope. They are almost entirely covered with wood. On the peninsula these forests are chiefly composed of kauri-trees; and the hills on which this tree grows, even when cleared, are of no use for any other purposes, both from the rugged nature of the ground and from the quality of the soil. It is a matter of surprise that such an immense tree as the kauri should grow in a soil where it scarcely could have been supposed that it could take root. The forests on the hills east of the Plain of the Waiho contain few kauri-trees, and consist chiefly of totara (Podocarpus totara), rimu (Dacrydium cupressinum), and other kinds, and in these parts the declivities and the flat tops of the hills could be converted into fields.

The peninsula which terminates with Cape Colville contains two harbours. That on the west, in the Gulf of Shouraki, is called Coromandel or Waiho Harbour, and is 25 miles from the cape. It is of moderate size, and better adapted for small than large vessels, for, owing to the shallowness of the water, large vessels cannot enter far enough to be effectually protected against the swell of the sea, although there is good holding-ground. On the east side of the peninsula is Mercury Bay, the entrance to which is rocky and difficult. But the harbour itself is landlocked, and has from six to ten fathoms water, which in the narrows shoals to four, three, and two. These two harbours are much visited for kauri-timber, which is brought down from the hills.

Manukau Harbour, on the west side of the island, is, as already observed, separated from an inlet of Waitemata Harbour by a portage of a mile and a half, and from that of Tamahi by another not exceeding a quarter of a mile. It is a fine basin, about 15 miles long, and eight broad at the widest part. The upper part is shallow, but there is a navigable channel for small craft nearly to its head. There is a bar before the entrance, but close to the northern head is a deep and free channel about three-quarters of a mile wide, and the channel between the heads is deep and free from danger. On the north shore, at a place called Karangahawe, there is a safe and sheltered harbour, and in this part there are fine forests containing kauri-timber; but good land is only found on the southern shore. An easy portage of two miles and a half leads from the southern shore to an affluent of the river Waikato.

The country extending along the western coast south of Manukau, as far as the river Mokau, appears to rise to a higher level than the northern districts of the island. The shores have in many places a low sandy beach: in others they are lined by sand-hills: but there are also large tracts where the sea washes the base of steep cliffs composed of sandstone and conglomerate. For some miles from the sea the country exhibits very few signs of fertility, being mostly overrun by a carex, or a stunted vegetation of fern: few bushes or trees are met with, except in the numerous ravines, which have a fertile soil, and where there are a few large trees. A few miles from the sea the country rises higher, and contains numerous hills, whose declivities are gradual, and partly covered with fern and flax, and partly wooded. The soil of this tract is rather fertile, especially where it is loamy or the mould rests on limestone; and in many parts there are plantations of the natives, who cultivate the common plants of the island, together with Indian corn. North of 38° S. lat., the highest portion of this tract does not appear to rise more than 1500 or 2000 feet above the sea-level, and the hills do not run in any determinate direction. South of the parallel just mentioned they take the shape of a continuous ridge, running parallel to the coast, and rise much higher. Mount Pirongia rises to 2428 feet, and may be considered as the northern termination of a range of mountains which runs southward through the southern districts of Eaheunomauwe, terminating on Cook's Strait. This chain is called, in its northern portion, Rangitoto; in the centre, Rua Wahine; and towards its southern extremity, Tara-rua.

There are three harbours between Manukau and the mouth of the Mokau river. The most northern is Wangaroa, which is a long inlet with a bar at the entrance, in which however there is a channel with 12 feet at low-water. Smaller vessels find good anchorage and shelter in several coves on the north shore. Several small vessels from Sydney, of about 60 tons burthen, visit this harbour regularly for salt pork and flax, which are obtained from a few Europeans who are settled here. The harbour of Aotia is a long and shallow æstuary with a bar at its mouth, and admits only schooners of 16 tons burthen. The harbour of Kawia (near 38° S. lat.) is one of the most important on the western coast of the island. It has a clear entrance about a mile and a quarter wide, with two fathoms at dead low-water of spring-tides. The tide rises 12 feet. The best anchorage is along the northern shore, where the depth varies from five to eight fathoms. The harbour forms an irregular basin, and is entered by two rivers which descend from the high hills at the back of it; they are navigable for boats for some miles from their mouth. In all these harbours there are numerous settlements of natives, and some of Europeans.

The river Mokau rises in the Rangitoto Mountains, and runs through a very fertile and moderately hilly district, in which the natives grow potatoes, maize, melons, taro, and tobacco, and the flax-plant covers extensive tracts. The river has a bar with one fathom and a half at low-water, but inside the mouth it is three fathoms deep, and forms a completely sheltered basin. The shores south of the river Mokau, and as far as that of Waitera, are elevated, and consist mostly of marl and a stiff blue clay, or a yellow sandstone, covered with a thick layer of loam. The country above them is undulating and overgrown with ferns, among which are numerous groves of trees. The soil possesses a considerable degree of fertility, and the vegetation extends to the sea-shore. The country farther inland rises in low hills with gentle acclivities and rounded summits, and is overgrown with large trees. It is stated to be fertile, but it has not yet been explored.

Mount Taranaki or Egmont occupies the centre of a projecting headland, and is about 20 miles from the shore. It is an extinct volcano, which rises 8839 feet above the sea-level and above the snow-line. It is a perfect cone, from the base of which the country slopes slowly towards the sea on the north, west, and south; and on the east it is surrounded by a hilly region, which extends to the Rangitoto chain and the volcano of Tongariro. The coast forms cliffs of moderate height, which consist of a yellowish sandy loam, with a rich mould on the top, which increases in depth towards the foot of the mountain. Near the sea-shore the soil is light and intermixed with sand. In general the land for three or four miles from the coast is open, and covered with vegetation, especially flax and fern; in the little dales however there are groves of trees or swamps covered with bulrushes and reeds. A great number of streamlets which descend from Mount Taranaki furrow this region, and form small lagoons at short distances from the place where they reach the sea. The vegetation is very rich round these lagoons. Three miles from the sea the country is covered with a low shrubby forest; but in proceeding farther inland, many large forest-trees, especially the rimu-pine, are interspersed, and they increase rapidly in number until a dense forest covers the whole country, which is almost impenetrable owing to the numerous creepers and thorny bushes which constitute the underwood.

Mount Taranaki is the western extremity of a volcanic region, which traverses the island of Eaheinomauwe from south-west to north-east, and terminates on the north-east on the southern shores of the Bay of Plenty. The country which lies east of Mount Taranaki has not been explored, and it is not known what vestiges of volcanic action are found in this region. But the Rangitoto Mountains contain the active volcano of Tongariro and the extinct volcano of Ruapahu. North of the first-named peak is the lake of Taupo, which is surrounded by hills of volcanic formation, from the rents of which numerous hot-springs rise, and which are interspersed with mud volcanoes. Towards the shores of the Bay of Plenty is a large cluster of lakes, some of them filled with hot water, and others surrounded by hot springs and volcanic rocks. In the Bay of Plenty itself is the island of Puhia-i-Wakari, or White Island, which has an active volcano.

The Rangitoto Mountains begin on the north with Mount Pirongia, above mentioned, and extend south by east to the peak of Tongariro, and then south to that of Ruapahu, about 70 miles. Their general elevation probably does not exceed 2000 feet above the sea, at least not north of Tongariro. This summit rises to 6200 feet, and that of Ruapahu reaches far above the snow-line, and is supposed to be at least 9000 feet high. Between these two summits and in their neighbourhood the range appears to attain its greatest elevation. But these mountains occupy a comparatively small width, hardly more than four or five miles, according to the accounts of those travellers who have crossed them. On the west of them extends a hilly region, whose general level is probably less than 1000 feet above the sea, but the hills upon it rise about 500 feet higher. On the east of the Rangitoto range is the basin of the Waikato river.

The Waikato is the largest river in Eaheinomauwe. Its source is in the Rangitoto Mountains. According to Mr. John Arrowsmith's most recent and excellent map, it rises on the northern declivity of Mount Tongariro, in a small lake called Rotuaire, which is 1700 feet above the sea, or higher than the Lake of Thun in Switzerland. But Dieffenbach expressly states that this river, which is called Waikato by the natives, joins the principal stream, which comes from the Rua-pahu. If this be the case, the source of the Waikato is near 39° 30′ S. lat. Several small rivers join it before it falls into Lake Taupo, by three branches, of which the largest is about 100 yards wide. This lake has an irregular shape. Its greatest length from south-south-west to north-north-east is about 36 miles, and its greatest width 25. The banks are in many places deeply indented. Several rivers fall into the lake from the south, and the common outlet of all of them is the Waikato. The lake is 1337 feet above the sea-level or higher than the Lake of Geneva. The Waikato river leaves the lake at its most north-eastern extremity, and is there about 300 yards wide, and very deep. It runs first north-east, but afterwards in a general north-north-east direction, until it reaches 37° 30′ S. lat., when it turns to the north-west, and is joined by its great tributary the Waipa. In approaching Manukau Bay it turns south-west, and falls into the sea. The whole course of the Waikato probably exceeds 250 miles. In the middle part of its course, the navigation, if not entirely interrupted, is rendered difficult by numerous rapids. The mouth of this river does not form a bay, but is a narrow channel, which at low water only vessels of about 30 tons can enter. But inside the headlands it is a full river, and when the tide is in it is navigable for large vessels for about 40 or 50 miles to the place where it is joined by the river Waipa. This river rises in the Rangitoto Mountains north-west of Lake Taupo, and runs above 100 miles, of which about 60 miles are navigable for large boats.

The upper basin of the Waikato, or that which surrounds Lake Taupo, and extends south of it to the summits of the Tongariro and Ruapahu, has that irregular surface which occurs in all countries which have been convulsed by volcanic agency. High and rugged hills enclose the lake on the north and west, and rise immediately from its deep waters, to an elevation varying between [illegible]

1600 feet. The hills east of the lake are less rugged, and have a much more gentle ascent. At the southern extremity of the lake is a low alluvial plain, about 15 miles in length, and of a triangular shape. On both sides this flat is bounded by hills, which are broken by narrow ravines. The surface of a great part of this region is bare or scantily covered with mosses and lichens, but where the volcanic rocks have been so far decomposed as to form a mould the soil is fertile. The hot springs, fumeroles, solfataras, and mud volcanoes, are numerous. From some of the hot springs the boiling-water rises several feet high, as in the hot springs of Iceland.

Some miles north of Lake Taupo the basin of the Waikato assumes a different aspect. The surface of the country is broken into hillocks, irregularly dispersed over the plain, which is perfectly level. All these hillocks consist of tufa or of small pumice-stones cemented together. The level ground consists of the same materials, and as it has undergone only a small degree of decomposition, the soil is poor and maintains only a stunted vegetation of grass and fern. Farther north the country improves, and the hilly surface is covered with wood, consisting principally of matai (Dacrydium matai) and totara (Podocarpus totara). North of this woody tract the surface consists of hills, of moderate elevation, of tufa and small pieces of pumice-stone loosely cemented together by volcanic ashes; but the vegetation is much less vigorous. The hollows on the hills and the ravines have some better soil, and are overgrown with shrubs and trees. The lower and more level part however presents a dreary aspect, being clothed with a scanty vegetation of fern and coarse wiry grass, with here and there a solitary dragon-tree. The pumice-stone has not undergone sufficient decay to allow the growth of anything else.

South of 38° S. lat. rises a hilly range, which divides the basin of the Waikato river longitudinally into two basins, of which the eastern is drained by the Waikato, and the western by the Waipa. This hilly range, which is called Maunga Tautari, terminates near the place where the Waikato turns westward. The lower part of the basin of this river is stated to contain a great amount of good land, and to be fit for every kind of cultivation, but we have no particular account of it. It will however soon be cultivated, as it has the advantage of being separated from the river Waiho and the Gulf of Shouraki only by a gentle swell of the land, on which a few hills are dispersed.

The valley of the Waipa, the largest of the tributaries of the Waikato, is described as one of the most fertile portions of New Zealand. It is about 100 miles long, and from 10 to 12 miles wide. The upper part resembles in some degree the country on the banks of the Waikato, having a broken and undulating surface, the soil of which consists chiefly of pumice-stone, but the vegetation is more vigorous, and the more level places are covered with fern or coarse grass alternating with groves of the kahikatea, or swamp-pine. The lower portion of the valley is a perfect level, which slopes gradually towards the banks of the river. Only a few isolated pyramidal hills of volcanic origin are dispersed over it; they consist of tufa and pumice-stone. The soil is partly alluvial and partly volcanic, and consists of a stiff clay mixed with sand. It is very fertile, and would produce any plant which would bear the climate. It is destitute of wood, with the exception of some groves, which occur in the depressions, which are generally swampy; but the river runs in rather a deep bed, and never rises so as to inundate the adjacent country. This fine tract is sheltered from the gales, which are so prevalent on the coasts of New Zealand, and seems to be particularly adapted for grain, tobacco, the hop, the vine, and the mulberry-tree.

To the east of the middle basin of the Waikato lies the table-land of Roturua, so called from the largest of the numerous lakes which are dispersed over its surface. It is separated from the valley of the Waikato by a range of hills running nearly north and south; its top is barren and thinly covered with vegetation, but the gorges contain a fertile soil, which in its natural state is covered with fern and shrubs, and yields good crops of potatoes and sweet potatoes. The elevation of the table-land above the sea-level is not known, but if we may judge from the cold which is experienced there, it is probably not much less than 2000 feet. The surface is hilly, and most of the hills rise with a gentle slope, but among them are several conical hills consisting of basaltic lava; some of the hills have no shrubs or trees, but most of them are more or less wooded. Many small lakes are interspersed among these hills, and some of a large size. The Lake of Roturua is about 24 miles in circumference and nearly circular. Near it there are many hot springs, and some of them close to its banks. From some of the openings in the ground every five minutes a column of steam and water, two feet in diameter, is thrown up to the height of three or four feet. Other lakes are filled with warm water, and in some of them the thermometer also rises to 95°, or 30° higher than the air. There are several solfataras, or cones of pure sulphur, and mud volcanoes. The soil consists of a black mould a few inches thick, resting on a substratum of pumice gravel. It is in general light, but possesses a considerable degree of fertility. The country is comparatively well inhabited.

The descent from the table-land to the low tract along the shores of the Bay of Plenty is hilly, and covered with forests, in which the tawai (Leiospermum racemosum), mirai (Podocarpus ferruginea), and hinau (Elæocarpus hinau) are the most numerous. The soil is a pumiceous gravel, richly mixed with vegetable mould. Some spots have no trees, and these places are overgrown with fern. The forest terminates abruptly, where the flat tract extending along the coast begins; but between the ramifications with which the hills terminate are many small and swampy valleys. The level tract, from 4 to 8 miles wide, exhibits a vigorous vegetation, indicating the richest soil; the chief plants are flax, fern, and veronica.

On the Bay of Plenty is the harbour of Tauranga, which is only visited by vessels of 200 tons burthen. There are four fathoms of water over the bar, the channel is not above 100 yards in breadth, and, owing to its bending at a sharp angle, large vessels would have great difficulty in entering it. A great number of pigs are exported; they are mostly brought from the valley of the river Waiho to be shipped here. Between Tauranga and Kati-kati which lies about 20 miles north of it, the coast-line is formed by several large islands, which in structure and configuration exactly resemble the mainland, but are separated from it by narrow channels. Their fertility is equal to that of the low tract along the shore.

In the Bay of Plenty is the island of Tuhua, or Mayor's Island, which is of considerable extent, and consists of very rugged basaltic rocks, with narrow but fertile valleys. It is inhabited by about two hundred natives, who cultivate the land, and occasionally provide passing whalers with provisions. White Island, or Puhia-i-Wakari, is small and low; it contains an active volcano, similar to Stromboli, and produces a great quantity of sulphur, of which several cargoes have been brought to Europe.

Till lately it was generally supposed that the most eastern portion of Eaheinomauwe, or the large peninsula between the Bay of Plenty and Hawke's Bay, was traversed by a high range of mountains, but it has been found that no mountains are visible from the table-land of Roturua, which lies contiguous to it on the north-west, and at present it is the prevailing opinion that this unexplored portion of the island probably does not differ materially in surface, soil, and fertility from the last-mentioned table-land, and that it may eventually become a rich country. There are however a few summits, which attain a great elevation, as Mount Edgecombe, or Putawaki, situated near the southern shores of the Bay of Plenty, and Mount Ikorangui, but they are isolated, and not connected by continuous ranges. The coast-line between Cape Runaway, or Te-Kahu, and Table Cape, or Mahia, has numerous indentations, but they are all open, and offer no shelter that can be depended on, except when the wind blows off the land. The same is stated to be the case with Hawke's Bay.

No portion of Eaheinomauwe hitherto described can be called mountainous, so far as it is known, though there are several elevated isolated peaks, which have been noticed. But the most southern part of the island is decidedly mountainous: mountain-ranges traverse the whole country south of a line drawn from Cape Mata-mawi on the eastern coast, to Cape Egmont on the western, with the exception of the most western districts.

The eastern half of this region is unknown, with the exception of the coast-line, which, from Cape Mata-mawi, situated at the most southern point of Hawke's Bay, trends south-south-west to Cape Palliser, or Kawa-kawa, a distance exceeding 150 miles, without any indentation which offers a shelter even for small craft. The shore is lined with high rocky cliffs, and behind them the more elevated country is covered with trees. This leads to the supposition that there is a high mountain-range at no great distance from the sea extending over the whole country, and this supposition is supported by the circumstance that not even the outlet of a small stream occurs. It must indeed be an inhospitable country, for it is said that there are not even any natives there.

Cape Kawa-kawa constitutes, with Cape Campbell, the southern entrance of Cook's Strait. West of the cape is a wide bay, which on the west is sheltered by the high lands terminating with Baring Head, or Cape Toura-kira. It is open to all winds except those from the north and east, and affords no safety or good anchorage. It is appropriately called Useless Bay, also Palliser Bay, and by the natives Wairapara. At the innermost recess of the bay is the mouth of a river, the Wairapara, which is stated to drain a wide valley which extends far inland between mountain-ranges, but we have no description of it.

West of this bay a headland projects into Cook's Strait in a direction from south-west to north-east. It is traversed by two chains of mountains, which terminate at Baring Head and Cape Terra-witi. Between these rocky capes a small bay extends northwards, called Port Nicholson. It is surrounded by high and steep rocky hills, generally covered with wood, except opposite the entrance of the harbour, where a sandy beach occurs about two miles and a half in length. This leads to the alluvial valley of the river Hutt, or Eritonga, which is surrounded by steep mountains, and extends seven miles inland, where the hills approach each other and form the gorge of the river. This tract has great fertility. Above it the valley is generally narrow, and enclosed by steep hills, but it widens in some parts to a mile, and in others the hills form platforms on their declivities, which are fit for cultivation; but above the alluvial tract the available land is of small extent. The hills surrounding Port Nicholson are furrowed by ravines, in which the natives have a few plantations. The bay extends about eight miles from south to north, and that portion of it which is adjacent to the eastern hills is exposed to a heavy swell during southern winds. At its extremity Cape Te-ra-witi bends eastward in the form of a hook, and thus it protects the western portion of the bay against the swell and winds. Here is Lambton Harbour, on which the town of Wellington is built. It has good holding-ground, is protected from the prevailing winds, and offers great facility for discharging cargoes. In the entrance of the port is a small reef, called Barret's reef; but there are no dangers except those arising from a sudden shift of the wind, which frequently occurs while working in between the reef and the steep eastern shore.

The two mountain-ridges which enclose Port Nicholson and the valley of the Eritonga unite at the source of the river, and are there called the Tara-rua range. This chain, consisting of several ridges, runs south and north, and extends to the elevated peak of Rua-pahu, where the Rangitoto Mountains begin, which are to be considered as their northern continuation. The range south of the Rua-pahu is broken about the middle by the river Manawatu, and that portion of it which lies north of the gorge by which the river escapes is called the Rua-Wahine range. The geological structure of the Tara-rua Mountains is argillaceous schist, interrupted, especially on the western side, by bulky and irregular dykes of red, black, and greenish Lydian stone. Sometimes the clay is more quartzose and granular, and forms a good stone for building purposes. These mountains apparently do not rise more than 3000 feet above the sea-level. Their external figure is very uniform. They extend in longitudinal ridges, with narrow crests here and there rising to a somewhat higher summit. In many places they are overgrown with forest, in others the woody region does not quite reach to the top. They send off from their sides short ramifications, which form ravines rather than valleys, from which small rivers flow to the sea or the lower country. As these rivers flow between hills which give them many tributaries, the violent rains often swell them suddenly, and the streamlet becomes a mountain-torrent. It then overflows the alluvial land on its banks, and carries with it the stems of large trees, which either remain fixed in its bed, or are buried near the sea-shore, when driven back and left dry by the tide. Quantities of drift-wood are found on the shores of Cook's Strait.

In the country extending from the Tara-rua Mountains to Cook's Strait the southern portion, as far as Paripari, is filled up with the offsets of the mountains. At the last-mentioned place the chain begins to recede from the sea-shore, increasing its distance from the coast-line as it runs north. The mountains are now succeeded by a belt of low sandy hills, commencing at high-water mark and widening as the mountains fall back, till, at the Manawatu river, the sandy belt is nine miles broad. Where this belt is traversed by rivers there are large tracts of alluvial soil, cultivated by a comparatively dense native population. The river Manawatu takes its rise on the southern declivity of Mount Ruapahu, and runs along the eastern side of the Rua-Wahine range, southward, in a valley between mountain-ridges, about 70 or 80 miles, when it pierces the range through a cleft by turning westward, and enters the lower country along Cook's Strait. As with all the rivers in Cook's Strait, the force of the current is not strong enough to remove the sand which is thrown up at its mouth by the south-westerly and north-westerly winds, and its depth over the bar is only six feet at low-water; the tide rises eight feet. The breadth at the mouth is about 300 yards at half-tide. Inside the bar the river deepens sufficiently to admit vessels of about 50 tons, and there is a well defined channel with from one and a half to five fathoms water for 40 miles up the stream. The native tribes that inhabit the country near Lake Taupo descend this river with their canoes to Cook's Strait. Sand-hills extend along the banks for the first nine miles from its mouth. At the back of them is a swampy region, through which it winds 30 miles more, being bounded throughout this distance by a belt of trees about 100 yards broad. Beyond this the forests spread over the more elevated land to the base of the mountains. Through all this tract the river is sluggish, and well adapted for steamers. This description applies in some degree to the country which extends from the Manawatu to the Wanganui river.

The river Wanganui rises on the western declivity of the volcanic peak of Tongariro, and runs with numerous windings to Cook's Strait. The mouth is more than half a mile wide, and has on the bar eight feet of water. Vessels of 230 tons have passed over it, but at low-water the sea breaks across the bar. Inside the bar the river grows deeper, and is about 300 yards wide. The banks are here low and sandy, and covered with drift-wood and pumice-stone, which the river brings down from the volcanic region surrounding its source. At the distance of some miles an extensive flat extends along the banks, which is bare of timber and even of bushes, and in its natural state is covered with flax and fern; it is considered well adapted for grazing. About 30 miles from the mouth the river flows between hills, which are well wooded, and extend to the base of Mount Tongariro. But in approaching that summit the country is again more open and flat, though much broken. The natives descend the Wanganui in their canoes from within a short distance of its source.

The coast from the Wanganui to Cape Egmont presents a cliff of moderate height, on the summit of which the land extends in a level plain, which rises gradually to the base of Mount Taranaki. Near the sea, and some miles inland, this tract is without trees or bushes, overgrown with fern and flax; it appears to be fit for agricultural purposes or grazing. Farther inland the plain is covered with forests, whose vigorous growth shows the fertility of the soil. The rivers which drain this region descend from Mount Taranaki, or from the hilly tract which runs from that summit towards Mount Tongariro. On these rivers there are numerous native settlements.

Respecting the *soil of New Zealand*, the alluvial tracts, where heavily timbered and with a dry soil, are very fertile, and yield good returns, but the labour of the clearing is very great. The swampy tracts, especially those which are covered with flax, make good land when drained, but the drainage is very expensive. Where the land is overgrown with fern, or the flax is found on dry ground, the soil is only of middling quality; but where the fern is short, the soil is bad. The wooded slopes of the mountains have generally a good soil, but the thin coating of mould which adheres to their steep sides is only supported by the [illegible] roots of the trees, which spread themselves over the ground like a fabric of net-work. When these are removed, the heavy rains wash down the vegetable deposits, and lay bare the sterile substratum of rock or clay. Where the sides of the mountains are formed in terraces, the vegetable earth is not subject to be washed down, and it generally yields good crops. The natives in most cases have established their plantations in the alluvial valleys or in such terraces. In the volcanic regions, the quality of the soil depends on the degree of decomposition which the surface of the volcanic matter has undergone.

Cook's Strait, which separates Eaheinomauwe from Tavai Poenammoo, is about 150 miles long, and lies from south by east to north by west. At its southern entrance, between Cape Kawakawa in Eaheinomauwe, and Cape Campbell in Tavai Poenammoo, it is about 50 miles wide; but the promontories which form its northern entrance, Cape Farewell in Tavai Poenammoo, and Cape Egmont in Eaheinomauwe, are more than 100 miles distant from each other. At the narrowest part, opposite Cape Te-ra-witi, the strait is not quite 30 miles across. The tide runs from the south at the rate of five knots an hour, during spring-tides. The prevailing winds near the southern entrance, the greater part of the year, are from the south and south-east, and often increase to heavy gales, augmenting the rush of water through the straits, and making considerable inroads on the coast. In the northern and wide portions of the strait the prevailing winds all the year round blow from the north-west and south-west, and cause a heavy swell to set against the shores of Eaheinomauwe, between the island of Kapiti and Cape Egmont. This coast has no harbours, and as the sea to a great distance from the shore is shallow, vessels are obliged to keep a good offing. The island of Kapiti, called by Cook the Island of Entry, is the most remarkable of the islands of the strait. It is about 25 miles in circumference, and consists of a ridge of hills, rising in some places to the height of 600 feet. These hills descend abruptly tc the westward and eastward, but at the southern extremity they are low and undulating. At the north-eastern point is an extensive alluvium, with a lagoon in the middle. A great portion of the island is cultivated by the natives, and produces potatoes, cabbage, turnips, and Indian corn. It is the centre of an extensive whale fishery. To the east of the southern extremity of Kapiti are three small islands, which, together with Kapiti, form a roadstead, which is sheltered from the prevailing north-west winds by Kapiti, and from the south-east winds by the three islets, and affords a safe anchorage for vessels.

Climate.—The climate of New Zealand is frequently compared with that of Great Britain, and certainly there is a great similarity between the two countries, so far as respects the frequent changes of the weather, the moderate heat and cold, and the limited annual range of the thermometer, the limited daily range of the thermometer, and the slow passage from heat to cold, and *vice versâ*, at the change of the seasons. All these peculiarities are chiefly, if not entirely, to be ascribed to the insular position of both countries; but they are more distinctly marked in New Zealand than in Great Britain, because Great Britain is only at a short distance from the continent of Europe, and its climate must be affected by the changes of weather which take place on this continent, but no country of any extent is near enough to New Zealand to affect its climate.

There is another similarity between the two countries. Those parts of Eaheinomauwe which are nearest to the equator are only hills, no eminence probably being found north of 38° S. lat. which exceeds 1500 feet, and these parts may be compared with the south-eastern and central districts of England; but those parts of the island which lie nearer to the pole rise into mountains, which however, with the exception of a few peaks, do not much exceed the elevation of the mountains in the northern part of England. But in Eaheinomauwe the hilly portion of the island is very narrow, whilst the mountainous part is of considerable width. In England, the contrary is the fact. This difference in the conformation of the northern and southern districts of Eaheinomauwe, combined with the difference of their geographical position, must of course considerably affect the climate of these two portions of the island.

We are in possession of metereological observations made at *Auckland* in Hauraki Gulf, and at Wellington in Port Nicholson; and though these observations have only been carried on for a twelvemonth, and therefore cannot be considered as conveying exact information respecting the climate of these places, we add the results, as they are better adapted to give a notion of the climate of the two different portions of the island, than the observations of hasty travellers.

Mean of Monthly and Annual Temperature at Auckland, Wellington, and London.

Months.	At Auckland. S. lat. 36° 51′		At Wellington. S. lat. 41° 22′		At London. N. lat. 51° 31′		Months.
Dec. . .	64°	6′	64°	7′	59°	36′	June
January.	69	3	66	4	62	97	July
Feb. . .	67	6	64	8	62	90	August
March .	63	1	62	5	57	70	Sept.
April . .	59	0	63	5	50	79	October
May . .	56	1	51	8	42	40	Nov.
June . .	52	1	51	3	38	71	Dec.
July . .	49	5	48	7	36	34	January
August .	54	3	51	2	39	60	February
Sept. .	54	8	53	5	42	01	March
October.	58	6	59	2	47	61	April
Nov. . .	58	8	60	5	55	40	May
Summer	67	2.	65	3	61	7	Summer
Autumn	60	1	59	3	50	3	Autumn
Winter .	51	9	50	4	38	2	Winter
Spring .	57	4	57	7	48	3	Spring
Annual mean	59	2	58	4	49	6	Annual mean

If we consider that the difference of latitude between London and Auckland is only 14° 40′, and that of the mean annual temperatures is 9° 56′, it appears that the climate of Eaheinomauwe is rather warmer than could be expected. Looking at the seasons, it is found that the climate of London is more influenced by the vicinity of the continent in winter than in summer; for in summer the difference amounts only to 5° 5′, while in winter it is 13° 7. The temperature of the air is more equable at Auckland than at London; as at Auckland the difference between the hottest and coldest months is not more than 19° 8′, and at London it is 26° 6′. Dieffenbach says, 'The place which in our northern hemisphere corresponds in its mean annual temperature to Auckland is Montpellier (43° 36′ N. lat., but in the last place the difference between the hottest and coldest month is 68°. The heat of the warmest month in Auckland corresponds to that of the warmest month at Vienna (48° 12′ N. lat.), but its coldest month is somewhat below the temperature of the coldest month of Lisbon (38° 43′ N. lat.).' The daily range of the thermometer on the coast frequently does not amount to more than 4°, and probably it never exceeds 8°; but on the table-land surrounding Lake Taupo, which may be considered as 1300 feet above the sea-level, it sometimes amounts to 25°, and in these parts the ponds and swamps are sometimes covered with ice about half an inch thick. On the coast frost is never experienced: the thermometer never descends below 36°. On the table-land the trees shed their leaves in winter; but along the whole coast the natives plant their potatoes at all seasons of the year, and the forest is always green. Dieffenbach says that the western coast is warmer than the eastern.

The climate of New Zealand is very humid. In ten months (from April, 1841, to February, 1842) there fell 34·49 inches of rain in Wellington. In London the mean annual quantity of rain is 24·10 inches, but in some districts in the West of England double that quantity falls. Dieffenbach thinks that more rain falls at Auckland than at any other part of the coast, and he attributes it to the narrowness of the island near that place. But the meteorological observations which he has inserted in his work show that the number of fine days is 197 in the year, and that is certainly a very fair proportion. Dews are frequent, and particularly heavy during the winter months. Fogs are rare on the sea-coast, owing to the brisk winds, which hardly ever cease to blow; but in the interior they rest upon the lakes and watercourses until they are dispelled by the sun or driven away by the winds. This abundant moisture renders vegetation so vigorous, that it covers even the rocks where only a thin layer of vegetable mould is found: it is not injurious to health, as the country is generally so well drained that swamps are comparatively rare and of small extent; besides, it feeds the numerous streams and rivulets, which render the island one of the best-watered countries on the globe. Rain falls in New Zealand in all months of the year, but the largest quantity falls in winter and spring.

Every part of New Zealand seems to be subject to almost continual winds and to heavy gales. The winds blow either from north and north-west or from south and south-east. In 1841 it blew from the north and north-west for 213 days, and from the south or south-west for 119 days. It is difficult to say which wind is most violent, as they blow from both quarters with great force. During the winter months the north-west wind prevails, but when the sun has a southern declination southerly winds are most general. But in Cook's Strait, which is nearly enclosed by high mountains, the direction of the wind changes so frequently and suddenly, that no two puffs follow each other from the same quarter, and the nearer the shore the more this is felt.

At Auckland, and in general on the northern narrow peninsula, south-west and west winds prevail. They generally commence about ten o'clock in the morning, and increase gradually almost to a smart gale, but subside at sunset into a calm. Easterly gales generally occur at the full and change of the moon, and continue for two and sometimes for three days. In the winter months they sweep with great violence over the more exposed part of the country. These winds nearly always bring heavy rains. Northerly winds are of rare occurrence.

The seasons are not very distinctly marked. At Wellington the fair season commences in the middle of December, and continues to the middle of April. The weather is agreeably warm: showers fall frequently, but they are short; and the winds, usually blowing from the south-west, rarely become gales. After the middle of April the weather is more variable, the winds increase in force, and the showers are heavier and last longer. The air becomes chilly. This weather continues to the beginning of July, when the bad or tempestuous season begins. Heavy rains occur almost daily, and sometimes they continue for many days together: the wind is almost a constant gale, and often blows with the strength of a hurricane. At Auckland the fair season lasts from October to April and even May. It is regularly interrupted by the heavy rains which occur at the full and change of the moon, and are attended by gales, and irregularly by squalls and showers. During the remainder of the year showers are frequent, and the westerly winds blow with considerable force. In December and January regular land and sea breezes are experienced. The sea-breeze sets in from the north-east in the forenoon, and veers to the south in the evening. Thunderstorms are frequent in August, and sometimes heavy.

Earthquakes have been experienced at several places, but the shocks have always been slight, and have caused no damage.

Productions.—Two plants were cultivated by the natives at the time of the arrival of the Europeans, the taro (*Caladium esculentum*) and the kumera, or sweet potato (*Convolvolus batata*). Among the fruit-trees, the most remarkable is the *Areca sapida*, of which the undeveloped plaited leaves, or the heart, are eaten, and the leaves are used in roofing the houses. The leaves of the *Piper excelsum* are used as tea. Some shrubs bear berries, which are much liked by the natives, especially the *Solanum laciniatum* and the elderberry-tree (*Coriaria sarmentosa*), whose leaves however contain an acrid poison, which produces violent symptoms if eaten by cattle.

The greater portion of the island is still covered with forests. There is a great variety of trees, and perhaps in no part of the globe do they attain a larger size and exhibit a more luxuriant vegetation, which is to be attributed to the humidity of the atmosphere. There are eleven species of *Coniferæ* and *Taxideæ*, and they produce the most valuable timber. Among them is only one coniferous tree, the kauri (*Dammara australis*), whose timber is so highly prized that it has been one of the greatest inducements to Europeans to visit the island. It is however only found on the northern peninsula: its limits on the western shore are the harbour of Manukau, and on the eastern the small river Kati-kati in the Bay of Plenty. The other trees of the pine tribe are, tanekaha (*Phyllocladus trichomanoides*), miro (*Podocarpus ferruginea*), totara (*Podocarpus totara*), mai (*Dacrydium mai*), kawaka (*Dacrydium plumosum*), kakikatea (*Dacrydium excelsum*), rimu (*Dacrydium cupressinum*), hutu (*Phyllocladus hutu*), a dwarf *Dacrydium*, and another *Podocarpus*. Other very useful timber-trees are *Leiospermum racemosum*, some kinds of *Leptospermum* and *Metrosideros*, the *Knightia excelsa*, *Laurus tarairi* and *Laurus tawa*, and *Vitex litoralis*. None of these trees however have hitherto yielded timber for exportation.

Three other kinds of plants deserve to be noticed: the ferns, the *Phormium tenax*, and the raupu. There are 94 species of ferns in the island, and some attain the size of trees. The *Cyathea dealbata*, the highest, is sometimes 40 feet in length. One species, the *Pteris esculenta*, has a root which was formerly much used as food by the natives; but since the cultivation of several other plants has been introduced by Europeans, it is only used to feed pigs, which quickly fatten on it. The *Phormium tenax*, or flax, covers many extensive plains; it grows on mountains and in swamps. It was formerly used by the natives to make clothing, and considerable quantities of flax obtained from it were exported; but since the demand for provisions by the vessels which visit the island has increased the value of labour, the natives have gradually ceased to prepare this article for the market. Many swamps are overgrown with a kind of bulrush called raupu (*Typha angustifolia*), which is a useful building-material for the natives, who make the walls and roofs of their houses of them, which they tie together in bundles with a climbing fern: these houses and roofs are impenetrable to rain.

The most important of the plants introduced by Europeans is the potato, which is extensively used by the natives, partly for food and partly for exportation: every vessel that touches at the island takes large quantities of them. Next in importance is the Indian corn, which is grown everywhere, and in the northern district forms an article of export. Wheat was introduced by the missionaries about 20 years ago, and its cultivation begins to spread. Other grains are not grown, but it is thought that all of those which are cultivated in Europe may be grown, rice not excepted. Turnips are very extensively cultivated. They are dried in the oven, wind, or sun, and they keep for a long time. The other vegetables are pumpkins, shallots, onions, garlic, beet-root, endive, celery, leeks, purslain, radishes, Spanish radish, Spanish onions, cabbages, broccoli, artichokes, cucumbers, capsicums, Chili pepper, and mustard. The fruit-trees of Europe have also been planted in Eaheinomauwe, and most of them succeed very well, especially in the northern districts, as pomegranates, figs, quinces, nectarines, peaches, apples, pears, vines, olives, raspberries, strawberries, and Cape gooseberries. Some attempts have been made to introduce the fruits of India, but without success. The bananas and mango-trees do not flower. Tobacco is cultivated at several places by the natives for their own consumption, and the sugar-cane succeeds very well at Hokianga.

The dog, a smaller variety of the Australian dingo, existed here at the arrival of the Europeans, and is still, though rarely, met with, as almost the whole race of the island has become a mongrel breed. This was the only domestic animal at that time. The white settlers have introduced the horse, cow, ass, sheep, and pig. Pigs are very numerous: they are easily fed and fattened on the fern-root. The other animals are not yet numerous, though they succeed pretty well, except sheep, for which the climate and soil appear to be too wet, with the exception of a few tracts. No wild animals are found in Eaheinomauwe, with the exception of a kind of bat, called *Mystacina tuberculata* by Gray. Formerly a native rat, which was eaten by the aborigines, was very common, but it has been nearly exterminated by the European rat, and is now only found on the table-land of Roturua.

The sea contains four kinds of seals: the bottle-nosed seal (*Phoca leonina*, Linn.); the sea-lion (*Otaria* [illegible]); the sea-bear (*Otaria Ursina*); and the fur-seal ([illegible]*phalus Ursinus*). Their great number, and the [illegible] of taking them, first attracted Europeans [illegible] but they have nearly exterminated these animals, and about 20 years ago they were obliged to abandon this branch of industry. There are also eight kinds of whales, the sperm-whale (*Physeter macrocephalus*); the hump-back (*Balæna gibbosa*); the fin-back (*Balæna physalus*); the pike-headed balæna (*Balæna Boops*); the large-lipped whale (*Balænopterus musculus*); the tohora, or right whale (*Balæna antipodum*, Gray); and the razor-back. When the seal fishery began to fail, the Europeans directed their industry to the whale-fishery, and with great success. This fishery is carried on partly in Cook's Strait and partly along the eastern coast of Eaheinomauwe. The number of whales taken annually by the eight establishments in Cook's Strait is, according to Dieffenbach, 120, and as each whale on an average yields six imperial tuns of oil, the aggregate makes 720 tuns, each of which sells in the London market for 27*l*. The value of the oil therefore is about 20,000*l*., to which sum 3000*l*. must be added for the whalebone. Dieffenbach however observes, that the fishery has been decreasing for some time, because only the females approach the land for the purpose of bringing forth and rearing their young, and the whalers kill the calves in order to capture the mother or else kill her during gestation. Thus the number of whales has greatly decreased on the whaling-ground, as it is called, which lies chiefly along the eastern shore of the island, at a considerable distance from the coast. Even on the whaling-ground the success of the whalers was so small in 1842, that most of them have left it, and directed their views to the north-western coast of North America. There are also the New Zealand dolphin (*Delphinus Zelandiæ*); the grampus or killer (*Delphinus Orca*).

In the Appendix to Dieffenbach's work on New Zealand, 84 species of birds are enumerated. The most remarkable is the kiwi of the natives (*Apteryx australis*), a struthious bird, unable to fly on account of its want of wings, instead of which it is provided with flappers. It is however very rare. There are 92 species of fish, of which some are in great abundance. A species of shark at a certain time of the year visits some districts of the eastern coasts in great numbers, and is taken by the natives, who consider its flesh a delicacy. Eels are very numerous in the lakes of the interior. There are no snakes, and it is doubtful if there are land-turtles. Iguanas were formerly found, but it is supposed that at present they do not exist. Shell-fish are very numerous, and formerly they constituted an important article of food. Like the shells found in the other parts of the southern ocean, many of them are of a larger size and brighter colours than the species found in the same latitude in the seas of the northern hemisphere. In Dieffenbach's work 240 species are enumerated. Very little is known respecting the metals. Gold and silver have not been found: but Dieffenbach states that from the island of Otea, or Great Barrier Island, which is north of Cape Colville before the entrance of Shouraki Gulf, he obtained specimens of a copper-ore, some of which contained nearly 25 per cent. of copper. Iron-ore is said to exist at several places; coal has been found in the neighbourhood of Hokianga and at some other places, and also in Tasman's Bay in the island of Tavai Poenammoo. Thick layers of lignite are observed in the cliffs which skirt the western and eastern coasts, but especially in the former. Limestone is found on the west coast, especially on the deeper inlets, and some limestone rocks would yield marble. Indurated scoriæ and some kind of sandstone are fit for building materials. Slates are met with in many places. Immense quantities of sulphur could be collected in the volcanic region.

Population and Inhabitants.—The population is composed of European settlers and of the native tribes. The natives call themselves *maori* (aborigines), in contradistinction to the foreigners, or *pakea*. Their number, according to a rough estimate of Dieffenbach, is about 115,000. The most intelligent travellers are of opinion that there were originally two different races, which became mixed, and thus many varieties have been produced, which may however be generally distinguished by difference in the structure of their body. Those who belong to the most numerous race are generally tall, muscular, and well proportioned, and do not vary in size as much as Europeans do. The form of the cranium approaches that of the European: in general however it may be said to be of longer dimensions from the forehead to the occiput. The forehead is high, but not very full in the temporal regions. The coronal ridge is ample, and there is no coronal suture. The occiput is fully developed. Their colour is a light clear brown, varying very much in shade; in some persons it is lighter than that of a native of the south of France. The nose is straight and well shaped, often aquiline; the mouth generally large, and the lips in many persons thicker than those of Europeans. The hair is generally black, and lank or slightly curved. The teeth are white, even, regular, and last to old age. The hands and feet are well proportioned. The features are in general prominent, but regular. The other race is distinguished by a less regularly shaped cranium, which is rather more compressed on the sides, by full and large features, prominent cheek-bones, full lips, small ears, coarse hair, which is curly, but not woolly, a much deeper colour of the skin, and a short and rather ill-proportioned figure. But in all tribes, and in all places these two races are mixed together, and there is no distinction made between them.

Though there are reasons for considering the natives as derived from two different races, this fact is not supported by the language, which is derived from one stock, and differs very little from that spoken in the Society and Sandwich Islands. The difference between the language in use in these three groups is less than that existing between the Dutch and German, as a native of Tahiti on arriving in New Zealand immediately understood what was said by the natives, which is not the case with the German and Dutch with respect to one another. It is a well-established fact that this language is derived from the same stock with the Malay language, but that of the Malays has been greatly enriched by foreign words from the Sanscrit, Arabic, &c., whilst that of New Zealand preserved its originality until the missionaries and other Europeans introduced new ideas and new signs for them.

When the voyages of Cook first made us acquainted with New Zealand, the inhabitants were considered the most civilized of the inhabitants of the islands of the Pacific. They derived their food from plants which they cultivated, lived in houses constructed so as to protect them against rain and the weather, were possessed of large war-canoes, and wore more clothing than the people in the other islands. But they were divided into many tribes, which were frequently at war with one another. That the New Zealanders had not been united in one political body, was probably to be ascribed to the numerous isolated and steep hills, which afforded to the single tribes places of refuge, in which they were able to maintain their independence. On such hills they built villages, which were fortified with palisadoes and ditches, and to these small fortresses they retired when attacked by an enemy. These fortresses were called *pahs*. Their wars were carried on with great cruelty, and they eat their enemies who fell in battle, and themselves killed and eat their prisoners. Women and children were carried off as slaves. These wars greatly impeded their progress in civilization. But as all the tribes were armed in the same manner, one tribe hardly ever obtained such a superiority over another as to be able to exterminate it.

The intercourse of the natives with Europeans effected a great change. The New Zealanders became acquainted with the use of fire-arms and adopted them. If fire-arms had been distributed equally among all the tribes, they would probably have maintained the same relative position in which they stood before that time. But some districts were more easy of access to Europeans, and attracted them by the advantages which they offered. The tribes which inhabited these districts obtained from the strangers, in exchange for provisions, so many guns, that they immediately acquired a superiority over their neighbours; and this circumstance led to the annihilation of several tribes which had formerly been numerous and powerful. Thus within the last forty years the island has lost the greater part of its population. It is even probable that the whole race would have been extirpated, if the missionaries had not arrived. Other Europeans who were settled on the island had an interest in fomenting the wars, but the missionaries had no such interest, and tried to put an end to them. They have succeeded in the greater part of the island, but even in 1841 some wars were still carrying on between those tribes among which the influence of the missionaries had not yet been fully established.

Women are better treated than is usual among tribes which have not made great progress in civilization. The wife is the constant companion of her husband, and they divide the domestic labours between them. She takes care of the plantations, manufactures the mats, and looks after the children; he constructs the house, and goes out to fish and to war. The affection which the women bear to their husbands is very strong; they frequently commit suicide by hanging or drowning themselves on the decease of their husbands either by natural means or in battle. Parents sometimes commit suicide on the death of their children.

The first person in each tribe is called *ariki*, and his dignity is hereditary. His authority however is limited to the assembly, which is composed of all the members of the tribe, where his opinion on the affairs of the tribe is of great weight, but he is not invested with any part of the executive. He receives presents from friends and relations, but they are not compulsory or numerous. Each tribe is composed of free men and slaves. The ariki and each free man possess land with well-defined boundaries, and in disposing of the land of a tribe every one can sell or retain his own as he likes. But in theory the ariki is considered the lord of the soil. The slaves are the prisoners of war, male or female, and such of their children as are born in slavery. They have to perform the greater part of the agricultural labour and are the property of their master, who can do with them what he pleases. The freemen are quite independent of one another. They are kept together more by custom and relationship than by any law. When one of them has sufficient authority with a number of individuals, he may attach them to his person, build a pah, and found a new tribe.

Their religion is confined to a belief in the influence of spirits on the destiny of men. These spirits are called *atua* and *wairua*. Atua is properly the deity, though it assumes different forms and is represented as so many separate spirits; the wairua are the spirits of the deceased, invisible and capable of influencing the fate of persons either in a friendly or in a hostile manner. Their priests are only considered as conjurors and physicians. But at present the greater part of the New Zealanders have been converted to Christianity.

The most singular custom among the New Zealanders, as well as among the inhabitants of many other islands dispersed over the Pacific, is what is called *tapu*, which signifies that a thing must not be used or touched, and heavy penalties are attached to the violation of the tapu. Many things are always tapu, as the plantations of the sweet potato, property contained in a house left uninhabited by its proprietor, a house containing seeds, a canoe left unprotected on the beach, a tree selected for being worked into a canoe at a future period. So far this practice is applied to protect property. A married woman and a girl promised in marriage are inviolably tapu. A burying-place and the utensils and clothes used in interments are strictly tapu. It is evident that this tapu supplies the want of prohibitory laws. But a thing may also be declared tapu by the priests, and then it cannot be used until the tapu is taken off. Even men or women may be pronounced tapu, and then they are not allowed to touch their food or drink, but are fed by others until the tapu is taken off, which is done by the priest or priestess by some simple ceremonies and prayers. The breaking of the tapu, if the crime does not become known, is punished by the atua, who inflicts disease upon the criminal; if it is discovered, it is punished by him whom it concerns, and often becomes the cause of war.

The natives have considerable talent for the mechanical arts, and a great inclination to cultivate their minds. Cook found among them war-canoes, which were eighty feet long, and constructed with considerable ingenuity. Dieffenbach found in several of their pahs, or fortresses, houses with pillars, which were covered over with carved figures: they were executed with great skill and neatness, and probably had a reference to the military exploits of their possessors.

Though the missionaries have not yet resided thirty years on the island, there are now few persons who have not learned to read and write; and even those who live in parts of the country which have only occasionally been visited by the missionaries have acquired these elements of civilization by mutual instruction.

History and Colonization.—There is some reason for supposing that some Spanish navigators discovered New Zealand in the sixteenth century, but nothing is on record which can prove it. We must therefore consider that the islands were discovered by the Dutch navigator Abel Tasman, who reached the west coast of Tavai Poenammoo in December, 1642, near 42° 10′ S. lat. He sailed along the coast northward, and entered the western entrance of Cook's Strait in the wide open bay called on our maps Blind Bay, but by the Frenchman D'Urville, Tasman's Bay. Here he anchored in a harbour, which he called Massacre Bay, as four of his seamen were killed there by the natives. After leaving this place he sailed along the western coast of Eaheinomauwe to the most north-west cape, which was called by him Cape Maria van Diemen. From that time New Zealand was considered a part of the Australian continent by the geographers of that time. No European seems to have visited it till the time of Cook, who, in his first voyage, spent nearly six months on the coasts, between 1769 and 1770, during which he circumnavigated the islands and surveyed the coasts. In December, 1769, a French ship commanded by Surville anchored for some time in Doubtless Bay, as it is called by Cook, but which Surville named Lauriston Bay, and in 1772 two French vessels, under the command of Marion and Crozet, sailed along the west coast of Eaheinomauwe and remained for some time in the Bay of Islands, where Marion and 27 Frenchmen were killed by the natives. Cook visited New Zealand in his second voyage three times, and in his third voyage for the fifth time. Vancouver also visited it in 1791, but merchant-vessels came to it only towards the close of the last century. In fact, these remote seas were hardly visited by trading vessels before the foundation of the British colony at Port Jackson in Australia.

When the colony at Port Jackson had gone through its first trial and began to rise, it became the centre of a new branch of commercial industry. Before the end of the last century a few vessels, English and American, departing from Port Jackson, began to prosecute the whale fishery in the sea east of New Zealand. As the number of whales was immense, their success was very great, and they soon learned that provisions and other necessaries of life were to be got much cheaper and with less labour in New Zealand than at Sydney, and thus New Zealand began to be the resort of the whalers, who visited the Bay of Islands in preference to all other parts, on account of its geographical position and the excellence of its harbour. To facilitate the intercourse between the natives and the crews of these vessels, a few English settled in that harbour and in some others on the east coast. About the same period the New Zealand flax began to be considered a useful article, both in England and in New South Wales, and many vessels visited the islands to procure it. The tracts where the Phormium tenax grows in greatest abundance are situated on the west shores of Eaheinomauwe; and settlements were made there in order to get cargoes for the vessels whose arrival was expected. During the first twenty years of the present century the coasts of Tavai Poenammoo and of Cook's Strait were overrun by sealers in every direction, who caught many thousands seals every season; the skins were sent to China, where they fetched a high price. When the seals began to fail, the whale fishery in Cook's Strait was established. This led to the settlement of several Englishmen on the shores of the strait. Thus a considerable number of Englishmen had settled in Eaheinomauwe ten years ago. Most of them had married native females, and finding that the country possessed a considerable degree of fertility, and that immense tracts were not cultivated, they began to acquire landed property before a regular colony had been established. Meanwhile the Church Missionary Society had directed its attention to the natives of New Zealand, and sent several missionaries in 1814. They were soon followed by some Wesleyan and Roman Catholic missionaries, and though their labours were not attended with immediate success, they have so far succeeded, that at present the majority of the natives are Christians, and have learned to read and to write.

The English government, having been informed that every foot of ground in New Zealand was the property of somebody, did not think it expedient to send a colony there, and made a declaration to that effect. But the English who were settled in the island wished to have some protection, and they complained that many runaway convicts from New South Wales had entered the country, where they exercised a pernicious influence over the natives, who were excited by them to many acts of violence against their neighbours and the settlers. This induced the English government to send there a consul or agent to decide disputes between the English according to the law of their country, and to remove vagabonds. This was done in 1833. Previous to this event a French vessel, under the command of La Place, sent by the French government on a voyage of discovery, came to New Zealand and anchored in the Bay of Islands. It was soon rumoured among the natives, probably at the suggestion of the settlers, that the French had come to seize the island, and that they intended to have satisfaction for the death of Marion and his crew. The natives, alarmed at the news, addressed the British government, and requested it to take the island under its protection. But the government, being well acquainted with the views of the French, did not think this necessary.

In 1835 a French adventurer, Baron de Thierry, announcing himself as sovereign chief of New Zealand and king of Nuhuhwa (one of the Marquesas Islands), published a formal declaration that he was about to go to New Zealand and to establish an independent sovereignty. He went in 1837 to Hokianga with a few settlers, but being soon abandoned by his companions, he left the country. The declaration of the baron gave great uneasiness to the British settlers, and they addressed a petition to William IV., praying for the establishment of a regular government in the form of a British colony, observing at the same time, very justly, that the chiefs of the native tribes had too little authority to enact laws for the proper government of their territories and the protection of their subjects and the settlers. The English government was still undecided. But in 1838 an Englishman arrived in London, who had been residing for some time in Eaheinomauwe, and had bought an immense tract of country, which he wished to dispose of. This gave rise to the New Zealand Company, which sent there the first regular colony in 1839. The number of emigrants who have gone, up to this time (1843), is between 5000 and 6000. They have settled on both shores of Cook's Strait: the principal settlements are Wellington, in Port Nicholson; Petre on the Wanganui river; and New Plymouth in Taranaki on the shores at the northern declivity of Mount Taranaki. These three settlements are in Eaheinomauwe. On the southern shores of the strait, in Tawai Poenammoo, settlements have been made on the shores of Tasman's Bay, where the town of Nelson has been built. In 1840 the English government, seeing that it now became necessary to establish an administration for the island, made a regular settlement on the shores of Port Waitemata in the Bay of Shouraki, where the town of Auckland was built.

The settlements of the New Zealand Company have not given satisfaction, either to the public or to the settlers, and it must be confessed that the persons who have had the direction of its affairs have committed some errors which might have been avoided, and have caused discontent among the settlers and retarded the progress of the colony. Their first and principal settlement, Wellington, has been established in the worst part of the island for agricultural purposes. With the exception of the comparatively small alluvial tract in the valley of the Eritonga river, the whole country, to the distance of more than eighty miles from Wellington, is occupied by high mountains, whose declivities are generally too steep for cultivation. Some ravines contain patches which may be cultivated, but they are too small to support a single family of European agriculturists. The mountains, as well as the level tracts, are covered with thick forests of large trees, and a very close underwood, which renders the clearing of the land so expensive, that a single acre can hardly be brought to a cultivable state for less than from 30*l*. to 60*l*. Most of the emigrants possessed capital and hoped to be able to buy a considerable tract of good land, but they find that their means are inadequate to clear even a small piece of ground. In forming the later settlements, Nelson, New Plymouth or Taranaki, and Petre, the agents have partly avoided this error, having selected districts which contain extensive level tracts. Part of these districts are either without trees or only covered with fern and bushes, so that they can be cleared at the expense of from 10*l*. to 20*l*. per acre. But these tracts have an inferior soil, which requires great labour to be brought into such a condition as to remunerate the expense. Those parts which are covered with trees have a better soil, but are difficult to clear. The New Zealand Company made another mistake. The directors thought that they had bought the land by having paid to the chiefs of the tribes the sums which had been stipulated. But these chiefs could not sell what did not belong to them. Every freeman of the tribe is a landed proprietor, and most of them are possessed of large tracts, though the majority are inclined to sell their lands for a moderate sum. The Company, considering their claims not well founded, did not from the first adopt the best means to obtain these tracts, and the natives being informed that their lands had been disposed of by the Company to emigrants who arrived and were impatient to be put in possession of what they had bought, continually raised their demands, and placed the agents of the Company in a very embarrassing situation. The colony was still in this disjointed state at the beginning of the present year (1843), and especially the new settlements on the Wanganui river and in Tasman's Bay. That under such circumstances the settlements cannot be brought to a thriving state is evident, and the knowledge of these facts, having reached England, has entirely put a stop to emigration. Since 1841 very few settlers have gone to the territories acquired by the Company, and many have returned to England or removed to other colonies near New Zealand, especially to Port Phillip.

In establishing the colony at Auckland, the government at first adopted the principle of the Company in buying from the chiefs of the tribes their sovereignty over the territories possessed by the tribes. But it was soon discovered that this was buying a thing which did not exist. The chiefs have no kind of sovereignty over the country: and if a sovereignty exists, it is in the tribe. In the most favourable view of the subject, it may be said that the chiefs are possessed of a certain authority over the individuals who compose the tribe. The English government has lately declared that it assumes the sovereignty of New Zealand, which henceforth is to be considered a part of the British empire, but that it does not intend to meddle with the affairs of the tribes, and it leaves every individual in the possession of his right to dispose of his property as he pleases. The English however who have settled among the tribes are under the immediate protection of the English government, which has constituted itself the judge in all legal matters between them and the natives. This is a very difficult task. Many of the settlers have acquired large landed property. In most cases a mere trifle, consisting of some blankets or guns, has been given for the land. The English were under the impression that they acquired the complete ownership of these lands; but it appears that the natives did not intend to sell to this extent. They intended only to give the purchasers permission to make use of certain tracts of land; they did not mean to give them the right to remove the natives from it, but they reserved to themselves the right of continuing to inhabit and cultivate the ground which they and their forefathers had occupied from time immemorial. Under such circumstances it would be cruelty and injustice to rely on documents written in a language which the natives very imperfectly understood, and to expel them by a judicial sentence from lands which they never intended to sell. These matters can only be settled on the general principles of equity. If the English government had not taken possession of the country, the English settlers would never have been able to enforce these supposed rights, and this ought to be a motive for adopting a mode of adjusting this matter by which protection shall be given both to the natives and the settlers.

Another difficult task for the English government is to determine the relations between some of the tribes themselves. In some cases a tract is inhabited and cultivated by a tribe which, according to their custom, is not considered the proprietor of the ground. This is the case when a tribe has been conquered by another and allowed to remain on the land, and has received from its conquerors some other place to reside in; or when the majority of a tribe, which was hard pressed by its enemies has abandoned its original country and removed to some more distant part, but a small remnant of it, unwilling to leave its native place, has remained hidden in the forests, cultivating a few spots without the knowledge of the victorious tribe, which has divided the conquered land among its own members, but has not taken actual possession of it. Though the wars between the tribes have become less frequent since the labours of the missionaries have been attended with success, there have even lately been some contests among the natives.

The colony established by the English government on Waitemata Harbour is on a less extensive scale than the settlement of the New Zealand Company. No emigrants have been sent to it from Europe; but some old settlers have removed to Auckland, and their number has been increased by others who have left New South Wales, Southern Australia, or Tasmania, and established themselves on Waitemata Harbour. Thus, about 2000 settlers have within three years been collected in that place. This rapid increase of the town and of the European population in its neighbourhood is chiefly owing to the situation of the colony in a country which is partly undulating and partly level, and contains only a few hills. Nearly the whole of it is capable of being worked by the plough, and will soon be covered with crops. Only the hilly tracts are occupied by forests, and the lower may without great labour be brought into cultivation. It seems therefore that the situation of Auckland has been judiciously chosen for the capital of the colony. But it does not appear that the population has of late increased much, which is probably owing to the circumstance that nearly all the emigrants from Europe to the colonies in the southern hemisphere have gone to Port Phillip, which offers great advantages to agriculturists who are possessed of a moderate capital. In this colony also immense tracts fit for cultivation alternate with others which make excellent pasture-grounds for sheep and cattle, and it is very probable that for a long time it will attract the larger number of emigrants, and that the progress of the colonies in New Zealand will be slow.

This event is perhaps not to be regretted, and it will certainly not be regretted by those who wish to preserve the natives in their nationality. It would appear that the number of Europeans already settled in the islands is large enough to exercise such an influence over the natives as to excite them to a rapid progress in civilization, and that, on the other hand, it is not large enough to introduce among the natives the practices and customs of Europe, to destroy their character, and to obliterate everything that distinguishes them as a nation. The number of European settlers at present exceeds 10,000, of whom about 6000 are in the settlements of the New Zealand Company on the shores of Cook's Strait, 2000 at Auckland and its neighboorhood, and the remainder are dispersed in the principal harbours on the east and west coasts. It is difficult to say what effects such a large number of Europeans will produce on the civilization of the natives, who, more than any other known nation which has stopped at a comparatively low stage in their progress of civilization, evince an ardent desire to profit by the example of those whom they consider their superiors in the arts of civilized life. But some notion may be formed from what happened before the foundation of the regular colonies. No sooner had their intercourse with Europeans made them acquainted with the different articles used by foreigners, than they began to desire not only fire-arms for the purpose of destroying their enemies, but also articles of clothing, and several kinds of utensils by which they expected to increase their comforts. The wish to obtain these increased their industry. They immediately began to prepare larger quantities of flax for the European markets, and extended their plantations of potatoes and maize to meet the demands of the vessels which resorted to their harbours. Many of them entered the vessels themselves as sailors. A few years ago there was hardly a vessel sailing between the harbours of New South Wales, Tasmania, and New Zealand, half of whose crew was not composed of New Zealanders. The same was the case with all British and American whalers, and the crews of the whaling-boats in Cook's Strait consisted almost entirely of natives of the islands under the conduct of a European. The number of New Zealanders serving as sailors must have amounted to some thousands, which certainly shows their disposition to a sea-faring life. It is stated that the number of native sailors has lately decreased, but we have no means of knowing what is the cause of this decrease. We know that since 1818 there has been a very great decrease of the whole population in consequence of the destructive wars among the tribes. The neat and curious carvings which are found in many houses and in their pahs, or fortresses, show their ability in working in wood, and as an instance that they have profited from their intercourse with Europeans, they have erected neat churches of wood, without any previous instruction from Europeans, on the models which had been laid before them. The foundation of regular colonies has given a new stimulus to their agricultural industry. In expectation of a ready market for their produce, the tribes which inhabit the country along the Wanganui river have greatly increased their cultivation of potatoes, maize, and sweet potatoes, and this is probably the chief reason why they are so disinclined to give up their lands to the settlers without what is considered by the New Zealand Company an exorbitant equivalent. Such has been the progress of civilization among the New Zealanders during the short period that a few European settlers have resided among them.

Towns.—Auckland, the seat of the government of the colony, is built on the southern shores of the harbour of Waitemata, which opens into the Gulf of Shouraki. The harbour has sufficient depth for vessels of considerable burthen. The town stands on cliffs of sandstone of moderate elevation, and on nearly level ground. Several volcanic cones rise in its immediate neighbourhood, at the base of which are hard scoriæ, fit for buildings and roads, and easily worked; the sandstone of the cliffs, though soft, hardens by exposure to the air, and is also a good building-material. The population amounts to more than 2000 individuals: a bank has been formed, and barracks have been built of scoriæ. The situation of the town is very judiciously chosen, as it is situated in a part of the island which contains a larger proportion of cultivable land than any other; besides, it has an easy communication with all the countries both to the north and to the south. An easy communication with the Bay of Islands by land through Kaipara can be effected in five days even now. From the harbour of Manukau, situated on the western shores of the island, it is only separated by a short portage, and the place where the Kaipara river becomes navigable for boats is only about 12 miles distant. The water-communication is here prolonged through the æstuary of Kaipara, and the navigable portion of the Wairoa river, to the centre of the widest part of the northern peninsula. The communication with the countries south of the town by means of Shouraki Gulf and the river Waiho or Thames is equally easy. Where this river ceases to be navigable for boats, a portage over nearly level land, and not more than about 12 miles, leads to the river Waikato, which issues from Lake Taupo, and to its tributary the Waipa river. Many of the English, who settled on the island before the foundation of the colony, reside in the harbours north of Auckland, and a great number of small coasting-vessels already visit Auckland, though hardly three years have elapsed since its foundation.

Wellington, the principal settlement of the New Zealand Company, is on the shores of Port Nicholson. This harbour, as already stated, is surrounded by mountains, except at the alluvial tract through which the river Hutt or Eritonga reaches the sea. These mountains rise abruptly from the water's edge, except in the most south-western corner of the harbour, where a strip of flat land extends at their base, about one-third of a mile broad and two miles long, the soil of which is composed of sand, shells, shingle, and vegetable earth. On this flat ground, which surrounds that portion of Port Nicholson called Lambton Harbour, the town of Wellington has been built. It extends about two miles in the form of a semicircle round the harbour. The flat ground not being considered sufficient for the town, the hills south of it were included. As these hills are generally too steep to build on, only the more convenient parts were selected for that purpose, and thus the most distant points of the town are nearly four miles from the harbour. The harbour is safe, and has good holding-ground. The town and adjacent country contain a population of about 4000 individuals, but it can hardly be expected that it will increase much, as its communication with the countries which have been settled can only be effected over high the whole island has derived its name. No high mountains appear from the sea in these parts.

Banks Peninsula was considered by Cook as an island, but some years since it was discovered that it is joined to the main by a low neck of land. It has an oval form, and is nearly 70 miles in circumference. The surface is very irregular and hilly, and some of the hills are visible at sea from a distance of 40 miles. The higher parts are barren, but the lower slopes of the hills are well wooded and the soil is favourable to vegetation. It possesses two harbours. The most capacious, called Akaroa, is near the eastern extremity of the peninsula; it has sufficient depth for large vessels, is easy of access, and well sheltered. On the northern shores of the peninsula is the harbour of Tokolabo, which is not much inferior to that of Akaroa. Pegasus Bay, extending between the peninsula and the mainland, is shallow and not safe. The country in the vicinity of the bay is in general level, and rises gradually from the shore. In these parts there are a few natives.

Some distance north of Banks Peninsula the mountains in the interior of the island become visible at sea, and north of Lookers-on-Bay they come very near to the sea, until they terminate at Cape Campbell. It is the Kai-Koura range, which rises in some places above the snow-line. The shores of this tract are very high and rocky, and generally there is no beach between the high grounds and the sea. At a few places inlets occur, but they are open, and not well sheltered from the prevailing south-east winds. The best harbour is in Lookers-on-Bay, a small æstuary, into which two rivers fall, which are navigable some miles from their mouth. The land round the harbour rises gently from the sea. There are a few natives.

Opposite the southern extremity of Tavai Poenammoo lies Stewart's Island. The strait which separates it from the mainland was discovered in 1816 by Stewart, a captain of a sealing vessel, and called Foveaux Strait. This strait is about 40 miles long and 12 wide on an average. It is very dangerous on account of numerous rocks which are dispersed over it, especially at the eastern entrance of the strait. Stewart's Island has nearly the form of an equilateral triangle, and measures in its greatest length and width about 40 miles. The coast is generally rocky and high. Along the western coast it has only anchorage under the lee of some small islands, but on the northern shores there are some small bays which afford good anchorage. The south-eastern shore has one of the finest harbours on the globe, called Pegasus or Southern Port. At its entrance are two islands, which divide it into three channels, and each of them is deep enough to admit large vessels. The island is rather mountainous than hilly, and is almost covered with forests, which contain abundance of ship-timber. Between the hills there are many fine valleys and some plains of moderate extent, whose soil is stated to be good and fit for cultivation. The harbours were once the resort of many sealing vessels, and at that period there was a small European settlement, where potatoes and other vegetables were cultivated with success; but since this branch of industry has been abandoned, the settlers have left the island and returned to Sydney. Some small vessels have been built in Port Pegasus.

(Cook's *Three Voyages;* Nicholas's *Voyage to New Zealand;* Cruise's *Journal of a Ten Months' Residence in New Zealand;* Ellis's *Polynesian Researches;* Polack's *New Zealand*, being a narrative of travels and adventures, &c.; Dieffenbach's *Travels in New Zealand;* Wood's *Twelve Months in Wellington, Port Nicholson;* Hay's 'Notices on New Zealand,' in *London Geographical Journal*, vol. ii.; and John Arrowsmith's *Map of the Colony of New Zealand*, 1843.)

ZEBRA. [HORSE, p. 314.]

ZECHARI'AH, or ZACHARI'AS (זְכַרְיָה; LXX., *Ζαχαρίας*), the son of Berechiah, the son of Iddo, was one of the twelve minor Hebrew prophets. He was contemporary with Haggai, and prophesied at the time of the rebuilding of the Temple at Jerusalem. His first prophecy is dated in the eighth month of the second year of Darius (Hystaspes), just two months later than the first prophecy of Haggai (B.C. 520-519; chap. i., ver. 1). He is mentioned in conjunction with Haggai in the Book of Ezra (v. 1; vi. 14), where, according to a common Hebrew usage, he is called the son of Iddo. We learn from the above passages in *Ezra*, that the rebuilding of the Temple, which had been suspended for two years through the opposition of the Syrians, was resumed in the second year of Darius, in consequence of the exhortations of the prophets Haggai and Zechariah; a decree was obtained from Darius to forward the work; 'And the elders of the Jews builded, and they prospered through the prophesying of Haggai the prophet and Zechariah the son of Iddo.' Of Zechariah's personal history nothing more is known, except that he was a young man when he was called to the prophetic office, and this circumstance confirms the internal evidence of the book itself, to show that his ministry extended over a considerable space of time. The idea that he was the martyr mentioned in *Matthew* xxiii. 35, seems quite unfounded. The person there meant is evidently Zechariah the son of Jehoiada, whose martyrdom, under the circumstances referred to in the passage of Matthew, is related in 2 *Chronicles*, xxiv. 20, 21, though in Matthew he is called the son of Barachias, probably by the error of a transcriber, who supposed him to be the same person as the prophet Zechariah.

The Book of Zechariah divides itself naturally into two parts. The first part (chaps. i.-viii.) is devoted to the encouragement of the Jews in rebuilding the Temple, by exhortations and by promises, both direct and symbolical. The remainder of the book (chaps. ix.-xiv.) contains predictions relating to the whole future course of time, and more especially to the conquest of the Persian empire by Alexander; the successful revolt of the Jews under the Maccabees from the Greek kings of Syria (chap. ix, x.); the rejection of the Messiah and the destruction of Jerusalem (chap. xi,); and the conversion and restoration of the Jews, and the destruction of their enemies in the last days (chaps. xii.-xiv.). It is agreed by almost all commentators that much of the latter part of this prophecy is still to be fulfilled.

The genuineness of the second part (chaps. ix.-xiv.) of the Book of Zechariah has been questioned, but upon grounds so slight, that it is sufficient to refer those who desire to investigate the subject to the works mentioned below. The only argument worth noticing is drawn from a diversity of style, which can easily be explained by the different periods of life at which the prophet wrote the two portions of his book. The genuineness and canonical authority of the book are otherwise undisputed.

Bishop Lowth remarks on the style of Zechariah, that the greater part of his prophecy is prosaic: 'Towards the conclusion of the prophecy there are some poetical passages, and those highly ornamented; they are also perspicuous, considering that they are the production of the most obscure of all the prophetic writers.' The obscurity of Zechariah is found chiefly in the images contained in the early part of his prophecy, which are drawn from familiar objects, described so generally as to leave much for the reader's imagination to supply, and accompanied only by slight hints for their explanation, and sometimes left altogether unexplained. A list of commentators on Zechariah is given in the Appendix to the second volume of Horne's 'Introduction.'

(E. F. C. Rosenmüller, *Scholia in Vetus Testamentum, Proœm. in Zech.;* The 'Introductions' of Eichhorn, Jahn, De Wette, and Horne.)

ZEDOARY. [CURCUMA; ZINGIBERACEÆ.]

ZEEMAN, REMI'GIUS, a clever Dutch marine painter, born, according to Pilkington (ed. 1829), at Amsterdam, in 1612. His real name was Remigius Nooms, but he received the name of Zeeman, says Heineken, from his painting pictures of marine subjects; he was however originally a common sailor by profession, and he acquired this name probably as much from that circumstance as his style of painting. He lived some years in Berlin, where, in the royal palaces, there are many of his works; there are some in this country, but they are not common. There are likewise several etchings by him of marine subjects and shipping. He died in the latter part of the seventeenth century.

(Heineken, *Nachrichten von Künstlern und Kunstsachen.*)

ZEGERS, or SEGERS, HERCULES, a clever Dutch landscape-painter and etcher, of Amsterdam, of the seventeenth century, remarkable for his want of success. He was a painter of great ability and great imagination; some of his landscapes exhibit a surprising extent of country-

and are set off by judiciously chosen groups of trees and well-diversified foregrounds. He was however very unsuccessful in disposing of his pictures, and he tried his fortune in etching, but in this branch, though equally clever, he was equally unfortunate. He at last tried his utmost upon a large plate, but when he took it to a publisher for sale, the man offered him merely the value of the copper for it. This so incensed Zegers, that, having told the printseller that the day would come when each print from it would be worth more than he had offered for the plate, he had a few impressions taken from it, and then destroyed it. His prophecy came true, for even in Houbraken's time a print from that plate sold for sixteen ducats. Zegers, broken-hearted at his bad fortune, took to drinking, and, in returning home one night intoxicated, he fell, and died in consequence of the fall. Houbraken, who quotes S. van Hoogstraten in his account of Zegers, states that he cannot give either the year of his birth or death; in Pilkington's 'Dictionary' however (ed. 1829) the dates 1629 and 1675 respectively are given. Zegers invented a method of printing landscapes in colours upon calico, but his invention was not taken up by any one.

(Houbraken, *Groote Schouburg*, *&c.*)

ZEGZEG. [SOODAN.]

ZEITOUNI GULF, the antient Maliacus Sinus (κόλπος Μηλιεύς or Μαλιεύς), is an arm of the sea comprised between the shores of Thessaly and Phocis. It is nine miles long and from three to four broad, points Anderas and Echinos being considered the entrance. Both shores are very low, and at the head of the gulf the coast is so cut up by swamps and marshy islands as to be quite undefinable: the land appears to be fast gaining on the sea. On the northern shore of the gulf are the villages of Ayia Marina, Stilida, the monastery of Ayio Gioanni, and Echinos. Of these the first is the largest, and may contain from 500 to 600 inhabitants; the latter, which is little inferior, has considerable Hellenic remains; a large portion of the northern wall is still perfect. A square high Venetian tower stands near the village, and appears to have been a military post. It still retains its antient name. The southern shore, although without habitations, has its recommendation in the magnificent scenery of Mount Œta, and the historical associations connected with the name of Thermopylæ, and the river Sperchius, now called the Hellada, which form the boundary of the new kingdom of Greece.

The whole face of the country hereabouts must have undergone a considerable change since the days of Leonidas. [LEONIDAS.] Thermopylæ no longer exists as a pass, and were it not for the hot springs, it could not be identified with the antient place. (Herod., vii. 198, &c.) Between them and the Sperchius is a mile of flat arable land, and between that river and the southern shores of the gulf there are about three miles of the same open country, though towards the sea it becomes very marshy. The Sperchius now discharges itself into the gulf by one opening about three miles from its head, and is very shallow at the mouth, which is much obstructed by mud-banks, with only ten to twelve inches of water over them, but within the bar are twelve to fifteen feet of water; the stream within its banks runs about a mile an hour. Due north of the hot springs is the only place where the river is fordable. About three miles higher up (to the westward) there is a good stone bridge, at the northern end of which is a Turkish guard, and at the southern a Greek guard.

The springs of Thermopylæ gush out of the rock at the foot of Mount Œta, and are received into a large stone basin, where they present the appearance of ink. Overflowing this basin, they disperse themselves over a considerable space, running down towards, but dissipated and absorbed previous to reaching, the Sperchius, which space is rendered very conspicuous by the aridity and whiteness occasioned by the water. They appear to be strongly chalybeate, and to contain a great quantity of sulphur; the odour which they emit is highly offensive. They form small fibrous crystals about the rushes and about small pieces of wood lying in their track, which indicates lime in suspension. The chain of Œta is of limestone.

A little east of the springs is a remarkable hillock, and near to its base the indications of the deposited soil are plainly discernible, having all the appearance of a sea-beach. This is in all probability the spot where the remnant of the Spartan band made their last stand against the Persians under Xerxes. To the westward of the springs is a most magnificent ravine with cliffs overhanging on each side to the height of 800 feet, and through it trickles a small stream, which, in winter, appears by the expanded watercourse to be a furious torrent, and seems to be the Asopus of the Greek writers. Crossing this, the path begins to be steep and difficult, till it arrives at some antient ruins (probably Heraclea) on one of the lower ridges of the mountain, about 1200 feet above the sea: this is the first Greek post. The road across the mountain is now frequently traversed, as the Greeks keep a large force on Mount Œta, which is obliged to descend into the plains in winter on account of the cold. The path is however of such a nature that no horses but those of the country, which are accustomed to such roads, could travel it.

The villages of Echinos and Ayia Marina afford small supplies of poultry, eggs, and bread, with a few vegetables and occasionally sheep may be had.

The deepest water in the gulf is fifteen fathoms: the bottom regular, and of a stiff blue mud. There is about two feet rise and fall of water, which appears however not to be a regular tide, but to depend on the strength and duration of land and sea breezes. But Herodotus says that it takes place daily (vii. 198).

(*Original Communication.*)

ZEITZ is the chief town of a circle, in the government of Merseburg, and the Prussian province of Saxony. It is situated in a pleasant and fertile country, on the right bank of the White Elster, over which there is a stone bridge. It is built on the side of a high hill, and accordingly most of the streets are rather steep. It is surrounded with a wall in which there are six gates, and is divided into the upper and the lower town. Having been formerly the seat of several public offices, it has several good buildings, among which are a beautiful castle called the Moritzburg, formerly the residence of the princes of Saxe-Zeitz, two churches, and a lyceum, which has a good library of 12,000 volumes, and many MSS. The public institutions and schools are numerous; among them are, two grammar schools, an orphan asylum with a school of industry, an evening and Sunday school, in which the children employed in the manufactories receive instruction gratuitously from five to eight in the evening, a school for the poor, a house of correction, two hospitals, a lunatic asylum, and several public offices. The number of inhabitants is 7700, who manufacture calicos, woollen cloth, leather, and starch. There are also many calico-printing offices, breweries, distilleries, and potteries; and the manufactures of white cotton goods, of gloves, and silk ribbons are very flourishing. Many of the inhabitants derive considerable profit from agriculture and the cultivation of their gardens. Near the town, on the banks of the Elster, there is a fine park.

The antient bishopric of Zeitz was formed in 968 by Otho I., to promote the conversion of the Wends to Christianity. In 1329 the bishop and his clergy removed to Naumburg as a more agreeable place of residence, and the bishopric was then called Naumburg-Zeitz. On the death of Julius Pflug, the last Roman Catholic bishop, in 1564, the administration of the bishopric was given to the electoral house of Saxony. Previous to this, the electorate of Saxony had maintained its supremacy and right of patronage over the bishoprics in its territory. The elector John George I. bequeathed by his will (in 1652) the bishopric of Naumburg-Zeitz and several other districts to his youngest son Moritz (Maurice). He was the founder of the collateral line of Saxe-Zeitz, which became extinct on the death of his sons in 1718. By an agreement made in 1726, the temporal government was assigned to the electoral house of Saxony, and the ecclesiastical affairs to the board of the Saxon privy council. This constitution remained till 1815, when the bishopric of Naumburg-Zeitz, with the exception of a tract of 20 square miles, was allotted to Prussia.

(Brockhaus, *Conversations Lexicon*; J. C. Müller, *Geographisch-statistisch-topographisches Wörterbuch des Preussischen Staates*; F. W. Heidemann, *Topographisch-statistisches Wörterbuch der Preussischen Monarchie.*)

ZELAYA. [MEXICAN STATES.]

ZELLE, ZELL, or CELLE, is a town in the principality of Lüneburg in the kingdom of Hanover, situated in 52° 37′ N. lat. and 10° 4′ E. long., at the confluence of the Fuhse with the navigable Allar, over both which rivers there are bridges, in a low sandy country. It is tolerably well built, and is the seat of the supreme court of appeal for the kingdom of Hanover. There are six churches in the town, and the public institutions are very numerous—the principal are an agricultural society, a medical institution, a surgical school with an anatomical theatre, a lying-in hospital, a government stud with 100 stallions, a workhouse, an orphan asylum, two hospitals, a large house of correction, a Bible Society, and a gymnasium. There are manufactures of hats, linen, woollen, tobacco, and gold and silver articles. The town has a considerable trade, and with the suburbs, which are extensive, contains, including the garrison, about 11,000 inhabitants, chiefly Lutherans. Zelle was formerly the capital of a duchy belonging to a branch of the house of Brunswick, which becoming extinct in 1705, the possession devolved on the elector. On the west side of the town there is a palace with a very handsome chapel, which was the residence of the unfortunate Caroline Matilda, Queen of Denmark, sister of George III., from 1772 till her death in 1775. A small monument erected to her memory is in the French garden.

(Stein; Cannabich; Brockhaus.)

ZELOTTI, BATTISTA, a distinguished Italian painter, and one of the best of the native painters of Verona, where he was born in 1532. He was the scholar of Antonio Badile, but he is said by Vasari to have studied also some time with Titian. Zelotti was the rival of Paul Veronese, at Verona, and he assisted him in some of his frescoes; he surpassed him as a practical fresco-painter, and he is considered by some to have been superior to Paul, both in warmth of colouring and in correctness of design, but he was inferior to him in the beauty of his heads, and in the general grace and variety of his compositions. The invention of Zelotti was fertile, and his compositions full of power, but his reputation was always below his merits, from the circumstance of his being chiefly employed in fresco in the smaller towns and villages or at the villas of noblemen, whence his works were less seen and less known than they deserved to be. One of his greatest works is at Cataio, formerly the villa of the Marquis Obizzi, now of the duke of Modena, where, about 1570, Zelotti painted a series of frescoes illustrating the services of the Obizzi family. He painted also some excellent works in the cathedral of Vicenza, which have been mistaken by many for works of Paul Veronese. Zelotti died about 1592, after a life of much labour for others, but little profit to himself.

(Vasari, *Vite de' Pittori, &c.*; Ridolfi, *Le Maraviglie dell' Arte, &c.*; Dal Pozzo, *Vite de' Pittori, &c. Veronesi*; Zanetti; Lanzi.)

ZELTER, CARL-FRIEDRICH, by profession an architect, or, as he modestly designated himself, a master-builder—though somewhat late in life he devoted himself entirely to music—was born at Berlin, in 1758. His education was liberal, for he was instructed not only in what was in the common sense of the term useful, but also in the elegant arts. At the age of seventeen he was articled to his father, a Saxon, and a builder. After a long illness from which he suffered in his eighteenth year, an extraordinary passion for music suddenly sprung up in him; but as his time was almost wholly occupied in his professional pursuits, he could indulge only in an evening in his favourite study. In 1783, having completed his probationary architectural drawing, he was admitted as a master-builder, by which more is meant in Germany than in England. And now for the first time he received instructions in counterpoint, from Fasch, to whom he acknowledges himself indebted for whatever merit his compositions possess. He also diligently attended his master's singing academy, a government establishment, and became one of its active members, whereof, in 1797, Fasch having become aged and infirm, he took the management. In 1809 Zelter was appointed, by the king, professor of music to the University and the Royal Institute of Berlin. At the commencement of the same year too, a new society was formed at Berlin, under the Title of *Die Liedertafel* (the Vocal Club), and Zelter was named the president. This was, in fact, a revival, in a much improved form, of the guild of the old German *Meister-Sänger*, and is now an establishment of even national importance.

Zelter died in 1832. His compositions are spoken of in high terms by German writers, though, with the exception of one, a movement of which is printed in vol. xi. of the *Harmonicon*, they have not yet reached this country. Judging however from this specimen, it may be inferred that the praise bestowed on them was not dictated by any partial feeling, or otherwise improperly bestowed. But while his musical works seem hitherto to have been confined to the place of their birth, his name is become familiar to all who take much interest in German literature. His correspondence with Göthe, published a few years ago, exhibits him as a philosophical, acute musical critic; as a man of general knowledge, of strong mind, and refined taste; and the friendship of the great poet with whom he was in such constant communication, which is so clearly evinced in Göthe's letters, is in itself a guarantee of the intellectual merits of him who enjoyed the intimacy and confidence of one of the most celebrated persons of the present age.

(*Harmonicon*, xi.; Suppl. to *Mus. Library*, iii.)

ZEMBLA, NOVA. [NOVA ZEMBLA.]

ZEMINDAR, a Persian word which signifies literally a landholder. The word was introduced into Hindustan by the Mohammedans, but it is probable that the office to which it is applied was previously in existence as a part of the system of village organization which extends throughout the whole of Hindustan. A village in Hindustan is not simply a collection of houses smaller than that of a town; it is a tract of country comprising hundreds (sometimes thousands) of acres of arable and waste land, the inhabitants of which form a sort of corporation, with several officers, each of whom has his distinct duties. The head man of this village corporation is the *potail*, who has at his command the village police. A number of villages form a district, which is larger or smaller according to the number and extent of the villages: the head man of such a district is, in the greater part of Hindustan, called a *zemindar*, and the district itself a *zemindari*. The chief business of the zemindar is to collect the revenues of his district for the government, and, that he may do this effectually, the police of the district is under his control, and he holds a police-court. As head of the district, a portion of land (nan-kar) is assigned to him as subsistence-allowance, which is in proportion to the extent of his district: as collector of revenue, he has a per-centage upon the amount collected. Like most things among the Hindus, both the subsistence-land and the office became hereditary. From the office however the zemindar was occasionally removed by the government, but he still retained his land. As the zemindar maintained a civil force not only for the collection of revenue, but for the protection of property and the preservation of the peace, his power, when the district was large, was necessarily great; and in disturbed times he occasionally maintained troops and exercised authority little less than regal. Thus, though he was not officially invested either with military or judicial powers, he frequently exercised both. The custom of sub-renting the zemindaries had become common under the Mohammedan government previous to British interference with it. The zemindars transferred to their farmers their almost unrestricted powers of collection, and much oppression was exercised, the farmers frequently either disregarding the engagements which had been entered into with the cultivators of the soil [RYOTS], or increasing the rent which by established usage they were bound to pay.

This account of the zemindars applies to such of the states of Hindustan as are still independent of the British government; but in the zemindaries which had fallen into the possession of the East India Company, a change in the collection of the revenue was made under Warren Hastings, in 1772, when the zemindaries were let to the highest bidder for a term of years, the zemindar in possession however being preferred when he offered terms which were deemed reasonable. In most instances more was offered than could be collected, and the system proved to be ruinous to the zemindars and disadvantageous to the Company.

At length a permanent settlement was made with the zemindars, during the government of Lord Cornwallis, in 1791, but was not completely carried out till 1793, forming, as it did, a part of the great financial and judicial reforms introduced by him. The amount to be paid to the government was settled at a fixed rate, in the first instance for a term of ten years, but this was to be rendered permanent if sanctioned by the authorities in England. The zemin dars were recognised as proprietors of the soil, and thus have become in fact, under the British government, what they had not been before, nor are yet, under the native governments, landed proprietors of the zemindari. The zemindar may dispose of the lands as he thinks fit, and the government does not interfere, so long as the tax is paid. The great zemindars generally underlet their territories, and live in the cities in splendid mansions; while the smaller zemindars, as well as the farmers of the great zemindaries, live in the country-towns, generally in dingy brick buildings, which look like deserted English manor-houses. When they go abroad however, on occasions of state, they exhibit, in their trains of servants and splendid trappings, the signs of great wealth. The land is divided by them into a number of small holdings, and the cultivators are often rack-rented very high.

(Mill's *History of British India*, by Wilson; Malcolm's *Central India; Jones, On Rent;* Heber's *Journal of a Journey in the Upper Provinces of India in* 1824-5.)

ZEMLIN. [SEMLIN.]

ZEMNI, a name for the *Blind Rat-mole* (*Mus typhlus*, Pall.). [MURIDÆ, p. 516.]

ZENAIDA, the name given by the Prince of Canino and Musignano to a genus of COLUMBIDÆ, placed by Mr. G. R. Gray in the subfamily *Gourinæ*.

Example, *Zenaida amabilis*, Bonap., *Am. Orn.*, pl. 17, f. 2.

ZEND (or, as transcribed in Sanscrit, *jandu*) seems to be the antient Parsee word for 'book,' and to have been specially applied to the volume of Zoroaster's sacred writings in the same way as we use the word Bible. (Burnouf, *Comm.*, p. 16.) It was first applied by Anquetil to the language in which the Scriptures of the Parsees are written, and in this sense it has been generally adopted throughout Europe.

The Zend language belongs to the Median branch of the Indo-Germanic family of languages. The radicals of which it is composed are classified in the following manner by Burnouf. (*Comm.*, p. 28.)

1. Zend radicals which almost exclusively belong to the language of the Vedas, or the most antient dialect of Sanscrit, which are very scarce in Latin and Greek, but of more frequent occurrence in the Teutonic languages.
2. Zend radicals which are not to be found in classical Sanscrit, but which are supposed to have once belonged to that language from their being preserved in the Dhâtu-Pât'as, or grammatical lists of verbal roots: this numerous class is scarce in the antient languages of Europe.
3. Zend radicals which belong to all the periods of Sanscrit literature, and are common to the Greek, Latin, Teutonic, Slavonic, and Celtic languages; this class is by far more numerous than the others, and seems to form the general stock of all the above-named languages.
4. Zend radicals which cannot be traced to any known radical in the Indo-Germanic languages, but which are to be met with in the modern Persian.

The first of these classes of Zend radicals establishes at once the high antiquity of the language in which Zoroaster wrote his books. There are however, even now, men of great authority in Oriental literature who think that the whole of the language is an invention of Parsee priests, and that it never had an historical existence. Sir William Jones was inclined to adopt this opinion, more from the little trust he placed in Anquetil du Perron than from a due and mature consideration of the question. After the elaborate investigation of the Zend language by Bopp (*Vergleichende Grammatik*), E. Burnouf (*Commentaire sur le Yaçna*), Rask (*Ueber das Alter und die Echtheit der Zendsprache*), and Bohlen (*De Origine Linguæ Zendicæ*), it is scarcely possible to doubt its authenticity and antiquity.

The characters which are employed in writing Zend seem to be only another kind of Pehlevi letters. This is the opinion of Erskine and Rask, authorities more than sufficient to overthrow the statements of Anquetil and Kopp, who assign to the Zend alphabet an antiquity far beyond reasonable limits. The characters are undoubtedly of Semitic origin, and cannot be anterior to the Sassanidæ. They are written from right to left. The Academy of Berlin have a fount of Zend types, formed on the charac-[illegible] the Vendidad Sade, published in lithograph by [illegible]

ZEND-AVESTA, or the 'living word,' is the name of the sacred books of the Parsees, which are usually attributed to Zoroaster. [ZOROASTER.] They were supposed to contain the original precepts and laws framed by Zoroaster, and consisted of twenty sections, entitled nosks (or 'nosk,' according to Anquetil), of which we possess only the twentieth, which has been partly translated by Anquetil du Perron, and which is by the Parsees called the *Vendidad*. However, even this work cannot safely be ascribed to Zoroaster; it may contain some fragments of his doctrines, but it cannot possibly belong to a period anterior to the Sassanidæ. It is distinctly stated (Malcolm, vol. i. p. 500) that the sacred writings of Zoroaster were entirely lost during the period which elapsed between the conquest of Persia by Alexander and the elevation to the throne of Artaxerxes, or Ardeshir, the first king of the Sassanian dynasty; for when this prince restored the empire he could only collect fragments of them from the recitation of priests: and it is very probably to this collection that we owe the origin of the Zend-Avesta in its present form. It is very diffuse, full of repetitions, and trivial addresses to Hormuzd, the Izeds, Amshaspands, and other spirits, good or evil.

The original is written in the language called Zend. But Du Perron's translation was made from the Pehlevi, under the dictation of the *Mobeds*, or masters who instructed him, and is far from being correct; the numerous faults and inaccuracies he was led into are very clearly shown by Eugène Burnouf's 'Commentaire sur le Yaçna,' Paris, 1833. The Yaçna, a portion of the Vendidad, was published in the original Zend by the same learned scholar.

ZENI. NICOLÒ ZENO and ANTONIO ZENO were two brothers, the published accounts of whose voyages have occasioned much controversy. They were Venetians. The word employed to designate the family is Zen, or Zena: to designate a single individual of that family, Zeno; to designate two or more individuals, Zeni. The Zena is one of the oldest of the patrician families of the mainland territories of Venice. Its first distinguished member, Marin Zeno, lived about the year 1200. The posterity of Antonio Zeno survived the republic, and opened, in [illegible], the family archives to the researches of Cardinal Zurla. But for the most part, when 'the Zeni' are spoken of, the brothers Nicolò and Antonio are meant. Their adventures and the controversies to which they have given rise, will therefore be first disposed of in the present article, although others of the name, having attained to some notoriety, may be noticed in the sequel.

Nicolo Zeno and Antonio Zeno were sons of Pietro Zeno, surnamed Dragone, and brothers of Carlo Zeno, commander of the Venetian fleet against the Genoese in the war of Chioggia. Their mother's name was Agnes Dandolo. The dates of the births of both brothers are known only from conjecture. Their parents married in 1326, and had in all ten children. Carlo was born about 1334, of whom it is known that his mother died when he was so young as scarcely to be able to remember her. This necessarily places the births of Nicolò and Antonio between the years 1326 and 1340.

The name of Nicolò appears frequently in the annals of Venice from 1365 to 1388. In 1365 he took a prominent part in the election of the doge Marco Cornaro; in 1367 he was one of the deputies sent to Marseille by the senate of Venice to convey the pope to Rome; he served during the war of Chioggia, in which he commanded a galley, in 1379; he is mentioned as having been considered one of the richest patricians in 1381; in 1382 he was one of the electors who nominated the doge Michelo Morosini, and in the course of the same year he was sent as ambassador to Ferrara; towards the close of 1388 he was sent, along with two other nobles, to receive the cession of Treviso from the lord of Padua. After this his name disappears from public history: his subsequent career is only known through a small work published by one of his descendants in 1558.

According to this work, Nicolò Zeno, having embarked on board a vessel of his own to visit England and Flanders, was driven out of his course by a storm, and shipwrecked on the 'island' of Frisland. Here he and his companions were rescued from wreckers by a prince of the name of Zichmni, into whose service Zeno entered in the capacity of pilot, and remained with him one or two years. At the close of that period, having been advanced by Zichmni to wealth and honours for services in war, he invited his brother Antonio to join him, which he did. Nicolò survived his brother's arrival four years, and died in Frisland. It is impossible to ascertain with certainty either the year in which he quitted Venice, or how many years elapsed from his departure to his being joined by Antonio. The year 1380, the date assigned to his shipwreck by his descendant, is evidently an error, for in November, 1388, he was still in Italy. Most probably he sailed in 1389; two years at the least must have elapsed before his brother joined him; and he survived that event four years. This brings us down to 1395 as the year of his death. It is certain that he was dead in 1398, for the family register, making mention of his son Tomaso in that year, describes him as the son of the 'quondam Nicolò.'

Of Antonio Zeno's history previous to his setting out to join his brother in Frisland, nothing appears to be known, except that he was married in 1384. According to the conjectures above stated, he must have arrived in Frisland about the year 1391. He remained there fourteen years in the service of Zichmni, having succeeded at his brother's death to his property and employments. At the end of that time (say 1405) he returned to Venice, where it is probable he died in the same year; for the passage in the family annals which notices the marriage of his son Dracone in 1406, speaks of him as 'quondam Ser Antonio.'

The controversy alluded to in the outset of this article relates to the countries visited by the Zeni, and whether their voyages extended to America. In attempting to form an opinion on these questions, it is necessary to keep in view the nature and amount of the information we have respecting those voyages; and with this view we shall set aside all that has been said by commentators, until we have ascertained what the text really says. All that we know is compressed in twenty-seven pages of a very small and not very closely printed quarto volume, printed at Venice, by Francesco Marcolini, in 1558. The narrative purports to have been compiled about that time by a younger Nicolò Zeno, who died in 1565, from the papers of Antonio Zeno. The materials in the possession of Nicolò the younger, at the time he wrote his book, appear to have been only two letters from Antonio Zeno to his brother Carlo, both written after the death of Nicolò. In one of these Antonio mentions that he had composed a work descriptive of the countries he had visited or heard of, and their customs, a Life of his brother Nicolò, and a Life of Zichmni. But this book and a number of letters from Antonio had been destroyed by Nicolo the younger when a boy:—'These letters (the letters quoted in the book) were written by Messer Antonio to Messer Carlo, his brother; and it grieves me that the book and many other writings on the same subject have perished wretchedly, I scarce know how; for having come into my hands when I was quite a boy, I tore and dispersed them as boys will do ('come fanno i fanciulli, le squarciai e mandai tutte à male'), as I cannot now remember without much sorrow.' Our knowledge of the voyages of the Zeni therefore rests upon a book compiled about 150 years after the death of the longest liver of the two, from two of Antonio's letters, and such vague recollection as the writer retained of the contents of some MSS. which had come into his hands and been destroyed by him when a boy. He states, it is true, that the map which accompanies his book was copied from an old and faded map ('marica e vecchia') in the family archives; but he does not assert that it was made by either of the brothers, or even that it was made about their time. From this review it must be apparent how little we know of the voyages of the Zeni, and how much that little has in all probability been disfigured.

Down to the death of Nicolò the elder, his descendant tells the story in his own person: this part of the book relates the Vikingar expeditions, in which Nicolò served under Zichmni. The rest of the book consists in great part of a letter from Antonio to Carlo, in which he rehearses the story of a fisherman who had been shipwrecked on some far western land, and detained there many years, and adds an account of an expedition, fitted out by Zichmni, to visit that country, in which he had accompanied him. The last two pages are occupied with a fragment of another letter from Antonio to Carlo, in which he mentions the book or books he has composed, and adds that he will write no more, as he hopes soon to communicate with him by word of mouth.

The part of the narrative which relates to Nicolò contains the history of three campaigns. In the first, Frisland is subdued by Zichmni, who commands the land forces, while Nicolò Zeno co-operates with the fleet. Zichmni was lord of the island of Porland, half a day's sail from Frisland, which he had wrested the previous year from the King of Norway; and of the duchy ('duchea') of Sorano on the mainland ('fra terra') on the side next Scotland. Frisland was an island rather larger than Ireland. From the part of the coast where Nicolò was wrecked, he conducted the fleet of Zichmni to the west, and, after conquering several small islands, turned into a gulf called 'Sudero,' and captured in a port called 'Sanestol' some ships loaded with salt-fish. Here he was joined by Zichmni, who had marched over-land. Zeno again set sail to the west, and reached the opposite headland of the gulf: the sea, it is remarked, was full of shallows. He next returns to a part of Frisland named Bondendon, where he learns that Zichmni has conquered the whole island. He sails thence to Frisland, 'the capital of the island, situated in a gulf on the south-east, of which there are many in the island, in which fish are taken in such abundance that many ships are laden with them, and Flanders, Bretagne, England, Scotland, Norway, and Denmark send there for supplies, and are much enriched.' In all this part of the narrative the only hint given of the position of the countries is that Sorano 'on the main' is on the side opposite Scotland. Were it not for the epithet 'island,' applied to Frisland, there is nothing incompatible with the notion of the country so named being the Friesland of the present day. There are even some points that coincide with it. Sailing westward from the part of Frisland which he was thrown upon, Zeno turns into the gulf of Zudero (the Zuyder Zee?); and the capital of Frisland is situated within a gulf to the south-east (the Dollart?). The Zuyder Zee is full of shallows ('pieno di seccagne'). The bays of Friesland were at that time frequented by vessels from all the countries enumerated, seeking for cargoes of fish. There are small islands ('isolette') in abundance between the Texel and the mouth of the Ems.

The second campaign was undertaken by Zichmni against Estland, which is between Frisland and Norway ('sopra la costa tra Frislanda e Norwegia'). The expedition does not reach Estland, but is driven by a storm upon Grisland, a large but uninhabited island. No mention is made of the relative position of Grisland to any of the other countries mentioned, nor of its distance from them. From Grisland an expedition is made against the islands and Island ('le islande' and 'Islanda che medesimamente con l'altre era sotto il Re di Norwegia') to the north. The expedition fails, but seven other islands in the same narrow seas ('negli stessi canali l'altre isole, dette islande, che sono sette') are conquered, a fortress erected in one of them, named Bres, and Nicolò Zeno left to winter there. Zichmni returns to Frisland. Our indications are here still fainter. Proceeding on the supposition that the Frisland of the Zeni may have been the country then and still so called, Estland (the land to the east), between Frisland and Norway, may have been the Danish peninsula. 'Islanda' and 'islande' appear to be merely the singular and plural of the Teutonic word island: the one cannot, and the other does not necessarily apply, to Iceland. Bres approximates to Bressay, the name of one of the Shetland islands.

The third campaign of Nicolò Zeno was a voyage of discovery he undertook from Bres. He set out in the month of July, and sailed to the north (or north-west) till he reached Engroneland. The distance is not given, but the whole description of Engroneland applies to Iceland, and is applicable to no other country. There are, the volcano; the hot springs; the brief summer; the early introduction of Christianity and the Latin language; the commerce with Norway—'Vengono molti navigli dal capo di sopra Norvegia e dal Treadon' (Drontheim?). The greater part of the priests we are told are 'delle Islande'—from the islands; another corroboration of the opinion that Islanda, as used in this narrative, is not the proper name of any one country. These indications are extremely vague: but there is nothing in them incompatible with the notion that Frisland is Friesland; Engroneland, Iceland; and the intermediate Bres, the Bressay of the Shetland group.

There remain—Antonio Zeno's report of the story of the shipwrecked fisherman, and his account of Zich expedition in search of the lands described by the fisherman.

The fisherman's story need not be minutely examined here. Antonio's version of it is sufficiently near the truth to show that it is really an imperfect account of one of the many accidental or premeditated visits paid by the Northmen of Europe, in these early ages, to the northern regions of America, but it is too succinct and disfigured to add anything to our knowledge of these expeditions: its only importance is derived from its having been the motive to Zichmni's voyage of discovery to the west.

This expedition, after labouring for many days among the islands and shallows which were the scene of Nicolò Zeno's first campaign, pushed out into 'the deep sea' in the beginning of July. Scarcely was the voyage fairly begun, when a tempest broke loose and tossed the vessels about for eight days, swamping some of them, and leaving the surviving crews entirely ignorant of their whereabout. On the return of good weather Zichmni steered to the west, and reached an island which Zeno calls Icari, adding, that the inhabitants said the name was derived from their first king, a son of Dedalus, king of Scotland. Every attempt to make good a landing on the territory of this Scotch colony having proved unavailing, Zichmni continued his voyage to the west for six days, at the termination of which he was assailed by another tempest, and forced to scud before the wind till he was driven to a land unknown to all on board. Here, as in the western voyage of Nicolò Zeno, the presence of a volcano appears to indicate Iceland, but the adventurer had no intercourse with the inhabitants, who are described as being of small stature and inhabiting caves. Here, Zichmni resolved to winter, and Antonio was sent to Frisland with some mutineers who refused to remain. A voyage of twenty days in an easterly and eight in a southerly course brought him to Frisland. The only indication in this voyage that aids us in conjecturing the places named is the volcano, which points to Iceland. If we assume Iceland to have been its western termination, there is nothing in the narrative incompatible with the assumption that Friesland was the point of departure, and the bearings, and the time occupied, as far as they are given, rather favour this view.

Confining ourselves to the narrative of Nicolò Zeno the younger, leaving out of view all that has been written by controversialists on the subject, we have found nothing inconsistent with the idea that the Frisland of the elder Nicolò may have been the Friesland generally known by that name, except that it is called an island. And considering that the Zeni appear to have been acquainted only with a limited portion of its shores, there is nothing extraordinary in their having taken it for an island. We have paid no attention to the map published along with the narrative of the younger Nicolò, for two reasons:—In the first place, it is impossible to look at it without feeling convinced that its projection could not have been made so early as the time of the Zeni. In the second place, it is in parts inconsistent with the narrative: in his first campaign Nicolò Zeno is expressly said to have sailed first from east to west, and then from west to east; according to the map he must have sailed from north to south, and from south to north. There seems little doubt that the map is the compilation of some later cosmographer.

If we may assume Frisland to have been the country between the Zuyder Zee and the Ems, the Estland between it and Norway would naturally appear to indicate the more easterly Danish peninsula; 'le islande,' the different island groups north of Scotland, of which Bressay alone seems recognisable; and the Engroneland of Nicolo, and the nameless island of Antonio Zeno, each with its volcano, Iceland. In corroboration of this view may be recalled—first, the time and bearings of Antonio Zeno's voyage from the island to Frisland; second, the Scotch colony in the first island reached by Zichmni; third, the resort of vessels to Frisland from France, England, and the Netherlands for fish; fourth, the commercial intercourse between Engroneland and Norway—specially it would appear with Drontheim. The state of Friesland towards the close of the fourteenth century affords an additional corroboration: it was a rude country, intermediate between the Hans towns and the trading towns of the Netherlands, where the 'strand-recht' (privilege of wreckers) was in full force, and where pirates found shelter and purchasers of their [illegible]. Zeno's account of Zihmni conveys the idea of the chief of a band of rovers who had wrested a small island near Friesland from the king of Norway, and thence made piratical excursions in every direction. Zeno's narrative would lead to the inference that his band were but indifferent seamen, and previously unacquainted with the countries they visited.

This view of the scene of the Zeni's wanderings is not put forth as certain: the materials do not admit of certainty. If it is not tenable, where is Frisland to be found? Some later writers have felt so strongly the impossibility of answering this question, that they have been obliged to assume that Frisland has since been submerged in the sea. Their difficulties appear to have arisen from the predetermination of earlier writers to convey the Zeni as far west as Greenland. Walckenaer, seeing the impossibility of this, has fixed the most westerly terminus of their voyages on the south-east of Iceland, to which he seems to have been led by the striking coincidence of the coast of Engroneland on the map of Nicolò Zeno the younger and the south-east coast of Iceland. Walckenaer however seeks for the Frisland of the Zeni in the northern parts of Iceland. The data are too scanty to warrant any approach to dogmatism on the subject, but on the whole we incline to adhere to the conclusions we have arrived at: first, because we see no impossibility in the Frisland of the Zeni being the country generally so called; secondly, because the relative positions and distances of the different places and the state of society appear to correspond with that assumption.

The other members of the Zena family who appear to require notice we will take in chronological order.

Carlo Zeno, grand-admiral of Venice, brother of Nicolò and Antonio, was born about 1334. While yet a mere child, the pope presented him to a prebendal benefice at Patras. At the university of Padua, some debts he contracted at play obliged him to abscond, and for five years he served as a soldier in different parts of Italy. Returning home, he found the republic engaged in a war with the Turks, and repaired to Patras for the double purpose of taking possession of his benefice and serving his country in a military capacity. In Greece he got involved in a duel, and this forced him at last to resign all views to an ecclesiastical career. He married a rich Greek widow, who however did not long survive their marriage. On his return to Venice, he took for his second wife a lady of the Giustiniani family. Unable to remain at rest, he repaired to Constantinople in prosecution of commercial speculations, which kept him seven years engaged. His transactions brought him into connection with the emperor John Palæologus, and enabled him to bring to a conclusion the negotiation by which that prince ceded Tenedos to the Venetians. This occurred in 1376, and is the first event in the life of Zeno of which we have been able to ascertain the date so nearly. This acquisition on the part of the republic was the commencement of the war of Chioggia, in which the Genoese, the Hungarians and the Lord of Padua were leagued against Venice. The defence of Treviso against the Hungarians was intrusted to Carlo Zeno. He maintained that frontier post till 1379, when the Venetian government, after the loss of the sea-fight at Pola, recalled him to take the command of a fleet. With eight galleys he sailed from Venice, and broke through the Genoese fleet without losing a vessel. He took a number of the enemy's ships in the Sicilian waters, and negotiated a peace with Joan of Naples. He then sailed northwards, and made the victorious Genoese tremble for the security of their own coasts. After scourging the north-eastern shores of Italy he set sail for the Archipelago, where he received reinforcements. With his fleet augmented to fourteen galleys he steered to Beirout to offer convoy to the stores of Venetian merchandise which had accumulated during the war. He appeared with his rich fleet at the mouth of the lagoons on the 1st of January, 1380. Venice was at that moment reduced to the last extremity. The Genoese had taken Chioggia and penetrated into the lagoons with a fleet of double the number of vessels that the grand-admiral Pisani had to oppose to them. The arrival of Zeno completely changed the face of affairs. He broke the Genoese blockade, provisioned Venice, and, transferring his services from the sea to the land force, retook Chioggia.

On the death of Pisani (15th August, 1380), Zeno was appointed grand-admiral, and in that capacity he made head against Spinola in the Archipelago, till the peace of 1381. The next five years were spent by Zeno in Lombardy in the service of the Visconti. After this he was employed on embassies to France and England, and advanced in succession to the dignified magistracies of Avogador delle Commune and Procurator of St. Mark. In 1403, while still holding the latter appointment, he was, contrary to the customary policy of Venice, placed in command of a fleet to oppose Boucicault, over whom he obtained a victory on the 7th of October. A few months later he was sent to command the army against Francesco Carrara, lord of Padua. Upon the death of Carrara and the sack of his palace, an entry was found in his registers of 400 golden ducats paid to Carlo Zeno. Zeno proved satisfactorily before the Council of Ten that this was simply the repayment of a debt which Carrara had contracted to him on the occasion of his flight to Ostia; but he was nevertheless deprived of all his employments and condemned to two years' imprisonment. As soon as he was set at liberty, Zeno embarked on a pilgrimage to the Holy Land. While there he entered into the service of the King of Cyprus, who was at war with the Genoese. In 1410 Carlo Zeno returned to Venice, and married for the third time. His remaining years were spent in literary pursuits, but tormented by the stone and the gout. He died on the 8th of March, 1418. Of three sons whom he had by his second wife, two died before him. The family was kept up by the survivor, Pietro.

Iacopo Zeno, a grandson of Carlo, was a posthumous son of Iacopo, who died the year before his father. He was born in December, 1417. He studied at Padua, and, after taking his degrees, repaired to Florence in 1439, during the sitting of the Council of Florence, and was soon received into the papal service. In 1441 he was apostolical referendary; in 1456 (or 1447, according to Ughelli) he was made Bishop of Belluno and Feltre; in 1459 he was promoted to the see of Padua, where he died of apoplexy in 1481. Iacopo Zeno was esteemed one of the first orators of his age. He left a valuable library and several works of his own composition in MS. The most important were—1. 'Vita summorum Pontificum,' preserved in the Ambrosian Library, of which the Bollandists have made great use; 2. 'De Vita, Moribus, Rebusque gestis Caroli Zeni'—a life of his grandfather, of which an indifferent Italian translation by Francesco Querini has been repeatedly published. The original Latin appeared for the first time in vol. xix. of Muratori's collection of Italian historians.

Caterino Zeno, a grandson of the traveller Antonio and the son of his son Pietro, surnamed 'il Dragone.' Pietro was married to Anne Morosini in 1406, but the year of his son's birth is unknown: so is the year of his death. In 1472 Caterino Zeno was appointed by the senate of Venice ambassador to Uzun-Hassan-Beg, king of Persia. He is said to have accepted the mission with the more readiness, that having married a relative of David Comnenus, the last emperor of Trebizond, he was allied by marriage to the king of Persia. At Tabriz, the residence of Uzun-Hassan, Zeno was (probably on account of his matrimonial alliance) received at court on a more familiar footing than the generality of Europeans. This enabled him to collect a mass of interesting information relative to the manners and politics of Persia. The insight thus obtained into Oriental customs he subsequently increased by journeys in Persia and Arabia. After the termination of his mission, he published at Venice a short account of his travels. He subsequently returned to the East, and died at Damascus. The narrative of Caterino Zeno's travels became in little more than 60 years after his death so rare, that neither Ramusio, nor his own kinsman Nicolò Zeno the younger, was able to procure a copy of them. The latter endeavoured to supply the deficiency by compiling an account of Caterino's travels from letters written by him to friends during his absence in the East. Even this work has become extremely rare; there is a copy of it in excellent preservation in the King's Library, in the British Museum. Formaleoni published at Venice, in 1783, an account of Caterino Zeno's adventures, which he pretended to have taken from an ancient MS. This work is a gross and rather clumsy forgery.

Nicolò Zeno the younger (a descendant in the direct line of Nicolò Zeno the elder), to whom we are indebted for the only notices we possess of the adventures of 'the Zeni,' and of Caterino Zeno, was born in Venice, on the 6th of June, 1515, and died on the 10th of August, 1565. He was a member of the Council of Ten. His countryman Patrizi (a contemporary), and Gaspari (in his 'Catalogo della Biblioteca Veneta') speak in the highest terms of his eloquence, and of his acquirements in mathematics and cosmography. He published, 'Dell' Origine di Venezia ed antiquissima Memoria de' Barbari.' But he is remembered chiefly for the little volume, published in 1558, containing the adventures of Caterino Zeno, in two books, and those of 'The Zeni,' in one book. This work has every internal mark of being a faithful compilation from the very imperfect materials in his possession. He leaves his heroes as much as possible to tell their own story.

Antonio Zeno the younger, a respectable Greek scholar of the sixteenth century, also belonged to the family of the Zena. He published at Venice, in 1569, a commentary on the speeches attributed to Pericles in Thucydides, and Lepidus in Sallust: 'Commentaria in Concionem Periclis et Lepidi, ex Thucydide et Sallustio.'

Apóstolo Zeno was born at Venice, Dec. 11, 1668: he was descended from a branch of the Zena family which had been settled ever since the thirteenth century in the island of Candia, from whence the parents of Zeno were obliged to emigrate and return to Venice owing to the Turkish invasion, by which they lost all their property. Zeno's mother was of a distinguished Greek family of Candia. Zeno lost his father when a child, and his mother was thrown for support on the assistance of her brother-in-law, the bishop of Capo d'Istria, who placed young Apostolo in the college of the Somaschi at Venice. He displayed early a decided taste for poetry, and after having left college he began to write melodramas, which were well received. One of them, entitled 'Temistocle' so pleased the Emperor Leopold I. of Germany, that he proposed to Zeno the situation of dramatic composer at Vienna with a salary of 4000 florins, which Zeno declined. He received orders for melodramas from several courts of Germany and Italy, and was handsomely rewarded for them. Since the time of Rinuccini, who may be said to have created the Italian melodrama, that species of dramatic composition had partaken of the vicious taste of the seicentisti, or seventeenth century school. Apostolo Zeno was the reformer and renovator of the genuine melodrama as a poetical composition, in which he was followed by his successor Metastasio, and afterwards by Sograffi, Barbieri, Romani, and others. But at present it must be acknowledged that the melodrama as a poetical composition is fallen very low in Italy, the 'libretti,' or words of an opera, being made entirely subservient to the music, so that most of them appear unmeaning when read.

Zeno in the midst of his poetical occupations did not neglect graver studies. He was possessed of sound critical discernment, and had collected an ample store of literary knowledge. In 1710 he began to publish his 'Giornale dei Letterati,' which was afterwards continued by his brother Pier Caterino Zeno, making altogether a series of forty volumes, full of important literary and biographical information. Having noticed many omissions and inaccuracies in the work 'De Historicis Latinis' of G. J. Voss, especially concerning the Italian historians who had written in Latin, Zeno undertook to supply the deficiency by his 'Dissertazioni Vossiane,' which were scattered about his Journal; they were collected and published after his death, in 2 vols. 4to., 1752, a work which is much valued. He likewise wrote a running commentary to the 'Biblioteca dell' Eloquenza Italiana' of Fontanini, which commentary is much more important and instructive than the text; it is written with much critical skill, and in somewhat a sarcastic vein. It was published also after Zeno's death, together with Fontanini's text, in 2 vols. 4to.

In 1717 Zeno was invited to Vienna by the Emperor Charles VI., with the offer of the situation of court poet, to which was afterwards added that of historiographer to his imperial majesty, accompanied with liberal emoluments. Zeno, having obtained leave of the state inquisitors, accepted the offer, and proceeded to Vienna in 1718. In crossing the Alps his coach was upset, and he broke his leg; but having recovered from the accident, he arrived at Vienna, where he was received by Charles in the kindest manner. He wrote dramas for the imperial opera, and oratorios for the imperial chapel till 1729, when his advanced years and the state of his health made him desirous of returning to Italy to end his days in his native country. Having obtained the consent of the emperor, and proposed young Metastasio to succeed him in his office of court poet, he returned to Venice, where he occupied himself in collecting books and medals, and in preparing his works for the press. The death of the Emperor Charles VI., and the war of the Austrian Succession which followed, deprived Zeno of the liberal emolument which he had continued to enjoy even after he left Vienna; but the Empress Maria Theresa soon after granted him an annual pension of 1000 florins, with the continuation of the title of poet and historiographer to the imperial court. In 1747 Zeno sold his cabinet of medals for 20,000 florins to the abbot of the Regular Canons of St. Florian in Upper Austria. His rich library he bequeathed by will to the convent of the Dominicans of le Zattere, near Venice, from whence the greater part has been since transferred to the library of St. Mark. Zeno died in November, 1750, being then eighty-two years of age.

Besides the works already mentioned, Zeno wrote also: 1, 'Mappamondo Istorico, Continuazione dell' Opera del P. Foresti,' 4 vols. 4to., Venice, 1702-3. 2, 'Vita di Paolo Paruta.' 3, 'Note alla Vita del Cardinal Bembo.' These two biographical works, as well as a Life of Sabellico in Latin, also by Zeno, are inserted in the collection of the historians of Venice, for which Zeno wrote also a 'Prefazione,' or introductory discourse. 4, 'Memorie Istoriche della Famiglia e Vita di Enrico Caterin Davila,' prefixed to the edition of Davila's 'Storie di Francia,' Venice, 1733. 5, 'Compendio della Storia della Repubblica di Venezia.' 6, 'Vita di Giambatista Guarino.' 7, 'Vita di G. G. Trissino.' 8, 'Notizie Letterarie intorno ai Manuzii, Stampatori, e alla loro Famiglia,' prefixed to the Italian translation of Cicero's Epistles by Aldo Manuzio, published at Venice in 1736. 9, 'Note e giunte alla Vita del Guicciardini scritta dal Manni,' prefixed to the edition of Guicciardini, in 2 vols. fol., Venice, 1738. Zeno's dramas have been published in 10 vols. 8vo., Venice, 1744. A selection of his letters was published in 3 vols. 8vo., 1752; but a more ample selection has been made by Morelli, in 6 vols. 8vo., Venice, 1785. Zeno left many other works unfinished or unpublished.

(Corniani, *I Secoli della Letteratura Italiana*; Tipaldo, *Biografia degli Illustri Italiani*; Lombardi, *Storia della Letteratura Italiana nel Secolo XVIII.*)

Pietro Caterino Zeno, elder brother of Apostolo, was born on the 26th of July, 1666. He took the monastic vows in his 22nd year, and was soon after appointed to teach rhetoric in his order's seminary at Murano. From thence he was promoted to the chair of philosophy at Venice. When Apostolo quitted Venice, in 1718, he confided the task of editing the 'Giornale de' Letterati' to his brother, who continued to discharge it till 1728, when he was obliged to resign on account of ill health. He died on the 17th of June, 1732, worn out by the excessive rigour with which he performed his devotional exercises. Besides his contributions to the 'Giornale de' Letterati,' Pietro Caterino Zeno published a translation of Arnauld's Logic, and translations of some of Bourdaloue's Sermons. He likewise published anonymously remarks on the poetry of Della Casa, and contributed the biographies of Baptisto Nani and Michele Foscari to his brother's 'Lives of Venetian Historians.'

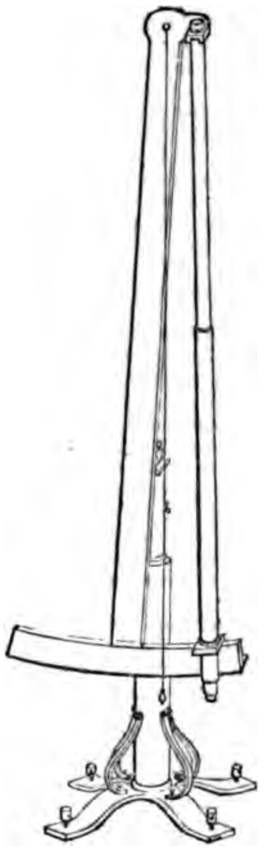
(*Dei Commentarii del Viaggio in Persia di M. Caterino Zeno il K. e delle Guerre fatte nell Imperio Persiano, dal Tempo di Ussun-Cassano in quà, libri due; e dello Scoprimento dell' isole Frislanda, &c., fatto sotto il Polo Artico da due fratelli Zeni, libro uno: in Venezia*, 1558; *Di Marco Polo e degli altri Viaggiateri Veneziani più illustri Dissertazioni del* P. Ab. D. Placida Zurla, in Venetia, 1818; Fabroni, *Vitae Italorum*; *Giornale de' Leterati*, vol. xxxviii.; *Journal of the Royal Geographical Society of London*, vol. ix.; *Biographie Universelle.*)

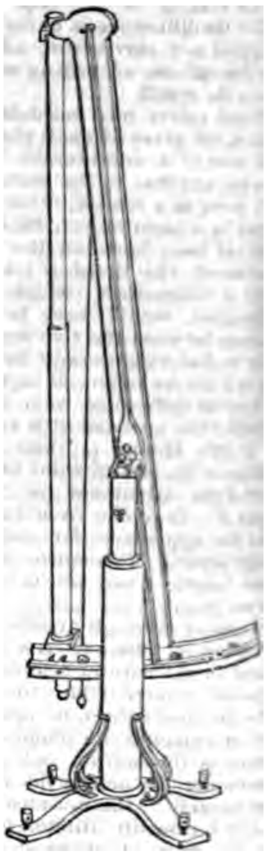
ZENIK, the name under which Sonnerat notices a quadruped, which in the opinion of Cuvier does not differ from the *Suricate*. [Viverridæ, pp. 408, 409.]

ZENITH and NADIR, two Arabic terms, imported
with astronomy, to signify the point of the
iately above the spectator, and the opposite
The latter term, though still
of the globes, is quite obsolete among astronomers; the former is very frequently employed.

The zenith is the point at which a vertical line cuts the heavens: if the earth were a sphere, this vertical line, or that in which a plumb-line hangs, would pass through the centre of the sphere. But the earth being a spheroid, the vertical line, which is everywhere perpendicular to the tangent plane, does not pass through the centre of the spheroid, but a little nearer to the spectator's side of the equator.

ZENITH SECTOR. This instrument is, as its name implies, a *portion* of a divided circle, which is employed in measuring the *zenith* distances of stars. Picard, in his celebrated operation for determining the figure of the earth, first applied a short arc to a long telescope, thus obtaining at the same time great accuracy with portability. The instrument which he used for measuring the celestial arc between Malvoisine, Sourdon, and Amiens, is figured and described in his tract entitled 'Mesure de la Terre:'* the following is a copy of his plate and description.





The instrument is of iron, strengthened with edge-bars, and covered with copper in the places required. The limb contains only about the twentieth part of the circumference of a circle of ten feet radius, and is divided by transversal lines [Vernier] to thirds of a minute. The telescope is ten feet long, and the wires are illuminated either from the top or by an aperture on one side of the telescope. The plumb-line is enclosed in a tin tube to protect it from the wind, and the observations were always made in a close apartment through an aperture in the roof.

The figure shows all this sufficiently, and also the foot-screws for setting the axis vertical, which it is when, on turning the instrument round, the plumb-line hangs before the same division of the limb. In making the observation, suppose the axis to be vertical and the limb to be towards the reader, as in *Fig.* 1 (the limb should also be in the plane of the meridian), and the telescope directed to a star, at its transit. Now if we suppose a line to be drawn through the centre, parallel to the line of sight of the telescope, the angle between the line so drawn and the plumb-line is the zenith distance of the star; but as the point where the arc is cut by the line supposed is not as yet defined, except by its parallelism to an optical and intangible line, there is as yet no measure. Read off however the division on which the plumb-line beats. Turn the instrument half round on its vertical axis, when the plumb-line remains on its former division, and the telescope points to the same zenith distance, but on the other side of the zenith; if then we would observe the same star as before, the sector must be turned on its horizontal axis through twice the zenith distance; and as the plumb-line always keeps parallel to its position, and passes through the centre, the division on which it now beats must be distant from the division first bisected by twice the angle moved through, that is, by twice the star's zenith distance, and the division which bisects the two readings is the zero point, or reading which corresponds to the zenith. It is not necessary that the star should be observed in both positions on the same night, provided the centre and arc of the sector continue to have the same position with regard to the line of sight. In this case, reversion on a following night will serve just as well for determining the division which corresponds to the zenith direction of the telescope. If this reading is not that which was intended by the maker, the difference is called the error of collimation, and is applied as a correction, additive or subtractive, to all the observations, according as they are on one or the other side of the zenith.

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* The first edition of this admirable work was published in 1671; there have been numerous reprints of it since.

Picard enters into no details with respect to his observations, but gives at each place a zenith distance, which is the mean of a considerable number. He only observed one star, and that to the north, viz. the Knee of Cassiopeia (δ), giving as a reason, 'that a star nearer to the zenith would have been more difficult to observe, and that if the star had been between the two zeniths, the error of the instrument (the division corresponding to the zenith, or error of collimation), which might have been imperfectly determined, would have been doubled in the apparent distance between the two zeniths, because then the sum of the two observations must have been taken; whereas when a star is always observed on the same side the zenith, there is only the difference to be taken, which must be correct, provided the instrument is well centred and well divided.'[*]

In 1674 Hooke published 'An Attempt to prove the Motion of the Earth from Observations,' in which he describes the instrument he contrived for observing the distance of γ Draconis from the zenith of Gresham College, and the apparatus for measuring the variations which might occur. This consisted of an object-glass of 35 feet focus length, fixed at the top of the house, and referred by two plumb-lines hanging from a bar in the object-cell and passing through apertures in the floors, to a system of wires below. Before each observation, Hooke set certain marks in his wire-cell to the plumb-lines, then fixed the wire-cell, removed the plumb-lines, and bisected the star: after the observation, he verified the position of the wire-cell on replacing the plumb-lines. There is a great deal to admire in this simple and ingenious contrivance, but his *mensurator* for noting the small variations seems clumsy and inexact. 'Inconvenient weather and great indisposition in his health' limited Hooke's observations to four in number, from which he erroneously concluded that there was an annual parallax of the earth's orbit, and therefore that Copernicus's theory was true. With very little alteration, such as a nicer reference of the plumb-lines to the cell of the eye-piece and a screw micrometer for a mensurator, Hooke's apparatus would still be applicable; and if his idea of using a deep dry well for the telescope-tube were adopted, we conceive that most accurate determinations might now be made.

Several observers about this time discovered a motion in the stars which they could not account for. Picard, Roemer, and Flamsteed all found that the position of Polaris varied at different times of the year, and Flamsteed fancied that the change was due to parallax. In or about 1725, a gentleman of the name of Molyneux, then resident at Kew, employed Graham to make him a *parallactic* telescope, so called from its object, viz. to discover the change of place in the stars occasioned by the earth's change of position in her orbit. This is described in Smith's 'Optics,' book iv., cap. 7, and more fully in Mr. Molyneux's own words in Bradley's 'Miscellaneous Works and Correspondence,' p. 93. It consisted of a telescope 25 feet long, with a short cross axis at the upper end, just at the place of the object-glass. This axis was so adjusted on its supports that the telescope moved in the meridian. A plumb-line hung on one end of the axis and passed over a dot in a plate fixed on the tube near the eye-end. The telescope was drawn forwards in the meridian by a string and weight passing over a fixed pulley, and pushed back by an antagonist-screw, which had a divided head and index. To make the observation, the plumb-line is first made to bisect the dot by the screw, and the division read off; then the star is bisected also by moving the screw, when the division is again read off. The revolutions and parts through which the screw is moved measures the angular distance of the star from a line in the heavens, which continues fixed, if there is no change in the relation of the object-glass and wires to the axis and dot.

Observations were made at Kew for some time with this instrument by Molyneux, Graham, and Bradley; and in 1727 Bradley had a zenith-sector constructed by Graham with which he made his celebrated discoveries of aberration and nutation. There is a short description of this instrument by Maskelyne in the first volume of his 'Greenwich Observations,' p. 9, which Rigaud has reprinted, with some memoranda by Bradley, in the 'Miscellaneous Works,' &c.; but Bradley himself gave no description in his Memoir on Aberration (*Phil. Trans.*, vol. xxxv., p. 637), and in his following Memoir on Nutation (*Phil. Trans.*, vol. xlv., p. 1) satisfied himself by referring to the description of a sector on a similar construction. (*Dégré du Méridien entre Paris et Amiens*, 1740.) This last-mentioned sector was made by Graham for the measurement of the degree in Lapland, and afterwards employed in the remeasurement of Picard's arc. We have now a full and minute description of Bradley's instrument, with numerous plates, in a work entitled 'Operations for the Verification and Extension of the Abbé de la Caille's Arc of the Meridian,' by Thomas Maclear, Esq., pp. 67-81, published by order of the Lords of the Admiralty. This account is by the astronomer-royal, who directed the alterations required to fit the sector for the field. The principal parts of this instrument, as originally made by Graham, are a telescope with a short sector attached to the eye-end, and a short cross or transit-axis to the object end, which causes it to move in the meridian when properly adjusted. A plumb-line passes over a fine dot at the extremity of the upper axis, and beats on the divided sector below, that is, it almost touches the dot above and arc below, but still hangs perfectly free. To prevent any disturbance from the wind, the plumb-line is screened by a tube, and the bob hangs in water that it may sooner come to rest. To make the telescope describe the meridian correctly, as well as to get a proper fixing for the clamp and micrometer-screw, another arc is fixed to the wall, and the telescope carries a frame with rollers at its eye-end, and is thus kept in contact with the fixed arc before and behind. A clamping apparatus, which slides along the fixed arc, and can be attached to it by screws in any position, carries a fine screw with a micrometer head, which pushes the telescope by acting on a piece of hardened steel, while the telescope resists either by gravity or by a counterpoise weight. There are numerous parts and contrivances for different adjustments, which will be easily understood from Mr. Airy's account. In making the observation, the telescope is first to be set, or nearly so, to the star, the bisection of the upper dot is verified, and then a division below is bisected by carrying the screw one way, *forward*, for instance, and the micrometer head is to be read off. When the star is in the centre of the field, it is bisected by carrying the screw still *forward*, and the micrometer is again read off. Finally, the screw is still to be carried *forward* till the next division is bisected, and the micrometer read off. A simple proportion will give the quantity, which is to be added to the first reading, or subtracted from the second reading, in order to get the reading corresponding to the star.[*] Bradley's sector as originally made was not reversible, and therefore only fit for measuring differences or variations. When, after its removal to Greenwich, actual zenith distances were required, the instrument was shifted across the room, from the east to the west side, where a second fixed arc, &c. were ready to receive it. We need not say that this was very objectionable, as such an operation, take what care you may, is always liable to derange the relation of the parts of the instrument, and so to lead to untrue conclusions. Even while it was at Wanstead, and considered to be immoveable, a slight change seems to have taken place, which has been investigated by Dr. Busch, in the 'Reduction of the Observations made by Bradley at Kew and Wanstead,' Oxford, 1832. In remounting it, the astronomer-royal has given the property of reversion very satisfactorily, and Mr. Maclear's observations with it are of extraordinary accuracy.

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[*] We have given the above extract from Picard because it shows, we think, that he did not reverse his sector at each place; if he had, he must have got a double zenith distance free from all *fixed* errors but those of centre and division, and his reasoning is not correct. The assumption which he tacitly makes, that the error of collimation continued to be the same during his observations at *different* places, is not allowable. It is evident that with such an instrument the exact adjustment to the meridian would be difficult, and hence probably his choice of a star, which, being distant from the zenith, required less nicety in this adjustment.

[*] In some of the books referred to, it will be seen that the dot bisected before observing the star is directed to be bisected again, and the *mean* of the readings taken. But a screw which carries weight never reads the same when moved forwards and backwards, and it is always safest to carry the screw the same way in the same operation.

A sector was used in the measurement of the meridian in France, by Cassini de Thury and La Caille, which greatly resembled the sector of Picard, except that the arc was of much greater extent, being 52$\frac{1}{3}$° and framed with three radii. The telescope was fixed at the back of the instrument, so as to be at once more firmly fastened and out of the way of the plumb-line; and, lastly its micrometer-screw was applied to the wires of the telescope (sometimes called the *interior* micrometer), instead of moving the whole sector. In this mode of observing, the instrument is set approximately to the star, and the nearest dot accurately bisected. When the star is in the centre of the field, it is bisected by the micrometer-screw which carries a wire in the focus of the object-glass, and thus the excess or defect from the nearest dot ascertained. This improvement in the application of the micrometer-screw is due to the Chevalier Louville, and in this respect we prefer the French to the English construction. See 'La Méridienne de l'Observatoire Royal de Paris verifiée,' par M. Cassini de Thury, Paris, 1740. The sector is figured at page 31, and described at page lxxi.

Bouguer and La Condamine, in their measure of the arc of Peru, were compelled to fabricate their own zenith sectors, and adopted a very elegant mode of graduation, the merit of which is given by La Condamine to their colleague Godin. The telescope and arc being prepared, a star is selected which has pretty nearly the same zenith distance at both extremities of the arc of the meridian. Now calculate approximately the value of the chord of the double zenith distance of the star, and find what fractional part it is of the radius. Suppose it is nearly $\frac{1}{17}$ of the radius, then take a beam compass, mark two dots on the arc, and step seventeen times with the same opening along the radius, and so fix the dot over which the plumb-line is to pass. The instrument is now graduated, and is used as follows:—After being adjusted to the meridian, the plumb-line is made to pass over the upper dot and one of the lower dots, after which the star is bisected by the interior or Louville's micrometer. On a following day the instrument is reversed, and the plumb-line being brought over the upper dot and the other lower dot, the star is again bisected by the micrometer. It is plain that the double zenith distance of the star, corrected for refraction, aberration, &c., is measured by the arc subtended at the central dot by the two dots below ± the sum or difference of the micrometer readings. But the arc is, by construction, that the sine of which is $\frac{1}{34}$, which is found from the tables; and the value of the micrometer readings being also known, the zenith distance of the star is known. The operation may be repeated at the other end of the arc with the same star, and using a different submultiple of the radius. See 'Mesure des trois premiers degrés du méridien,' par M. de La Condamine, Paris, 1751, pp. 105 et seq.; 'Figure de la Terre,' par M. Bouguer, Paris, 1749, pp. 176 et seq.

We insert here the method employed by Maupertuis, La Caille, and others to ascertain the value of the total arc of the sector. A line of considerable length was carefully measured from a well-defined spot and a signal erected; then a perpendicular was measured from the signal, of such a length as very nearly subtended at the spot the arc to be verified, and here a second signal was placed. The sector was then laid horizontally on a bed prepared for it, the centre being exactly over the defined spot, and the telescope pointed to the first signal; when this was done satisfactorily, a fine line was stretched over the centre and the first dot of the divided arc. Now shifting the sector round, the second signal was bisected, and it was seen what division was bisected by the line which continued to pass over the centre. The true angle is evidently that marked on the ground, and is calculated from the given length of the perpendicular and the distance. The value of the arc read off on the sector is compared with this, and the error of the total arc detected, which is afterwards used for correcting all the angles observed. At present the value of the total arc of a sector would be determined by a comparison with the mural circle.

In 1775 Bird erected a zenith sector at the Observatory of Oxford, which is in most respects similar to Graham's, but it is fixed to an upright pillar which revolves freely, so that the instrument is reversible. From some cause or other, though observations have been made with this instrument, they have not been considered satisfactory. It appears to us to be an excellent instrument and one capable of doing good work, though one chief use of these sectors, viz. ascertaining the index error of the meridian declination instrument, has been supplied to modern circles by observations by reflexion.

The zenith sector of Ramsden, which was used in the trigonometrical survey of Great Britain, and in the Holstein arc, is described and figured in great detail in the 'Phil. Trans.' for 1803, and in the second volume of the 'Account of the Ordnance Trigonometrical Survey of England and Wales.' It was burned in the fire which consumed a considerable part of the Tower in 1841. As this instrument is very fully detailed in the account referred to, it is useless to enter into particulars here. Ramsden viewed the upper dot by a long microscope, which saved considerable trouble, as well as avoided the chance of deranging the bisection by mounting to read it. The 'Astronomical Observations with Ramsden's Zenith Sector,' reduced by Lieutenant Yolland, R.E., has recently been published (1842) by order of the Board of Ordnance.

After the destruction of Ramsden's sector, Colonel Colby applied to the Astronomer Royal, for his advice as to the best form of instrument for determining latitude in the *field*. The construction given by Mr. Airy and executed by Mr. Simms differs in many respects from any which preceded it. The description, with explanatory figures, is to be found in the 'Monthly Notices of the Royal Astronomical Society, vol. v., p. 188. The vertical axis, which is cast in one piece and strongly framed, carries at its back three levels, one above the other, which being read off at the moment the star is bisected, determine the position of the axis with respect to the zenith. The telescope-frame with the eye and object end is cast in an open solidly braced piece, and is held at its middle on a centre in front of the vertical axis. This second frame moves freely for a few degrees on each side the zenith. The divided arcs are graduated on the vertical axis near its top and bottom, and there are four micrometer microscopes, one at each side of the object and eye end, the tubes of which are bored in the solid telescope-frame. There is a wire-micrometer in the focus of the telescope. A stop to the axis enables the observer to turn the instrument exactly half round by touch, and almost instantaneously. The observations are made thus:—The instrument being pretty nearly in the meridian and the axis vertical, the telescope is set nearly for the star, and the microscopes are read off. Before the star reaches the centre of the field, the observer bisects it with the micrometer-wire, noting the time, while the assistant reads off both ends of each level. The whole instrument is then turned half round and the star is again observed, the bisection being now performed by the tangent-screw of the telescope-frame, the time is again noted, the assistant reads off the levels as before, and finally the arcs above and below are read off by the micrometer microscopes. In this way the double zenith distance of a star, free from all error of collimation or of the vertical axis, may be obtained in a few minutes. This instrument has now been in use for some months, and performs very satisfactorily. The telescope is one of 3½ feet focal length, and the instrument bears the same relation to a mural circle that the ordinary sector does to a quadrant.

When Troughton first proposed the mural circle as the best form for a meridian declination instrument, great doubt was thrown on the practicability of observing by reflexion with sufficient nicety, and in that case, as the mural circle does not reverse, a supplementary instrument was wanted to show the position of the zenith or horizon. Partly on this account, but chiefly to settle the constants of aberration and precession with the greatest precision, Troughton planned a *zenith tube*, consisting of a telescope of 25 feet focal length, without any sector, and in which the variations of zenith distance of γ Draconis and close zenithal stars were to be measured by a micrometer-screw. The instrument has not been described, indeed it can scarcely be considered as yet completed, though several improvements have been made in its construction by Mr. Airy since his appointment as astronomer royal. The telescope rests on its lower end, continued beyond the focus, on a piece which has adjustments for verticality, and a collar below the object-glass is pressed by a spring into a Y bearing. The wires at the focus are moved by a micrometer-screw, and the star and wires are seen through a diagonal four-glass eye-piece. The plumb-line hangs within the tube, and is viewed above and below by micrometer microscopes. Instead of adjusting the plumb-line before each observation, it is bisected by the micrometers after the observation, and a correction applied which is deduced from the upper and lower readings. Mr. Airy, having had some reason to suspect that the wire twisted on reversing the instrument, has given a double suspension to the plumb-line and made the instrument reversible on a star in the same night, by using a stop as in the ordnance sector. The observations with the zenith tube are printed yearly in the Greenwich Observations.

The zenith sector has not been much used upon the Continent since the great surveys made in the middle of last century for ascertaining the figure of the earth. In the French arc from Dunkirk to Formentera, the latitudes were observed by the repeating circle, and in some of the stations there is reason to suspect that error has been committed. More recently, the transit in the prime vertical has been employed in Germany and Russia for ascertaining differences of latitude, and as it would seem with great success. [Transit.] A prime vertical transit has lately been constructed by Repsold for the imperial observatory of Pulkowa, of which a most favourable account has been given by Professor Struve. While admitting the excellence of this kind of instrument for telescopes of moderate size, we do not see how they can equal, far less surpass, the zenith sector when made reversible and of the proper magnitude.

Some years ago Mr. Babbage proposed a construction for a zenith sector (*Memoirs of the Astronomical Society*, vol. ii., p. 101) which might perhaps be applied in the following manner:—Conceive a parallel ruler to be placed upright, one of the bars being made into a vertical axis with the necessary adjustments, and the other carrying a telescope. It is clear that if the bands were equal the telescope would continue parallel to itself whether the ruler be open or shut. But if one of the bands is a little longer than the other, then a very large angular motion of the band will give a small angular motion to the telescope-bar, and as the measurement of the former angle can be easily made with tolerable accuracy, the latter angle can be computed with great exactness.* Exquisite workmanship would no doubt be required to make such an instrument answer, but we think that for this and other differential purposes Mr. Babbage's suggestion is deserving of more attention than it has yet met with, especially where telescopes of limited size are used.

The adjustments of a zenith sector or zenith tube will differ according to the construction of the instrument. Where it is not reversible, the time of the transit of a star near the zenith must be got from observations with another instrument, and the star *made* to pass the meridian-wire at the calculated time by the proper adjusting screws. When this is done and the telescope secured, a star must be made to pass along the declination-wire (this should be carried by a micrometer-screw) by twisting the wire-cell, when the adjustment for a fixed zenith telescope is complete. If the telescope rest on a cross axis and carries a sector, the cross axis must be made horizontal, the transits of stars towards the extremities of the arc must be observed, and the azimuthal deviation ascertained [Transit] and corrected; or, the time at which an extreme star *should* pass being known, the cross axis at top and fixed arc below must be turned so as to *make* the star pass at the right time.

When the instrument is reversible, the axis is first to be set truly upright. Suppose the instrument in its meridian position nearly, and face east, read off the division bisected by the plumb-line, or the two ends of each level. Now turn half round, read off again, and bring, by the adjusting screws, the plumb-line or the levels half-way to the first readings, and finally adjust each level by its own screw to read each end alike. If this be carefully done, when the instrument is restored to its first position, the plumb-line or levels will remain undisturbed by the last reversal. Now turn the axis one-quarter round, and correct whatever change is thereby caused, by the east and west screws of the axis. The axis is now vertical, or by a repetition of the process may be made so. The next adjustment is to make the line of sight describe a great circle. This is the collimation error of the transit. This may be done as described above, from knowing the true time; or by observing one star or two stars near the zenith in *reversed* positions, when the disagreement between the observed and computed difference will give the quantity and direction of the alteration required. In a modern instrument this adjustment would be by antagonist screws carrying the wire-plate. If the instrument be simply a zenith tube, make a star run along the declination-wire, and the adjustment is finished. With a sector place the instrument nearly in the meridian, observe the transit of a zenith star, which gives the time. Then by turning round the axis, make an extreme star pass at the proper time and clamp the axis. In the new ordnance sector the instrument rests on a tray which is adjusted as to meridian by strong screws on the stand, acting against the sides of the tray. Finally, twist the wire-cell till a star runs along the declination-wire. A comparison of the zenith distances of the same stars observed in reversed positions of the instrument, will give the error of collimation, and this *may* be corrected if the observer wishes, but it is better to leave it untouched, and to consider the sum of two observations, Face East and Face West, as a double zenith distance.

(For plates and descriptions of some of the constructions here referred to, and others which we have omitted, see Pearson's *Practical Astronomy*, vol. ii., pp. 531, 554, plates xii., xiii., xxvi., xxvii.)

ZENJAN. [Persia.]

ZENO (Ζήνων), of Elea in Italy, was a pupil of Parmenides. According to the vague expression (ἤκμαζε) used by Diogenes Laertius, he was enjoying his greatest celebrity about B.C. 464. He visited Athens in company with Parmenides, and they were present at the Great Panathenæa. Parmenides is described by Plato as at this time a man advanced in years, with his hair quite white, but of a handsome and pleasing person: he was then about 65 years of age. Zeno, who was then near 40, is spoken of as a tall and comely personage. If we place this visit to Athens, with Clinton, in B.C. 454, in the fifteenth year of Socrates, Zeno was born about B.C. 494. The authority for the visit to Athens is the 'Parmenides' of Plato, which, so far as relates to this historical fact, is generally admitted to be sufficient authority.

Strabo is of opinion that Zeno, as well as Parmenides, was employed in legislating for Elea. He probably lived till the commencement of the Peloponnesian War, or at least to B.C. 435. According to Plutarch (*Pericles*, 4) he was one of the masters of Pericles. The circumstances of his death are reported with much diversity. He is said to have conspired against a tyrant of Elea, who is variously named, and, on the discovery of the conspiracy, to have been put to death in a cruel manner.

Many works were attributed to Zeno, which, says Diogenes, were full of wisdom. One of his great works he is said to have read at Athens, on which occasion Socrates was present. Though the 'Parmenides' of Plato, which is the authority for this reading at Athens, cannot be taken to be literally true in all respects—for Socrates, then a very young man, is represented as discoursing with Zeno—yet there seems no reason to doubt the fact of Zeno having read his work at Athens. The object of this work, which was divided into several parts, was to show that it is impossible to conceive things as being Many, and this conclusion was derived as a necessary consequence from the supposition of things being Many; for Zeno showed that if we suppose things to be Many, then the same things are both like and unlike. Now, it is impossible to conceive the same things to be both like and unlike, and therefore it is impossible to conceive things to be Many (*οὐκοῦν εἰ ἀδύνατον τά τε ἀνόμοια ὅμοια εἶναι καὶ τὰ ὅμοια ἀνόμοια, ἀδύνατον δὴ καὶ πολλὰ εἶναι.* Plato, *Parmenides*). Zeno is said to have been the first who used the form of the dialogue in his philosophical discussions. His object was to maintain the doctrines of Parmenides, for he is said to have added little of his own to what his master did. His method was, to assume the truth of received opinions, and then to show the contradictions to which they lead; and, accordingly, Aristotle (as quoted by Diogenes) calls him the inventor of Dialectic; not of Logic, as some modern writers have it.

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* Let the length of the upper band be a, of the lower band $a+h$, the distance between the bands b, and let the bands be horizontal; the telescope-bar makes with the zenith an angle the tangent of which $=\frac{h}{b}$; when the bands are inclined at an angle θ, the tangent of zenith distance $=\frac{h \times \cos\theta}{b}$. The quantity h may be measured and regulated by a micrometer-screw and such a tilt given to the telescope, that the star can be observed in reversed positions of the axis, and thus the double zenith distance found. The zero of the micrometer-screw is found from its position when opening and closing the bars makes no change in the place of a star. We prefer this construction of a zenith sector to that of Mr. Babbage. The zenith point is only to be got by reversion, and the upright bar must be watched and ascertained by levels, &c. Mr. Babbage has given an exact formula, when the points of attachment of the telescope-bar are constant. We have supposed an adjustment in one of these points, which allows the bands to be horizontal, while the telescope-bar is inclined.

Zeno's work in defence of the Doctrine of the One was, as Plato makes him describe it, designed to support the opinion of Parmenides against those who ridiculed it on the ground that if there is only One, many absurd and inconsistent consequences must flow from the doctrine; and, accordingly, his work is in opposition to those who say that things are Many, and it has for its special object to show, that many more absurd consequences will flow from their hypothesis of things being Many, than from the hypothesis of the One, if a man rightly follow them up. This is the key to the explanation of what we know of the arguments of Zeno.

Zeno asked Protagoras if a single grain of millet, or the ten-thousandth part of a grain, would make a noise in falling. Protagoras said it would not. He then asked if a medimnus of such grains would make a noise in falling; and the answer was, Yes. Zeno further asked if there was not a ratio between the medimnus of grain and a single grain, or the ten-thousandth part of a single grain. Protagoras admitted that there was. 'Will there not, then,' said Zeno, 'be the same ratio between the noise of the medimnus and of the single grain, as there is between the medimnus and the single grain? and consequently a single grain, or the ten-thousandth part of a grain, will make a noise in falling.' There is nothing peculiarly subtle in this argument. If merely viewed as an instance that the senses do not always lead to a safe conclusion, it is well enough for that purpose.

Other arguments go deeper, and show more clearly the contradictions that arise from the notion of Many. Zeno, it is said, seemed to annihilate the notion of space, for his argument was this:—If there is space, it is in something, for every thing that is, is in something; but that which is in something, is also in space. Space, then, must also be in space, and so on infinitely: therefore there is no space.

Again: he proves that if things are many, they are both finite in number and infinite; and he proceeds thus:—If things are many, they must be as many as they are, neither more nor less: they must, therefore, be finite. On the other hand, if they are many, they must be infinite; for there are always other things between things, and again, other things between these things, and consequently things are infinite. In the latter part he evidently considers the spaces between things as things, for things must have spaces between them; and these spaces he considers as things, or the equivalents of magnitudes, and as capable of endless subdivision.

Another argument is to this effect:—If a thing exists, it must have magnitude; for we cannot imagine a thing as existing which will not increase another thing by being added to it, or diminish another thing if taken from it. Now, if a thing has magnitude, it is capable of infinite subdivision; therefore, if things are many, they must be both small and great—small so as to have no magnitude, and great so as to be infinite. This is the literal version of Simplicius, which seems to mean, that infinite division of a thing implies an infinite number of corpuscles; and in this view a body is infinitely great, but the corpuscles are infinitely small.

Zeno had four arguments against motion. The first argument is this:—If a certain space is to be passed over, the half must be passed over before the whole space, and the half of that half before the whole of it, and so on in infinitum. There is, therefore, an infinite number of spaces to be passed over; and if the whole is passed over in a limited time, then an infinite number of spaces will be passed over in a finite time, which is impossible. Bayle calls Aristotle's solution of the difficulty 'pitiable.' Aristotle's solution is this, as explained by the 'Commentarii Conimbricences:'—That which is infinite in division, inasmuch as it is not infinite in act but in capacity only (*non actu sed potestate*), may be passed over in a finite time: for since time is continuous, and in like manner infinite, the time and the space will correspond in the same law of infinity, and in the same division of parts.' It is easy to show that this is no solution.

Another argument is the Achilles, as it is called, which is akin to the last. Achilles runs a race with a tortoise, which has a certain start, but Achilles, though swift, can never overtake the tortoise, which is slow. For when Achilles has reached the point from which the tortoise started, the tortoise has advanced a certain distance: and this will always be the case: therefore Achilles can never overtake the tortoise. On this Ritter observes:—'We cannot suppose that Zeno, who in his proofs always maintains the infinite divisibility of space, should not also have considered the infinite divisibility of every portion of time; and yet the fallacy of the argument consists entirely in neglecting this consideration.' But Zeno only admitted the infinite divisibility of space in order to show the consequences of the hypothesis. What Ritter says is no solution. We may take the fingers of the clock for Achilles and the tortoise, and assume that there is no other measure of time; and we will suppose the long finger to be at twelve, when the short finger is at one, and Zeno's argument is the same still. The difficulty lies in the idea of motion, of which Zeno gives another instance in a third argument against motion. An arrow when it moves through the air is at every moment in a space equal to itself, and therefore is at rest, for nothing moves in the space in which it is; but that which does not move is at rest, for everything either moves or is at rest. Therefore the arrow which moves, while it moves is at rest. Aristotle replies, that this argument is false, for it supposes that time is composed of indivisible moments; and he adds, that time is not composed of indivisible parts, nor is anything else composed of such parts. But this is not an answer, for time may be excluded from the consideration. The arrow is supposed, by those who admit motion, to pass from one point in space to another. But in every position between these two points it is, as Zeno says, where it is; and when a thing is where it is, we conceive it to be at rest, and we cannot conceive otherwise. Bayle, who seems not to approve of Aristotle's solution, offers one which is no better. Zeno's difficulty remains. There is no absolute motion: we only conceive motion relatively.

There is a fourth argument, which is well stated by Bayle.

If we view the arguments of Zeno as mere sophisms, we view them wrongly. They touch the fundamental difficulties of all science, and Aristotle admits that their solution is not easy (*Topic.*, viii. 8). His arguments were directed to show the difficulties inherent in all our abstract notions. When, as Aristotle says, he denied motion and said that the space of a stadium could not be passed over, we need not suppose that he denied the phenomenon of a stadium being passed over by him who seemed to pass over it. He would not deny that there was the appearance of a stadium being passed over, but he denied that we could conceive how it was passed over, or that we could conceive absolutely any amount of motion. There is no authority for saying that he denied the existence of the One, even if he denied the existence of individual things. He did not admit that the true nature of the One could be known, for he said that if any person would show him what the One is, he would be able to tell him what things are (*τὰ ὄντα*). His speculations all point to the difficulty of determining the notion of individual things, and to the consequent conclusion of all things be ing One, without parts, an absolute, immeasurable, inconceivable Existence. Nothing particular is said of his theological doctrines, and the few physical doctrines that are attributed to him are not worth mentioning.

(Diogenes Laertius, *Zeno of Elea*; Ritter, *Geschichte der Philosophie*, vol. i., and the *Fragments of Zeno*, by Ritter and Preller, in their *Historia Philosoph. Græco-Roman.*; Bayle, *Dict.*, art. 'Zeno,' which has very copious and curious notes; *Biographie Universelle*, art. 'Zeno,' by Victor Cousin, *and the references there*; Kant, *Kritik, &c., Die Antinomie der Reinen Vernunft.*)

ZENO of Citium, a small town in the island of Cyprus, was the founder of the sect of the Stoics. The time of his birth cannot be accurately ascertained, nor the dates of the other events of his life. He was however a contemporary of Antigonus Gonatas, king of Macedonia, and died before him. Antigonus Gonatas died B.C. 240. Clinton places the birth of Zeno between B.C. 357 and 352, and his death either in B.C. 263, or in B.C. 259 according to Diogenes Laertius. His father was a merchant, and Zeno when young followed his father's business. It is said that his father, on returning from one of his voyages, brought home some of the writings of the followers of Socrates, and that the perusal of them determined Zeno to the study of philosophy. It is not certain what his age was when he came to Athens: some accounts make him to have been thirty years of age, but his disciple Persaeus says he was only two and twenty. He taught at Athens for fifty-eight years, and he lived to the age of ninety-two, or, according to other accounts, to the age of ninety-eight. In a letter addressed to King Antigonus, which is preserved by Diogenes Laertius, Zeno says that he is then eighty years of age, and he alleges this as a reason for not being able to visit the king according to his invitation; but he sent to him his disciples, Persaeus and Philonides.

When Zeno first arrived at Athens, he became the pupil of Crates the Cynic, and this will account for his doctrines having some relationship to those of the Cynic school. But Zeno's moral character was above the standard of the Cynics, and their meagre philosophy could not satisfy his intellectual desires. He subsequently attended the lectures of Stilpo and of Diogenes Cronus, who belonged to the Megaric school; but it is probable that he was not satisfied with them, for he ultimately came over to the Academy, and became a hearer of Polemo. Zeno's doctrines, so far as we know them, show traces of the various schools in which his philosophical character was formed. He was not an original thinker; he selected out of all that he learned what seemed to him the best for his purpose. It was accordingly objected to Zeno, that though he differed little from his predecessors, he still wished to found a school of his own; and it was further objected, that he made fewer changes in doctrines than in words. His pupils assembled in the painted colonnade (στοά) at Athens, whence they received the name of Stoics (Στωϊκοί): they were at first called Zenonians from the name of their master. A slight accident which happened to him on coming out of his school, determined Zeno to put an end to his life on the spot. His practice was, in accordance with his doctrines, characterized by the strictest integrity and morality: his mastery over all sensual gratifications was complete. A story is told which, whether true or false, shows at least the estimation in which he was held: it is said that the Athenians entrusted the keys of their fortresses to his keeping.

The name of Zeno is more conspicuous as the founder of a school, which continued for several centuries, than for what he did himself, though his writings were numerous. A list of them is given by Diogenes; very few fragments of them remain. His style is said to have been characterized by brevity and closeness of argumentation. It seems probable that the Stoical doctrines, as exhibited in the opinions and writings of his followers, cannot be considered to have been elaborated by Zeno, though, according to all testimony, he laid the foundation of that which was developed and extended by others. His successors in the Stoic school were as follow:—Cleanthes, Chrysippus, Zeno of Tarsus, Diogenes of Babylon, Antipater of Tarsus, Panætius of Rhodes, and Posidonius. According to Clinton, Posidonius came to Rome B.C. 51. Panætius was the friend of Scipio Africanus the Younger, Laelius, and other distinguished Romans, and he introduced the Stoical philosophy at Rome. The Stoical doctrines suited in many respects the Roman character, especially in the modified form in which they received them, and these doctrines were embraced by many distinguished persons. In the imperial period the chief writers who belonged to the sect were L. Annæus Seneca, Musonius Rufus, who lived to the time of Vespasian, and Epictetus, a native of Hierapolis in Phrygia, and the master of Arrian, the historian of Alexander. But the most illustrious of all the Roman Stoics was the emperor Marcus Aurelius, who in his own work, which is extant, has left his portrait painted to the life.

Zeno's doctrines were mainly directed to the moral part of philosophy, and he approached nearer to the Cynics than his followers. It appears from the fact of his disciples separating into different parties, that his system was either not completely developed or that it possessed too little originality to unite all his followers. Chrysippus is said to have been the person who gave to the Stoical system its full development and fixed its doctrines; accordingly there was a saying, 'If there had been no Chrysippus, there would have been no Stoa.' The Stoics made three divisions of philosophy, which Plutarch calls the Physical, Ethical, and Logical (λογικόν), of which our word Logical is not a translation. But other Stoics made different divisions. The triple division was made by Zeno himself, as Diodorus states in his Life of Zeno, in which he has collected all the Stoical doctrines. The Logical part of the Stoical system comprehended their metaphysics. They made a distinction between truth (ἀληϑεία) and true (ἀληϑές): truth implied body (σῶμα); but true was without body, and was merely in opinion. They attributed to things an absolute existence in themselves. Their system, so far as we can learn what it was, was obscure, and they were certainly not well agreed among themselves on their metaphysical doctrines. They cultivated logic, rhetoric, and grammar. In their Physical doctrines they assumed two first principles, the Active and the Passive: the Passive was Matter (οὐσία), the first substance of which all things were made; the Active was God, who was one, though called by many names. The universal belief in a deity, or in many deities, they considered one of the evidences of God's existence. All the universe, says Seneca, according to our Stoical doctrines, consists of two things, Cause and Matter. The Cause which puts matter in motion is conceived as pervading it, but it is Rational; the motions produced are not the effect of chance, and all the harmony and beauty of the visible world are a proof of design. It followed from their general doctrines that the Soul (ψυχή) is corporeal, for they defined all things to be Body which produce anything or are produced. They argued thus: nothing that is without body sympathizes with body, nor does body sympathize with that which is not body; but only body with body. The body and the soul sympathize, for they are both bodies. Death is the separation of the soul and the body. The Soul is a spirit (πνεῦμα) that is born with us; consequently it is body, and it continues after death; still it is perishable: but the Soul of all things, of which the souls of animals are parts, is imperishable. As to the duration of the soul, there were different opinions: Cleanthes thought that all souls lasted to the general conflagration; Chrysippus thought the souls of the wise only lasted so long.

The Ethical doctrines of the Stoics have attracted most attention, as exhibited in the lives of distinguished Greeks and Romans. To live according to nature was the basis of their Ethical system; but by this it was not meant that a man should follow his own particular nature; he must make his life conformable to the nature of the whole of things. This principle is the foundation of all morality; and it follows that morality is connected with philosophy. To know what is our relation to the whole of things, is to know what we ought to be and to do. This fundamental principle of the Stoics is indisputable, but its application is not always easy, nor did they all agree in their exposition of it. Some things were good, some bad, and some indifferent: the only good things were virtue, wisdom, justice, and temperance, and the like. The truly wise man possesses all knowledge; he is perfect and sufficient in himself; he despises all that subjects to its power the rest of mankind; he feels pain, but he is not conquered by it. But the morality of the Stoics, at least in the later periods, though it rested on a basis apparently so sound, permitted the wise man to do nearly everyth that he liked. Such a system, it has been well obser might do for the imaginary wise man of the Stoics; but it was not a system where general adoption was compatible with the existence of any actual society.

The subject of the Stoical sect is one of great extent. The Stoics, or the so-called Stoics, formed a sect that continued for four centuries, in which time the doctrines were subject to so much change that we often see little besides the name in which the professors of this sect agreed. Most of the works of the Stoical writers are lost. Two of them whose works remain, Epictetus and the emperor Marcus Aurelius, if not the most genuine specimens of the Stoic school, are certainly two of the most worthy.

(Diogenes Laertius, *Zeno;* Ritter and Preller, *Historia Philosoph. Græco-Roman.;* AURELIUS; EPICTETUS; and other articles in this work.)

ZENO (Ζήνων), emperor of the East, succeeded, in A.D. 474, the emperor Leo I. Thrax, or more correctly his own son Leo II., the younger, as will appear below. Zeno was the son of Rusumblasdes, or Rousombladeosa, a noble Isaurian, and his original name was either Aricmesius, or perhaps Taradicodisus or Taradiscodiseus, or more probably Trascalisseus. We know nothing about his earlier life, of which however detailed accounts were probably given in the works of Eustathius of Syria, which are lost, and those of Candidus, of which only some fragments are extant. We must suppose that he was a man of great influence, especially among his warlike countrymen the Isaurians, and well known at the court of Constantinople, for in A.D. 468 the emperor Leo Thrax gave him his daughter Ariadne in marriage, evidently for the purpose of securing his influence among the Isaurians, whose assistance he wanted against the ambitious schemes of his prime minister Aspar.

On that occasion the son of Rusumblasdes adopted the Greek name of Zeno, and was created by the emperor Patricius, and appointed commander of the imperial lifeguard and commander-in-chief of the Greek army in Asia Minor. In A.D. 469 Zeno was consul with Flavius Marcianus, and he assisted the emperor in getting rid of Aspar, who was put to death in A.D. 471. Leo, being old and childless, wished to appoint Zeno his successor, but the people disliked Zeno on account of his ugliness, a reason which may appear insufficient in our days, but which was important among the Eastern nations, who have always liked and still like to be ruled by handsome kings. Leo consequently gave up his plan, and chose Leo, the son of Zeno and Ariadne, for his successor, in A.D. 473.* The emperor Leo Thrax died early in the following year, A.D. 474, and Leo the younger succeeded him under the regency of his father, upon whom the title of Augustus was perhaps conferred by Leo Thrax; it may be that Zeno assumed that title on his own authority, but neither of these opinions has been well established. Assisted by the empress-dowager Verina, and probably also by her daughter and his wife Ariadne, Zeno succeeded in gaining the affections of the people in some degree, and he consequently found no resistance when he contrived to be proclaimed emperor. His son, the young emperor Leo, put the imperial diadem on his head; but although Zeno became emperor, he was only the second in rank, as we may see in the laws issued by the two emperors, where Leo's name is always put before the name of his father; on some coins however the name Zeno stands before Leo. Leo died towards the end of the same year, A.D. 474. Zeno, and even his mother Ariadne, an excellent woman, have been accused of having poisoned their son, but this charge, as well as some other stories concerning the death of Leo, are mere calumnies invented by orthodox ecclesiastical writers who found fault with the heterodoxy of Zeno.

Although Zeno met with no opposition in succeeding his son as sole emperor, he came to the throne under very difficult circumstances. Descended from a great Isaurian family; supported by two brothers, Conon and Longinus, who were both enterprising, active, and ambitious; surrounded by many other Isaurians, who looked to him for honours and power; and revered by the warlike inhabitants of Isauria, who were not of Greek descent; he had to experience that the very circumstances which seemed to consolidate his strength, made his throne totter, and were so many causes of those rebellions and other public calamities by which his reign was marked as one of the most disastrous for the dignity and grandeur of the Eastern empire. When Zeno became emperor, the Isaurians came into power: hence arose jealousy among the Greeks, and dissatisfaction among those who had helped him to the throne; intrigue, revolts, rebellion, and civil war were the consequence, and this was followed by revenge, cruelty, and rapacity; general discontent and weakness in the government; arrogance and threats on the part of foreign barbarians, the conquest of Italy by the East-Goths, and the foundation of a new Western empire by Theodoric the Great. In short, the reign of Zeno was a crisis in the history of the East. As the details of this reign are far from being sufficiently clear, we shall only give a sketch of the most remarkable events.

Zeno was scarcely established on the throne when he lost it by a rebellion of Basiliscus, the brother of the empress-dowager Verina, both of whom conspired against the new emperor when they saw that their influence was checked by the increasing power of the brothers and other Isaurian friends of Zeno. The rebellion broke out so suddenly (A.D. 475) that Zeno fled to Isauria without making any resistance, and Basiliscus was proclaimed emperor. Zeno, being joined by Ariadne, prepared to oppose Illus, a general of Basiliscus, who advanced upon Isauria, and defeated Zeno, who retired into a castle called Constantinople. Illus was going to lay siege to it, when he was informed that there was great want of union among the adherents of Basiliscus, and that the people in general disliked the new emperor on account of his cowardly and treacherous conduct in the unfortunate expedition against the Vandals of Carthage, in A.D. 468. Upon this Illus proposed to Zeno to support him with his army; the proposition was accepted with great joy, and Zeno and Illus marched to Constantinople. Near Nicæa they met with Armatius, or Harmacius, the nephew of Basiliscus, who offered no resistance to Zeno, by whom he was apparently bribed, and the usurper was soon besieged in Constantinople by Zeno. The city was taken by surprise, and Basiliscus was made prisoner, and starved to death in a tower in Cappadocia. Zeno was re-established, and in order to reward Harmacius, he made him commander-in-chief of the army, presented him with large estates, and conferred upon his son Basiliscus the younger the dignity of Cæsar, which was equivalent to making him his successor. It seems that Zeno did not act voluntarily in this affair, but that Harmacius demanded the Cæsarship for his son, as the price of his defection from the usurper Basiliscus. Harmacius became so arrogant, that Zeno was compelled to get rid of him. Assisted by Illus, he succeeded in seizing Harmacius, who was put to death, and his son Basiliscus was banished, after having been deprived of his dignity as Cæsar. Illus now acquired great influence over the emperor, which he soon abused, and he not only insulted the empress Ariadne, but conspired against her life. Illus, being deposed from his rank as prime minister, fled to Asia and revolted against Zeno: his fate is told below. During the time that Illus was in power several other rebellions broke out. Theodoric, surnamed Strabus, an adherent of Basiliscus, retired after the fall of the usurper into Thrace, collected a considerable force, and ravaged the environs of Constantinople. The emperor, unable to subdue him, bought peace from him, in A.D. 478; but Theodoric soon forgot his oath, united himself with Theodoric the Goth, who afterwards conquered Italy, and the emperor would perhaps have lost his throne but for the death of Theodoric Strabus, which took place in A.D. 481. As to Theodoric the Goth, Zeno soothed his anger by creating him consul, and finally stimulated or allowed him to conquer Italy. [THEODORICUS THE GREAT.] After peace had been concluded with Theodoric Strabus, in A.D. 478, another most dangerous revolt broke out under Marcian, the son of Anthemius, emperor of the West, and the grandson of the emperor Marcian, who had married Leontia, the sister of the empress Verina. Marcian intended to depose Zeno, and he took Constantinople by surprise, but he was surprised in his turn by Illus, and after a desperate fight fled for refuge to a church. He was taken out by force, his head was shaven, and he was banished to a monastery at Cesaræa. But he escaped, caused fresh troubles, and was exiled to the castle of Papyrus in Isauria, or perhaps to Tarsus in Cilicia. The third great revolt was that of Illus, who, as already observed, had insulted the empress Ariadne, and escaped being put to death by flying to Asia, where he placed himself at the head of an army of 70,000 men. The patrician Leontius, who was sent by Zeno against Illus, betrayed the emperor and joined the rebel. Longinus, the brother of Zeno, took the field against both, but he was defeated, and probably made prisoner, for soon afterwards he was found in the camp of the rebels acting in concert with Illus and Leontius. The rebels then laid siege to the castle of Papyrus, where the empress-dowager Verina was confined on account of her dangerous intrigues, and the castle having been taken, Verina also joined the rebels, and as they intended to put Leontius on the throne, she adorned him with the diadem, and he was received as emperor at Antioch, in A.D. 484. Zeno now dispatched a fresh army against the rebels, which was commanded by John the Hunchback and John the Scythian, two generals who have often been confounded, but who were two different persons. They defeated the rebels in A.D. 488, who took refuge in the fortress of Papyrus, which the imperial generals hastened to surround with a superior force. At last the fortress capitulated; Illus and Leontius were made prisoners and put to death, and the empire was thus delivered from the greatest enemies of public order. Zeno died in the month of April, A.D. 491, and his successor was an officer of the imperial palace guard (Silentiarii), Anastasius I., surnamed Silentiarius, who married Ariadne, the widow of Zeno. It is said that Zeno died under strange circumstances, but the accounts of his death are very contradictory. If we believe Zonaras and Cedrenus, Zeno was beheaded in his bed while asleep; or he died in consequence of a debauch; or was buried alive while insensible in a fit of apoplexy: and Ariadne was the author of his death. It happens however that some ecclesiastical writers, Theophanes, Evagrius, and Theodorus Lector, who make the worst of Zeno whenever they find an opportunity, do not mention a violent death, which, if true, would have served their purpose by throwing disgrace upon the memory of the emperor. The truth seems to be that Zeno died of apoplexy. Zeno's character was somewhat like that of his predecessor Leo I. Thrax, but he was his inferior in every respect, in good as well as bad qualities: he was cruel, especially in the latter period of his reign, but less cruel than Leo; he was often overpowered by anger, but he never fell into such frightful fits of passion as Leo; he sometimes did honourable things for honour's sake, but less frequently and with less dignity and generosity. In short he was the shadow of Leo, without his energetic character, intelligence, and knowledge. Zeno did not understand the art of government; he was as vain as a woman, and his constant endeavours to be admired as something great made him ridiculous in the eyes of the witty Greeks.

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* Zeno had another son, who was likewise called Zeno, by his first wife Arcadia, but he died young.

(Agathias, iv.; Evagrius, ii. 15, &c., iii.; Cedrenus, p. 351, &c., ed. Paris; Zonaras, vol. ii., p. 51, &c. ed. Paris; Candidus, p. 18, ed. Paris; Theophanes, p. 96, &c., ed. Paris; Procopius, *Bell. Vandal.* i. 7; *De Aedif. Justiniani*, iii. 1; *Bell. Goth.*, i. 1, ii. 6; Jornandes, *De Regnorum Success.*, pp. 58-61; *De Rebus Gothicis*, pp. 139-141, ed. Lindenbrog; Suidas, sub voc. Ζήνων.)

ZENO'BIA (Ζενοβία, on the coins Ζηνοβία), **SEPTI'MIA**, was the daughter of Amrou, an Arab chief, who possessed the southern part of Mesopotamia. By her first husband Zenobia had a son named Athenodorus Waballath. Her second husband was Septimius Odenathus.

Odenathus was of Palmyra, a flourishing city included within the limits of the Roman empire, and dignified with the title of Metropolis Colonia. He was at the head of some tribes who belonged to that part of the Syrian desert which surrounds Palmyra. His Roman name Septimius indicates some connection with the empire, and it is ingeniously conjectured by St. Martin that the origin of this connection and of the adoption of the name Septimius by the family of Odenathus must be traced to the time of the emperor Septimius Severus. The name of the father of Odenathus was Septimius Airanes Waballath, and Odenathus had by his first wife a son named Septimius Orodes, or Herodes, as Trebellius Pollio calls him. Septimius Severus married Julia Domna, a Syrian woman of Emesa, and this circumstance, combined with his long residence in Syria, renders it probable that a connection was formed between the emperor Severus and the family of Odenathus, who, as usual in such cases, would adopt the name of their Roman patron. In the year A.D. 244, after the assassination of the younger Gordian, Philip, called the Arabian, was proclaimed emperor, and on leaving Syria for Rome he intrusted the government of Syria to his brother Priscus. The bad administration of Priscus caused a rebellion in Syria, and Jotapianus, a descendant of the royal house which had reigned at or possessed Emesa, was proclaimed emperor. Jotapianus was defeated by the imperial troops and lost his life, but Philip was assassinated before the news could reach him. Other usurpers arose in Syria, but Palmyra preserved its independence. In the year A.D. 251 Septimius Airanes was prince of Palmyra, and his son Odenathus was general. On the death of Airanes, Odenathus succeeded to the principality of Palmyra. The year of the death of Airanes is not certain, but it was before A.D. 256. In A.D. 256 Mariades, whom Trebellius Pollio calls Cyriades, left Antioch with a large sum of money, and betook himself to Sapor, king of Persia. He persuaded Sapor and Odenathus to an invasion of Syria, in which Antioch was taken. Mariades was proclaimed Cæsar. He enjoyed his dignity for about a year, having been assassinated, according to Trebellius Pollio, while Valerian was on his march to the Persian war. It was Sapor's design to anticipate Valerian by invading Syria, but he was defeated near Emesa, and on his retreat he was annoyed and robbed by his old ally Odenathus. But after the surrender of Valerian to Sapor, Odenathus sent costly presents to the Persian king, in order to conciliate him; the presents were rejected with contempt, and Odenathus was commanded to come in person. The prince of Palmyra disregarded the command, and while the Roman troops were retreating on all sides in the confusion which followed the capture of Valerian, he alone opposed the progress of the Persian arms. The Persians had entered both Syria and Cilicia, and Sapor was at Antioch. Odenathus, at the head of the Arabs of the desert, and some few Romans who joined him, attempted to cut off the retreat of Sapor, in which he was aided by Balista, the Roman general, who made a diversion in Cilicia. His wife Zenobia also accompanied him in this campaign. Sapor at last commenced his retreat; but at the passage of the Euphrates he sustained a defeat and lost much of his baggage. He was followed by Odenathus through Mesopotamia, again defeated, and pursued to Ctesiphon on the Tigris, his capital. If Odenathus besieged Ctesiphon, it appears that it was unsuccessfully.

About this time Odenathus assumed the kingly title, and it is probable that he was considered emperor in the East. Gallienus, the son of Valerian, who became emperor upon his father's capture, A.D. 260, was too indolent to attempt to maintain his authority. The Roman army in Syria and Egypt proclaimed Macrianus emperor, who associated with himself in the empire his two sons Quietus and Macrianus. Quietus was left in Syria. The new emperor marched through Asia, and advanced as far as Illyricum, where he was opposed by Aureolus, who had also risen against Gallienus, and totally defeated. Upon this Aureolus was received by Gallienus into partnership in the empire, and he forthwith marched to the East to crush the partizans of Macrianus. Odenathus, seeing what turn things had taken, entered Syria, upon which Balista, who had quarrelled with Quietus, murdered him and delivered up to Odenathus the town of Emesa, in which Quietus and Balista were then besieged. Soon afterwards Balista proclaimed himself emperor, but he was defeated by Odenathus and lost his life. About this time probably (A.D. 263?) Odenathus was associated by Gallienus in the empire, and received the title of Augustus. A coin also was struck in his honour, on which were represented the Persians taken captive. Odenathus now undertook a second war against the Persians, to avenge the cause of Valerian: he made many prisoners, whom he sent to Gallienus, and the slothful emperor enjoyed a triumph which was earned by the bravery of another. Odenathus again besieged Ctesiphon, but without any result. On leaving Ctesiphon he marched into Cappadocia to oppose the Scythians, who were ravaging that part of Asia Minor. Odenathus was assassinated at Emesa in Syria with his son Orodes, by a relation named Mæonius, A.D. 267, but the conspirators were put to death by the soldiers of Odenathus, and his wife Zenobia succeeded to his power.

The events of the life of Odenathus are confusedly told, yet the main facts may probably be received as true. He laus, king of Macedon, which was from B.C. 413 until B.C. 399; and Harduin and others are therefore probably incorrect in fixing upon Heraclea in Lucania, in Italy, as the birth-place of Zeuxis; for that city was not founded until after the destruction of Siris, B.C. 433. (Diodorus Siculus, xii., c. 6; Strabo, p. 264.) From the complaint of Apollodorus, who lived at Athens, Zeuxis must also have been early in that city; and he was most likely a native of one of the Heracleas in Greece, and, from his connection with Archelaus, probably Heraclea Lyncestis in Macedonia. Harduin supposed Heraclea in Lucania to be the birthplace of Zeuxis, from the circumstance of his being commissioned to paint a picture by the Crotoniats—a very insufficient reason. Zeuxis, when he had made himself rich by his profession, and must accordingly have been somewhat advanced in years, gave away some of his works, and Archelaus was then living, for he presented a picture of the god Pan to that king. Zeuxis lived also some time at Ephesus, and Tzetzes, an indifferent authority, calls him a native of that place.

Lucian terms Zeuxis the greatest painter of his time: he was immediately preceded by Apollodorus of Athens, whom he surpassed; and he was immediately followed by Parrhasius of Ephesus, who surpassed him. The peculiar excellence of Zeuxis is defined by many antient writers: he drew well and in a grand style, and the beauty and grandeur of his forms were so predominant, that he was said by Aristotle to have failed in expressing mind. Aristotle adds that he was in this respect much surpassed by Polygnotus of Thasos, who preceded him about half a century. Quintilian says that Zeuxis followed Homer, who loved powerful forms even in women; he likewise notices his excellence in light and shade. Cicero also speaks of the fine forms of Zeuxis. That he was excellent in light and shade and colour is evident from the complaint of Apollodorus, that Zeuxis had robbed him of his art: effective colouring and light and shade were the peculiar excellencies of Apollodorus. With these excellencies Zeuxis combined a dramatic effect of composition, and he was distinguished also, according to Lucian, by a peculiar choice of subject; for he seldom or never, says Lucian, exerted his powers upon such vulgar or hackneyed subjects as gods, heroes, or battles; but he always selected something new and unattempted, and when he had chosen a subject he laboured his utmost to render it a master-piece. Lucian instances, as an example, a picture of a family of Centaurs, of which he saw a copy at Athens, and which excited his wonder from its extraordinary excellence. The original was lost at sea on its way to Rome, whither it was sent by Sulla. Lucian describes it as follows:—'On a grass-plot of the most glossy verdure lies the Centauress, with the whole equine part of her stretched on the ground, the hind feet extending backwards, while the upper female part is gently raised and reclining on one elbow. But the fore feet are not equally extended, as if she lay on her side; yet one seems to rest on the knee, having the hoof bent backward, whereas the other is lifted up and pawing the ground, as horses are wont to do when they are going to spring up. Of her two young, one she holds in her arms to give it the breast, the other lies under her sucking like a foal. On an elevation behind her is seen a Centaur, who appears to be her mate, but is only visible to the half of the horse; he looks down upon her with a complacent smile, holding up in one hand the whelp of a lion, as if jocosely to frighten his little ones with it. . . . . In the male Centaur all is fierce and terrific: his shaggy mane-like hair, his rough body, his broad and brawny shoulders, and the countenance, though smiling, yet wild and savage; in short, everything bears the character of these compound beings. The Centauress, on the other hand, as far as she is brutal, resembles the finest mare of the Thessalian breed which is yet untamed and has never been mounted; by the other moiety she is a woman of consummate beauty, excepting only in the ears, which have somewhat of the satyr shape. The blending however of the human and the animal natures is so artificial, and the transition of one to the other so imperceptible, or rather they so gently lose themselves in one another, that it is impossible to discern where the one ceases and the other begins. Nor in my mind was it less admirable that the new-born young ones, notwithstanding their tender age, have somewhat wild and fierce in their aspect, and that mixture of infantine timidity and curiosity with which they look up at the whelp, while at the same time they continue eagerly sucking, and cling as close as they can to the mother' (Tooke's Translation). Pliny notices several pictures by Zeuxis, but his most celebrated work was his Helen, which he painted for the city of Croton. It was in the painter's own opinion a perfect work, and he inscribed upon the pannel, according to Valerius Maximus, the three lines of Homer, thus rendered by Pope:—

> 'No wonder such celestial charms
> For nine long years have set the world in arms!
> What winning graces! what majestic mien!
> She moves a goddess, and she looks a queen.'
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> *Il.*, iii., 156-158.

This picture, for which, says Cicero, the citizens of Croton allowed Zeuxis to select five of their most beautiful virgins as his models, was dedicated in the temple of Juno Lacinia at Croton. The story of the models has been admirably used by Ariosto in his description of the beautiful Olympia, in 'Orlando Furioso:'—

> 'E se fosse costei stata a Crotone,
> Quando Zeusi l' immagine far volse,
> Che por dovea nel tempio di Giunone,
> E tante belle nude insieme accolse;
> E che per farne una in perfezione,
> Da chi una parte e da chi un altra tolse,
> Non avea da torr' altra che costei,
> Che tutte le bellezze erano in lei.'
>
> *Or. Fur.*, xi., 71.

Ælian says that Zeuxis exhibited this picture at so much a head, and made a great deal of money by the exhibition, and that it acquired the name of The Prostitute in consequence. It was a very famous work in after-times, and painters apparently travelled to Croton to see it. Stobaeus relates that the celebrated painter Nicomachus of Thebes, hearing some person remark that he perceived nothing extraordinary in the picture, observed—'Take my eyes, and you will see a goddess.' There was in Pliny's time a picture of Helen by Zeuxis, in the Portico of Philip at Rome. Probably a greater work by Zeuxis, though less celebrated than his Helen, was his picture which he presented to the Agrigentines, of the infant Hercules strangling the serpents sent by Juno to destroy him, in the presence of his panic-struck mother Alcmena and of Amphitryon. Other famous works by him were—Jupiter in the midst of the assembly of the Gods; Penelope bewailing the absence of her husband; Menelaus mourning over the fate of Agamemnon; a Marsyas bound, in the temple of Concord at Rome in Pliny's time; an Athlete, under which he wrote the line—'It is easier to find fault than to imitate,'—which, according to Plutarch, Apollodorus wrote upon some of his pictures; and a Cupid crowned with roses, which was in the temple of Venus at Athens. This Cupid is noticed by Aristophanes in the comedy of the 'Acharnenses,' but the painter's name is not mentioned; it is however ascribed by the scholiast to Zeuxis. As this comedy was acted as early as the third year of the 88th Olympiad (B.C. 426), Sillig has concluded that it is an error of the scholiast to ascribe the picture in question to Zeuxis, as he cannot have painted so soon; but from what has been said above it is pretty evident that Zeuxis was a man of mature years in B.C. 426, and, as we have seen, he had amassed a fortune within 27 years of this date, for he presented a picture of Pan to Archelaus, who died in B.C. 399. Zeuxis had previously executed several works for Archelaus in his palace at Pella, for which the king, says Ælian, paid him 400 minæ, 1625*l*., according to Hussey: this, though a small sum compared with what was paid to some of the painters of the Alexandrine period and later, was probably at that time comparatively a very large one. The time and place of Zeuxis's death are unknown, but, as Sillig has observed, he must have died, and probably some years, before the second year of the 106th Olympiad (B.C. 355), the year in which Isocrates delivered his oration περὶ Ἀντιδόσεως (on the exchange of property), in which he praises Zeuxis, for, according to the Greek custom, he would not have done it had the painter been still living. Festus (*sub voc.* 'Pictor') relates, from Verrius, that he died through laughing excessively at the picture of an old woman which he had made, but this is perhaps a mere fiction: there is no other notice of such a disaster.

Zeuxis is represented as having been very proud of his reputation and ostentatious of his wealth; he used to wear a mantle with his name woven in letters of gold on the border. To balance this weakness there are two or three anecdotes of an opposite character, which show that he had no want of penetration. Plutarch relates a story, that upon an occasion when in his company a painter of the name of Agatharchus boasted of the great facility and rapidity with which he painted, Zeuxis quietly remarked, that he took a long time to paint anything. And Ælian records how he reproved a certain Megabyzus, a high priest of Diana at Ephesus, who during a visit to the painter conversed so very ignorantly about pictures, that some lads who were grinding colours were forced to laugh, upon which Zeuxis observed to him—'As long as you were silent, these boys were admiring you, wondering at your rich attire and the number of your servants; but now that you have ventured to discourse about the arts, of which you have no knowledge, they are laughing at you.' Plutarch relates this story of Apelles and Megabyzus, and Pliny relates it of Apelles and Alexander. Zeuxis, probably while at Ephesus, entered into a contest with Parrhasius; Zeuxis painted some grapes which are said to have deceived birds, but Parrhasius painted a curtain which deceived Zeuxis himself, who accordingly confessed himself beaten. Zeuxis also painted a boy carrying some grapes, which likewise deceived the birds, but in this instance, to the dissatisfaction of the painter, who justly observed, that if the boy had been as well painted as the grapes, the birds would have feared to approach them. Though these stories in themselves are valueless, the fact that such stories should have been circulated in antient times is of considerable interest, as it shows that the antients believed that exact imitation could be accomplished in colours, a result they could only have arrived at by the evidence of their senses; yet they do not appear to have estimated such productions at more than their due value, which is evident from the fact that there is scarcely a passage in antient authors in which mere beauty of execution and exact fidelity of imitation are praised, if we except one or two original expressions of Pliny, who is the least critical of all the antient writers when speaking of the arts.

Cicero states that Zeuxis used only four colours, but this is probably an error, or he may mean in his carnations, in which four are all that are necessary. The same writer makes also the following remark:—that the works of Zeuxis, of Aglaophon, and of Apelles are in different styles, yet they are all three perfect in their respective styles. Zeuxis painted also pictures in white or mere chiaroscuro, that is, in light and shade, what the Greeks termed monochroms (μονοχρώματα), that is, in one colour.

It is remarkable that Pausanias does not mention the name of Zeuxis, and we may infer from this that Zeuxis painted easel pictures only, or upon tabulæ, wooden pannels (πίνακες), which, from their perishable nature and facility of removal, are very easily lost. The more eminent a painter therefore, the greater is the risk that his works will perish, as they are better worth removal. Few of the great painters of Greece painted upon walls: Apelles never did, and there is reason to believe that the works of Polygnotus at Delphi were painted upon pannels, which were inserted in the walls; on this subject see Raoul Rochette, 'Sur l'Emploi de la Peinture,' &c.

(Pliny, *Hist. Nat.*, xxxv. 9, 36; Lucian, *Zeuxis* or *Antiochus*; Quintilian, xii. 10, 3; Cicero, *De Invent.*, ii. 1; *Brutus*, 18; *De Orat.*, iii. 7; Valerius Maximus, iii. 7, 3; Ælian, ii. 2; iv. 12; xiv. 17 and 47; Tzetzes, *Chil.*, viii. 196; Stobaeus, *Serm.*, 61; Plutarch, *Peric.*, 13; *De Glor. Athen.*, 2; Aristotle, *Poet.*, 6.)

ZIBETH, or ZIBET. [Viverridæ, p. 406.]

ZIDON. [Sidon.]

ZIEGLER, FRIEDRICH WILHELM, a popular actor and dramatic writer of Germany, was born at Brunswick in 1760. His fine person, and his great talents as an actor, made the Emperor Joseph II. anxious to gain him for the court theatre of Vienna, and the Emperor at his own expense sent him to the best German theatres for the purpose of studying and cultivating his art, and afterwards appointed him to the court theatre of Vienna, where Ziegler remained for nearly forty years. Zeigler was not satisfied with his fame as an actor, but he endeavoured to obtain the higher reputation of a dramatic author. His attempts were crowned with great success, and he became one of the most popular and prolific writers of the day. His plays, partly comedies and tragedies, and partly domestic dramas, were performed at Vienna and in nearly all the towns of Southern Germany, where they enjoyed the same popularity as those of Iffland and Kotzebue. Invention, situation, and effect were generally very happily combined in his plays, and he showed a great practical knowledge of theatrical affairs: owing to these circumstances, some of his plays, such as 'Parteienwuth' and 'Die vier Temperamente,' still continue to be acted, although the language is rather obsolete. In 1798, when Kotzebue came to Vienna as the successor of Alxinger, Ziegler and some others formed so strong an opposition to him, that he quitted Vienna after two years. As Ziegler was engaged in the service of the imperial court, he frequently allowed himself to be made use of for political purposes, partly by writing plays with certain political tendencies, and partly by witty hints and allusions. A collection of his dramatic works, in 5 vols. 8vo., appeared at Vienna, 1791-94. A more complete collection of Ziegler's 'Sämmtliche Dramatische Werke,' in 13 vols. 8vo., appeared at Vienna in 1824. He made also several attempts as a critic on the dramatic and other arts, but his success was small, as he possessed little philosophical knowledge, whence his aesthetical works are very confused and almost worthless. His principal works in this respect are—1, 'Zergliederung von Hamlet's Character nach Psychologischen und Physiologischen Grundsätzen,' Wien, 1803, 8vo.; 2, 'Die Dramatische Schauspielkunst in ihrem ganzen Umfange,' Wien, 1821, 8vo.; 3, 'Der innere und aüssere Mensch in Beziehung auf die bildenden Künste, besonders auf die Schauspielkunst,' Wien, 1825, 2 vols. 8vo. In the year 1821 Ziegler left the stage, and had a pension given to him for the remainder of his life, which he spent principally at Presburg. He died at Vienna, on the 21st of September, 1827.

(Brockhaus, *Conversations-Lexikon*; *Bibliothek der Schönen Wissenschaften*, under *Ziegler*.)

ZIMAPAN. [Mexican States.]

ZIMB, an insect translated *hornet* in Scripture (*Exodus*, chap. xxiii., ver. 28; *Deut.* vii. 20; *Joshua* xxiv. 12). The Hebrew name is *tzirah*, and probably expresses its loud buzzing noise. The account which Bruce has given of the *zimb*, or dog-fly, of Abyssinia, offers such striking analogies to the insect specifically termed *tzirah*, and included in the more general term *zebub* of the Hebrew Scriptures, that very little doubt exists regarding the identity of the two. It is difficult to conceive that Isaiah could have had in view any other insect when he says—'The Lord shall hiss for the fly that is in the uttermost part of the rivers of Egypt' (*Isaiah* vii. 18). The original word rendered *fly* in our translation is *zebub*, and, as Bruce observes, 'The Chaldee version is content with calling this animal simply *zebub*, which signifies the fly in general, as we express it in English. The Arabs call it *zimb* in their translation, which has the same general signification. The Ethiopic translation calls it *tsaltsalya*, which is the true name of the particular fly in Geer, and was the same in Hebrew.' The following is the substance of the account which Bruce gives of the Abyssinian *zimb*. This insect had not previously been described by any naturalist:—'It is in size very little larger than a bee, of a thicker proportion, and has wings, which are broader than those of a bee, placed separate, like those of a fly; they are of fine gauze, without colour or spot upon them. The head is large; the upper jaw or lip is sharp, and has at the end of it a strong pointed hair, of about a quarter of an inch long; the lower jaw has two of these pointed hairs, and the pencil of hairs when joined together makes a resistance to the finger nearly equal to that of a hog's bristle. Its legs are serrated on the inside, and the whole covered with brown hair or down. . . . . He has no sting, though he seems to me rather of the bee kind; but his motion is more rapid and sudden than that of the bee, and resembles that of the gad-fly in England. There is something peculiar in the sound or buzzing. It is a jarring noise, together with a humming, which induces me to believe it proceeds, at least in part, from a vibration made with the three hairs at its snout.

'As soon as this plague appears, and their buzzing is heard, all the cattle forsake their food, and run wildly about the plain till they die, worn out with fatigue, fright, and hunger. No remedy remains but to leave the black earth [where they breed] and hasten down to the sands of Atbara, and there they remain while the rains last, this cruel enemy never daring to pursue them farther. Though his size is immense as is his strength, and his body covered with a thick skin defended with strong hair, yet even the camel is not able to sustain the violent punctures the fly makes with his pointed proboscis. He must lose no time in removing to the sands of Atbara, for, when once at tacked by this fly, his body, head, and legs break out into large bosses, which swell, break, and putrefy, to the certain destruction of the creature. Even the elephant and rhinoceros, who, by reason of their enormous bulk and the vast quantity of food and water which they require daily, cannot shift to desert and dry places as the season may require, are obliged to roll themselves in mud and mire, which, when dry, coats them over like armour, and enables them to stand their ground against this winged assassin; yet I have seen some of these tubercles upon almost every elephant and rhinoceros that I have seen, and attribute them to this cause. All the inhabitants of the sea-coast of Melinda, down to Cape Gardefui, to Saba, and the south coast of the Red Sea, are obliged to put themselves in motion and remove to the next sand in the beginning of the rainy season, to prevent all their stock of cattle being destroyed. This is not a partial emigration; the inhabitants of all the countries from the mountains of Abyssinia to the confluence of the Nile and Astaboras northward, are once a year compelled to change their abode and seek protection in the sands of Beja; nor is there any alternative or means of avoiding this.

'Providence from the beginning, it would seem, had fixed its habitation to one species of soil, being a black fat earth, extraordinarily fruitful; and, small and inconsiderable as it was, it seems from the first to have given law to the settlement of the country. It prohibited absolutely those inhabitants of the fat earth called Mazaga, domiciled in caves and mountains, from enjoying the help or labour of any beasts of carriage. It deprived them of their flesh and milk for food, and gave rise to another nation whose manners were just the reverse of the first. These were the Shepherds, leading a wandering life and preserving their immense herds of cattle by conducting them into the sands beyond the limits of the black earth, and bringing them back again when the danger from this insect was over. . . . We cannot read the history of the plagues which God brought upon Pharaoh by the hands of Moses, without stopping a moment to consider a singularity—a very principal one—which attended this plague of the fly. It was not till this time, and by means of this insect, that God said he would separate his people from the Egyptians. And it would seem that then a law was given to them that fixed the limits of their habitation. It is well known that the land of Goshen or Geshen, the possession of the Israelites, was a land of pasture, which was not tilled or sown, because it was not overflowed by the Nile. But the land overflowed by the Nile was the *black earth* of the valley of Egypt, and it was here that God confined the flies; for he says, it shall be a sign of this separation of the people, that not one fly should be seen in the sand or pasture-ground, the land of Goshen; and this kind of soil has ever since been the refuge of all cattle emigrating from the black earth to the lower part of Atbara.'

If 'the fly that is in the uttermost parts of the rivers of Egypt,' which is held forth in *Isaiah* as an agent for the punishment of iniquity, is (as we have shown there is every probability of its being) the insect now under consideration, it would appear that the zimb was not then, any more than at the present day, a native of Palestine, but that swarms of them were drawn from Egypt for the execution of a special purpose. From Bruce's graphic description of the habits and appearance of the zimb, we are irresistibly led to connect it with some of the *Œstridæ*. Latreille also expressly mentions the camel as being subject to the attacks of the Œstridæ, and Mr. Hope communicated, a few years ago, to the Entomological Society an account of a larva of one of these insects which attacks the rhinoceros. As this portion of Bruce's narrative (relating to the number and the effects produced by these flies) was much ridiculed and long regarded as particularly unworthy of belief, we may add that, in addition to the facts stated by Latreille and Mr. Hope, strong corroborative testimony may also be found in the works of more recent African travellers, although not bearing directly upon the actual zimb:—'Notwithstanding our fatigue, no rest could we obtain. The buzz from the insects was like the singing of birds; the men and horses groaned with anguish, &c. &c. I do not think our animals could have borne such another night; their legs and necks were covered with blood, and they could scarcely stand from the state of irritation in which they had been kept for so many hours.' (Denham and Clapperton's 'Travels,' vol. ii., p. 104.) Many similar passages indicating the power (which appears to us almost incredible) of certain of the insect-tribes in Africa might be quoted, but we shall content ourselves with the following brief extract from Dr. Clarke's 'Travels,' which seems fully to bear out the statement of Bruce:—'In the history of this insect, as in every other instance, the testimony of the Abyssinian Dean strictly confirmed all that Bruce had written on the subject. He told us that horses and cows were its principal victims, but that he had heard of armies being destroyed by this terrible scourge.' (Clarke's 'Travels,' part 2nd, sec. ii., p. 65.)

The Latin *Asilus* and the Greek *οἰστρος* were probably only different pronunciations of the same term *ha-tsirah*, as this fly is called both by Moses and Joshua. Mr. Bracy Clark, in the 9th volume of the 'Linnean Transactions,' part ii., 1843, refers the fly alluded to by Moses (and said to 'hiss and make a noise') to the Œstrus bovis, and remarks on Bruce's figure, that it has no resemblance to the genus of flies the *Cuterebra*, but is rather, though with something fictitious about it, allied to the genus *Stomoxys*, or perhaps *Tubanus*, both of which genera are certainly silent flies in their attacks on cattle.

There can be no doubt that the *οἰστρος* was a perfectly distinct insect from any of the modern Œstridæ.

Aristotle describes it not merely as a blood-sucker ('Historia Animalium,' lib. viii., c. 2), but also as furnished with a strong proboscis (lib. iv., c. 7). He observes, likewise, that it is produced from an animal inhabiting the waters, in the vicinity of which it chiefly abounds (lib. iii., c. 7). Ælian (*Hist. Anim.*, lib. vi., c. 38) gives a nearly similar account. Comparing the Œstrus with the Myops (probably *Tabanus*, Latr.), he says that the Œstrus, for a fly, is one of the largest: it has a stiff and large sting (meaning proboscis), and emits a certain humming and harsh sound. Virgil's account, as far as the sound is concerned, is similar. Now the modern Œstrus, so far from being a blood-sucker, furnished with a strong proboscis, has scarcely any mouth; and it especially shuns the vicinity of water, to which cattle fly for refuge. Hence it is more probably related to Bruce's zimb, which is represented in the figure with a long proboscis, which is found in the neighbourhood of rivers, and belongs probably to Pangonia or to Nemestrina.' (See Kirby and Spence's *Intr.*)

ZIMMERMANN, JOHANN GEORG VON, was born on the 8th of December, 1728, at Brugg, a small town in the German part of the canton of Bern. He belonged to a distinguished family, especially on his mother's side, and as she was a native of the French part of the canton of Bern, Zimmermann acquired from his childhood an equal facility in speaking French and German. His education was conducted in the house of his parents up to his fourteenth year, when he was sent to Bern to prepare himself for the university. In 1747 he went to Göttingen, to study medicine, and here he was received by Haller, his countryman, in the kindest manner. Haller took him into his house, and assisted him in his studies, which were not confined to subjects directly bearing upon the medical profession; no branch of knowledge was without interest for him. He also learned English, and gained an intimate acquaintance with English literature, for which he had always a great partiality. His love of study was so great, that he scarcely ever took any relaxation; and he thus laid the foundation of an illness by which he suffered all through life. He was aware of his over-exertion, and he wrote from Göttingen to a friend: 'I here lead the life of a man who is desirous to live even after his death.' The first symptoms of melancholy appeared while he was yet at Göttingen. When he took his degree of doctor of medicine, he wrote a 'Dissertatio Physiologica de Irritabilitate' (Göttingen, 1751, 4to.), by which he acquired considerable reputation as a theoretical writer on medicine, both on account of the independence of his judgment and the soundness of his observations: this little work is still held in great esteem. It was translated into Italian by P. Gian Vincenzo Petrini (Naples, 1756, 8vo.). After leaving Göttingen he spent a few months in Holland and at Paris, and then returned, in 1752, to Bern, where he commenced his career as a physician with great success. Shortly after, Haller came from Göttingen to see his friends at Bern, and also for the recovery of his health, and his native place had such charms for him, that he resolved not to return to Hanover. Zimmermann was commissioned to fetch Haller's family from Göttingen, and not long after he married a relation of Haller. About this time the place of public physician (Stadt physicus), at Brugg became vacant, and Zimmermann, who had already acquired great reputation as a physician, was prevailed upon to accept it on account of the property and family connections he had at Brugg. His practice here increased to an extraordinary degree, for no physician surpassed him in the quick perception of the nature of disease and the remedies required to remove it; patients came from all parts of Switzerland and from the adjoining countries to have his advice. But although he loved his profession, independent of all pecuniary advantages, he could not confine himself to the mere practice of his art, and he was unable to forego the pleasure of devoting himself to more extensive studies. His numerous professional engagements, and the fact that at Brugg he had no friends of congenial pursuits, produced great mental discontent. Zimmermann, with all his philosophy, had not the power of accommodating himself to circumstances, and while he was ever longing for the intellectual enjoyments of Göttingen and Bern, he refused, like a spoiled child, to enjoy the pleasures which he might have had. His hypochondriac disposition was thus gradually developed, and increased his love of solitude. He avoided society as much as he could, and spent all his leisure hours in reading, although he discharged his professional and official duties with the utmost strictness, and treated his patients with a kindness and cheerfulness which often produced the best effects. It is remarkable that even during the strongest attacks of hypochondriasis Zimmermann appeared a different man as soon as he entered the sick-room. In 1756 he published his first essay on Solitude, which is only a sketch of his celebrated work with the same title, which he published about thirty years later. About the same time he formed the plan of his work on Experience in Medicine ('Von der Erfahrung in der Arzneikunst'), which however did not appear till 1763 (Zürich, 2 vols. 8vo.). A second edition, in one volume, appeared at Zürich, 1787, 8vo. It is only a fragment; the author intended to add two more volumes, but he did not carry out his plan. This work possesses the greatest interest for the student of medicine and every one else. The philosophical spirit which pervades it, the amount of experience, and the sound rules as to the manner in which a medical man should observe, render it still a work of great utility. It has been translated into French and Italian. A third work was on National Pride ('Vom Nationalstolze,' Zürich, 1758, 8vo.: the sixth edition appeared at Zürich, 1789, 8vo.), the popularity of which is attested by the numerous editions and translations into French, Russian, English, and other languages. Zimmermann examines national pride in all its manifestations, investigates its causes and results, with a clearness and freedom from prejudice which are seldom found in similar works. The whole is interwoven with pleasing anecdotes. There are two English translations of it: the first bears the title 'Essay on National Pride; translated from the German,' London, 1771, 12mo., but is much interpolated and altered. The second, by S. H. Wilcocke (London, 1797, 8vo.), is much better, and contains a memoir of Zimmermann. Although his residence at Brugg was the source of discontent and melancholy, yet it is the period during which he produced his best works, or at least, as in the case of that on Solitude, formed the plan of them. These works spread his fame far and wide, and the most distinguished learned and scientific societies of Europe honoured his merits by making him a member. This celebrity, instead of making him happier, only increased his desire to have a wider sphere of action. Many honourable offers were made to him from various parts of Europe, but he had not resolution enough to accept them, or they were not to his taste. At last however the honourable post of physician to his Britannic majesty at Hanover, and the title of aulic councillor, were offered to him, through the influence of a friend. This offer seemed to satisfy his wishes, and in 1768 he went to Hanover. But the world in which he now lived was as little calculated to give him happiness as that at Brugg. The jealousy of one of his colleagues, and the pretensions of persons of quality and their unreasonable demands on his time, caused him not a little annoyance and vexation; he felt his own dignity too much, and had too just a notion of the duties of a physician to determine the number of his visits and their duration by anything else than the nature of the illness. Those who were offended by such straightforward conduct, did not of course contribute to make his residence at Hanover pleasant. But notwithstanding this, there was at that time no physician in all Northern Germany who enjoyed such unbounded confidence as Zimmermann, and the patients who consulted him were so numerous, that he had little time left to indulge in his hypochondriac disposition. During this period of uninterrupted activity in his profession, his only recreation consisted in occasional visits to several of the courts of Germany, where his advice was requested, and to the waters of Pyrmont. But in a short time he found that Pyrmont, instead of being a place of rest for him, was a much more busy place than Hanover, for persons flocked thither from all parts when it was known that he was there. In 1770 his wife died, and he himself was at the time suffering from internal disease, which induced him the year after to go to Berlin for the purpose of submitting to a dangerous operation. He remained at Berlin for five months, and made the acquaintance and friendship of the most distinguished men of that capital. He was also introduced to Frederic the Great, with whom he had a long conversation. On his return to Hanover he felt in good spirits, and as he had got rid of the cause of his bodily suffering, he looked forward to happiness. But his great professional exertions brought on a return of his old complaint, and in its train came his former depression of spirits, which was increased by the death of his daughter. He had now only a son left, and this son was constantly in ill-health, which at length terminated in a state of perfect insensibility. The friends of Zimmermann, who pitied his situation, prevailed upon him to marry again: the influence which his young wife exercised over him promised to be most beneficial; he seemed to revive, he became cheerful, and took pleasure in social circles. The fruit of this happy period was the working out and completion of his great work on Solitude ('Ueber die Einsamkeit'), which appeared at Leipzig in 1784 and 1785, in 4 vols. 8vo. This work, the best and most matured of all his productions, was soon translated into all the languages of Europe, and became as popular in foreign countries as in Germany. The English translation, under the title 'Solitude considered with respect to its influence on the Mind and the Heart' (London, 1791, 8vo.), was made from the French translation of J. B. Mercier, which however is only an abridgment of the original; for Mercier had not the boldness to lay before the French public all the important disclosures which the original work contains. This book on Solitude procured the author friends and admirers in all parts of Europe. The empress Catherine II. of Russia sent him a magnificent present, accompanied by a letter in which she thanked him for the salutary prescriptions he had given to mankind; she also invited him to St. Petersburg and offered him the post of her private physician. On his declining to go to Russia, the empress requested him to recommend a number of young physicians who were willing to settle in her dominions. This request was readily complied with, and Zimmermann was knighted, and received the order of St. Wladimir as a reward. In 1786, when Frederic the Great was attacked by his last illness, he wrote two letters to Zimmermann to invite him to come to Potsdam and give him his advice. On his arrival there, Zimmermann discovered that the king's case was hopeless, and he refused to prescribe any powerful medicine. His visit to Potsdam was the turning point in his life: until then he had been the favourite of the public as a philosopher, a physician, and a highly gifted writer, but he now left the path in which he had earned his just laurels, and all he wrote after this time served rather to destroy than to increase his reputation. After his return from Potsdam he wrote two works on Frederic the Great: 'Ueber Friedrich den Grossen und meine Unterredung mit ihm kurz vor seinem Tode' (Leipzig, 1788, 8vo.), and 'Fragmente über Friedrich den Grossen' (Leipzig, 1790, 3 vols. 8vo.), which created the greatest sensation in Germany, and involved the author in disputes which ended only with his life. These works pretend to give an account of the king, derived from sources to which no one had had access before. They contained attacks on men of unblemished character, and Zimmermann charged them with things which had no existence except in his own imagination. Truth itself seemed no longer to be sacred to him, and various calumnious reports respecting the private life of Frederic the Great and other eminent men were set forth as new discoveries, and that in so coarse a manner as to offend the good feeling of the public. The cause of this change in his conduct must be looked for in his discontented disposition, and the desire to shine in a new sphere for which he was not fitted—politics and contemporary history. The peculiar state of his own mind prevented his gaining a clear perception of things, and made him see in the political changes of the time nothing but conspiracies to upset religion and all social order. The opposition he met with, especially on the part of the freethinker Dr. Bahrdt and A. Hoffmann, only increased those feelings. He now devoted all his time to the combating of the monsters which his own imagination raised up, with the exception of two hours every day, which he gave to his patients. His diseased imagination represented to him Jacobins, Illuminati, and the promoters of improvements of every kind, as persons animated by the same evil spirit, and he denounced them all as criminals who ought to be put to death by the hangman. In order to secure the assistance of all governments against them, he drew up a memorial, which he sent to the emperor Leopold, and which bore the following title: 'Ueber den Wahnwitz unseres Zeitalters und über die kräftigsten Hülfsmittel gegen die Mordbrenner, die uns auffklären wollen, und gegen die Untergrabung und Vernichtung der Christlichen Religion und der Fürstengewalt.' It consisted of 370 quarto pages. The emperor intended to place it before the princes' diet at Regensburg, and to call upon the princes of the empire to put an end to the proceedings of the Illuminati. But the death of the emperor, who had testified his gratitude to Zimmermann by a handsome present, prevented this plan being carried into effect. Zimmermann however continued his exertions till the year 1794, when his physical as well as mental powers began to decline, and he was obliged to give up all his occupations. His melancholy rose to a deplorable height. The French revolution was making rapid progress, and he fancied that the French were hunting him out and intending to put him to a cruel death as an aristocrat; he even thought of taking to flight, and as his physician believed that a change of place might be beneficial, Zimmermann went to Eutin in Holstein. But no means were of avail, and, after an absence of three months, he returned to Hanover in a worse condition than he had left it. His fear of his enemies was at last increased by the dread of poverty and starvation, a monomania which the most substantial proofs of the contrary were unable to destroy. Wherever he went he fancied that he was diffusing the miasma of the plague; in short his mind was completely deranged, and after months of severe suffering, both real and imaginary, he died on the 7th of October, 1795, in the sixty-seventh year of his age.

Zimmermann was one of the most remarkable men of the last century, both as a physician and a philosopher. He possessed an inexhaustible imagination, great sagacity and judgment, and most extensive knowledge not only of medicine, but also of philosophy, history, and the whole range of antient and modern literature. The great works which he wrote previous to 1786 are masterly productions of their kind, and, as far as their style and language are concerned, they are still classical, with the exception of a few provincialisms and French forms which are contrary to the spirit of the German language. During the latter period of his life his mind was not sound: his nervous sensibility and his hypochondriac disposition had ruined his mental powers, and for all he did during that period he perhaps deserves more to be pitied than to be censured. Besides the works which we have already noticed, and a number of essays in literary and scientific journals, the following deserve to be mentioned:—1, 'Leben des Herrn von Haller,' Zürich, 1755, 8vo.; 2, 'Vertheidigung Friedrichs des Grossen gegen den Grafen von Mirabeau,' Hanover, 1787, 8vo.; 3, 'Versuch in anmuthigen und lehrreichen Erzählungen, launigten Einfällen und Philosophischen Remarquen über allerlei Gegenstände,' Göttingen, 1779, 8vo.: this is a collection of essays which Zimmermann had contributed from time to time to a Hanoverian periodical, and were published in one volume by an anonymous editor; 4, 'Zerstreute Blätter vermischten Inhalts,' edited by a friend of Zimmermann after his death (1799, 8vo.); 5, 'Die Zerstörung von Lissabon,' Zürich, 1756, 4to.: this is an epic poem of no great value, which some friends of the author got published without his knowledge.

The number of works on the life and writings of Zimmermann is very great; the following are the best among them: S. A. D. Tissot, *Vie de M. Zimmermann*, Lausanne, 1797, 8vo.; J. E. Wichmann, *J. G. Zimmermann's Krankengeschichte, ein Biographisches Fragment*, Hanover, 1796, 8vo.; *Zimmermann's Verhältnisse mit der Kaiserin Catharina II., und mit dem Herrn Weikard*, &c., Bremen, 1803, 8vo.; Döring's *Zimmermann*, in the *Zeitgenossen*, third series, No. 6; *Zimmermann's Briefe an einige seiner Freunde in der Schweiz*, Aarau, 1830, 8vo.

ZIMMERMANN, E. A. W. [Uelzen.]

ZINC. This metal, in commerce frequently called *Spelter*, was first mentioned by Paracelsus, in the sixteenth century, under the name of *Zinetum*.

It does not occur in the native state, but is obtained from its ores, which are chiefly the sulphuret and carbonate of zinc. The operation by which it is procured from the ores is called *distillation by descent*. The ores after calcination are mixed with carbonaceous matter, and placed in a furnace or crucible, which is closed above, and in the bottom an iron tube is fixed, the upper orifice of which is in the interior of the crucible, and its lower aperture terminates just above a vessel which contains water; the vapour of the reduced metal passing into the vessel is condensed; in this state it is commonly mixed with some other metals, as arsenic and cadmium, from which it may, in great measure, be purified by redistillation.

The properties of zinc are, that it has a brilliant metallic lustre and a bluish white colour. It is so hard as to be filed with some difficulty, and its toughness is such as to require very considerable force to break it when the mass is considerable. Its texture is lamellated and crystalline. The specific gravity of cast zinc is 6·862: and when forged, 7·205. It undergoes little alteration, even by the combined operation of air and moisture, at common temperatures. When heated between about the temperature of boiling water and 300° Fahr., it becomes both malleable and ductile, so that it is rolled into sheets and drawn into wire. It fuses at 773° Fahr., according to Daniell; and when cautiously cooled, crystallizes, assuming the prismatic form. Exposed to a white heat, out of the contact of air, it sublimes and is condensed unchanged.

We shall now notice the various ores of zinc, premising that two only of them, namely, the sulphuret and carbonate, are usually employed as such.

Sulphuret of Zinc; Blende.—Occurs crystallized and massive. Primary form the cube. Cleavage parallel to the planes of the rhombic dodecahedron. Fracture conchoidal. Hardness, scratches carbonate of lime, and is scratched by phosphate of lime. Rather brittle. Colour white, and various shades of yellow, green, red, brown, and black. Streak varying with the colour from white to reddish brown. Lustre adamantine. Transparent; translucent; opaque. Specific gravity 4·07.

Massive Varieties.—Amorphous: structure crystalline, granular, compact, globular, botryoidal, reniform, stalactitic, fibrous.

Before the blowpipe does not melt *per se*; but when heated on charcoal, fumes of oxide of zinc form a white coating upon it. When nearly or quite pure, forms a colourless solution in nitric acid with the separation of sulphur.

Found in great abundance in many countries, both in primary and secondary formations, and both in veins and beds. It abounds in Cornwall and several of the northern counties of England: the white variety occurs in New Jersey, North America. Large quantities of the ores of zinc are met with and worked in Germany; they occur also in various other parts of the earth.

Analysis by Arfwedson:—

Sulphur . . .	33·66
Zinc . . .	66·34
	100·

Some varieties contain small portions of iron and cadmium.

Oxisulphuret of Zinc; Voltzite.—Occurs in the form of small hemispheres, divisible into thin layers. Fracture conchoidal, irregular. Hardness 4·5. Colour yellowish red, interspersed with brown bands. Lustre pearly on the natural layers, but vitreous or resinous in the other directions. Slightly translucent; opaque. Specific gravity 3·66.

Occurs in Cornwall? and at Roziers, department of Puy de Dome, France.

Analysis by M. Fournet:—

Sulphuret of Zinc .	81·0
Oxide of Zinc . .	15·0
Oxide of Iron . .	1·8
Organic Matter . .	2·2
	100·

Carbonate of Zinc; Calamine.—Occurs crystallized and massive. Primary form a rhomboid. Cleavage parallel to the primary planes. Fracture uneven, conchoidal. Hardness, scratches fluor-spar, but is scratched by apatite. Colour white, yellowish white, grey, brown, and green. Streak white. Lustre vitreous. Translucent. Opaque. Specific gravity 4·442.

Massive Varieties.—Amorphous; structure granular, compact, reniform, botryoidal, stalactitic; fibrous.

This ore occurs rather abundantly, and is found both in veins and beds, in various parts of England, France, and in America.

Analysis by Smithson, (1) from Somersetshire, (2) from Derbyshire:—

	(1)	(2)
Carbonic Acid . .	35·2	34·8
Oxide of Zinc . .	64·8	65·2
	100·	100·

Soluble, with the extrication of carbonic acid gas, in acids.

Hydrous Carbonate of Zinc; Hydrous Calamine.—Occurs usually massive or encrusting other minerals. Texture fine-grained and close. Hardness 2 to 2·5. Colour white or greyish or yellowish white. Dull; opaque. Specific gravity 3·584 to 3·598. It frequently accompanies the preceding species.

Soluble in acids with the extrication of carbonic acid gas.

Analysis by Smithson:—

Carbonic Acid . .	13·52
Oxide of Zinc . .	69·36
Water . . .	15·10
	97·98

Sulphate of Zinc; Listerite.—Occurs crystallized and massive. Primary form a right rhombic prism. Fracture conchoidal. Hardness 2·0 to 2·5. Brittle. Colour white, sometimes inclining to peach-blossom red and violet-blue. Streak white. Transparent. Translucent. Lustre vitreous. Specific gravity 2·036. Soluble in water. Taste astringent, nauseous, and metallic.

Massive Varieties.—Amorphous; structure granular, compact; botryoidal, reniform, stalactitic, fibrous. Sometimes investing other bodies.

Before the blow-pipe froths, and covers the charcoal with white flocks.

Found at Holywell in Flintshire, Fahlun in Sweden, at Rammelsberg in the Harz, and Schemnitz in Hungary.

Beudant's analysis of the substance from Schemnitz gives—

Sulphuric Acid . .	29·8
Oxide of Zinc . .	28·5
Oxide of Manganese .	0·7
Oxide of Iron . .	0·4
Water . . .	40·8
	100·2

Phosphate? of Zinc; Hopeite.—Occurs crystallized. Primary form a right rhombic prism. Cleavage parallel to the great diagonal, distinct. Fracture uneven. Hardness, scratches gypsum, is scratched by fluor-spar. Colour white, greyish white. Streak white. Lustre vitreous, pearly on the cleavage plane. Transparent; translucent. Specific gravity 2·46.

Before the blow-pipe yields water, but no carbonic acid; becomes milk-white, and melts into a clear colourless glass. Soluble without effervescence in nitric or hydrochloric acid, and slowly in sulphuric acid.

Found hitherto only in the calamine-mines of Altenberg, near Aix-la-Chapelle.

It has not been perfectly analyzed, but consists of oxide of zinc, a little cadmium, an earth, and much water, probably combined with phosphoric acid.

Silicate of Zinc; Willemite.—Occurs crystallized and massive. Primary form an obtuse rhomboid. Cleavage easy, in a direction perpendicular to the axis. Transverse fracture conchoidal. Hardness, readily scratches glass and phosphate of lime; is scratched by the knife. Colour usually yellow, brownish, or reddish yellow, sometimes white and transparent. Specific gravity 4·18.

Before the blow-pipe, the crystals partly lose their transparency; with borax, a globule is obtained, which is transparent, with a small nucleus of silica floating in it. Found at Moresnet, Aix-la-Chapelle.

It yielded by analysis—

Silica	72·33
Oxide of Zinc. .	27·67
	100·

Hydrous Silicate of Zinc; Smithsonite; Electric Calamine.—Occurs crystallized in attached and globular and botryoidal aggregations of crystals. Primary form a right rhombic prism. Cleavage parallel to the lateral planes. Fracture conchoidal, uneven. Hardness, scratches fluor-spar, and is scratched by felspar. Brittle. Colour white, blue, green, yellow, and brown. Streak white. Becomes electric by heat. Lustre vitreous. Transparent; translucent. Specific gravity 3·379. When heated in a glass tube yields water, and becomes milk-white. Heated before the blow-pipe with borax, it dissolves into a colourless glass, which does not become milky on cooling.

When powdered and heated in hydrochloric acid, the oxide of zinc is dissolved, and the silica gelatinizes on cooling.

Found at Matlock in Derbyshire, and other parts of England; in Scotland, Germany, and many other parts of Europe.

Analysis by

	Smithson.	Berthier.
Silica . .	25·0	25·0
Oxide of Zinc	68·3	66·6
Water .	4·4	9·0
	97·7	100·

Aluminate of Zinc; Automalite. [GAHNITE.]

Oxide of Zinc and Oxide of Manganese; Red Oxide of Zinc; Spartalite.—Occurs in embedded small nodules and massive. Cleavage parallel to all the planes of a regular hexagonal prism. Fracture conchoidal. Hardness 4 to 4·5, easily scratched by the knife. Brittle. Colour bright red. Streak orange-yellow. Lustre adamantine. Translucent. Specific gravity 5·4 to 5·5.

Massive Varieties.—Amorphous, structure crystalline, granular.

Before the blow-pipe infusible *per se*; but with borax gives a yellow transparent glass. In nitric acid dissolves without effervescence.

Found only in New Jersey, North America.

Analysis by Berthier:—

Oxide of Zinc . .	88
Sesqui-oxide of Manganese	12
	100

Sulphuret of Zinc and Iron; Marmatite.—This is a definite compound of sulphuret of zinc and of sulphuret of iron; its structure is lamellar, and colour black; indeed it appears to be black blende united with sulphuret of iron. It is found at Marmato, province of Popayan, South America.

Analysis by Boussingault:—

Zinc . . .	43·0
Iron . . .	15·7
Sulphur . . .	28·6
Pyrites . . .	1·7
Quartz . . .	8·0
	97·

The quartz is a mere accidental admixture.

Bi-seleniuret of Zinc and Protosulphuret of Mercury;

The distinguishing characters of Zingiberaceæ are—first, the structure of the seed, in which a fleshy body is interposed between the embryo and the albumen, entirely enveloping the former. This body is called *vitellus* by Brown, and is the remains of the innermost integument of the ovule, which is unabsorbed during the progress of the seed to maturity. A second peculiarity consists in the 2-celled anthers; and with this structure is combined decidedly aromatic properties. But the distinction between Marantaceæ and Zingiberaceæ depends, as pointed out by Lindley, on more important considerations than these. ‘In true Zingiberaceæ,’ he says, ‘as Brown has observed, the stamen is always placed opposite the labellum, or anterior division of the inner series of the corolla, and proceeds from the base of the posterior outer division; while the sterile stamens, when they exist, are stationed right and left of the labellum. But in Marantaceæ the fertile stamen is on one side of the labellum, occupying the place of one of the lateral sterile stamens of Zingiberaceæ. This peculiarity of arrangement indicates a higher degree of irregularity in Marantaceæ than in Zingiberaceæ, which also extends to the other parts of the flower. The suppression of parts takes place in the latter in a symmetrical manner; the two posterior divisions of the inner series of the perianthium, which are occasionally absent, corresponding with the abortion of the two anterior stamens. In Marantaceæ, on the contrary, the suppression of organs takes place with so much irregularity, that the relation which the various parts bear to each other is not always apparent: instead of the central stamen being perfect, while the two lateral ones are abortive, as in Zingiberaceæ and most Orchidaceæ, or of the central stamen being abortive and the two lateral ones perfect, as in some Orchidaceæ, it is the central and one lateral one that are suppressed in Marantaceæ.’ Taking Zingiberaceæ and Marantaceæ together, they are nearly allied to Musaceæ, especially in the character of their leaves; but all Musaceæ have either five or six stamens, with a calyx and corolla alike. With Iridaceæ these orders also agree in their superior flowers and the triple number of their stamens, but the abortive or deformed character of these organs in Zingiberaceæ and Marantaceæ distinguishes them. Their aborted stamens ally them with Orchidaceæ, from which however they differ in the absence of the cohesion of stamens and style.

The following genera belong to this order:—

1. ZINGIBERA.
   Zingiber
   Curcuma
   Hitchenia
   Kæmpferia
2. AMOMA.
   Amomum
   Elettaria
   Donacodes
   Diracodes
   Hedychium
3. ALPINIÆ.
   Alpinia
   Hellenia
   Gastrochilus
   Monolophus
   Cassumunar
   Galanga
   Monocystis
   Cenolophon
   Phæomeria
   Peperidium
4. COSTI.
   Costus
5. GLOBBÆ.
   Globba
   Leptosolena
   Hornstedtia
   Kolovratia
   Roscoea

Nearly all the species are tropical plants, and by far the greater number inhabit various parts of the East Indies; they are also found in Africa and America.

The plants belonging to this order possess great beauty, on account of the development of their floral envelopes and the rich colours of their bracts. They are also employed to a considerable extent in medicine and as condiments, on account of their aromatic stimulating properties. Some of these are referred to under CURCUMA LONGA (the Turmeric plant), CARDAMOMS, and AMOMUM. Of the various genera belonging to this order, *Zingiber* is probably the most important. It is known from the rest by the inner limbs of the corolla having but one lip, and the anther having a simple recurved horn at the end. There are several species belonging to this genus, which was formed by Roscoe. The *Z. officinalis*, the Narrow-leaved or common Ginger, has subsessile, linear-lanceolate, smooth leaves, elevated oblong spikes, acute bracts, and a 3-lobed lip. The rootstock of this plant is the ginger of commerce. It is imported into England from various quarters of the world, but more especially the East and West Indies. This plant is now grown in almost all parts of the globe in tropical climates, but it seems to have been originally indigenous in the East Indies. The ginger-plant may be propagated by seeds or by cuttings of the root. When the cuttings are planted out in spring, which is the mode generally pursued in its cultivation, in the course of three or four months their rootstocks have a mild aromatic flavour; and it is in this state they are used for the preparation of what is called preserved ginger. At the end of the year or the beginning of the next they are considered fit to yield the ginger of commerce. The rootstocks are then prepared in two ways: either by scalding them in boiling water, and drying them with artificial heat; or by peeling, and drying them in sunshine, without immersing them in hot water. The former is the mode of preparing the black ginger, and the latter was that of the white ginger of commerce. The chemical composition of the rootstock of ginger, according to Bucholz, is as follows:—

Soft acrid resin .	3·5
Yellow volatile oil .	1·5
Acidulous extractive .	10·5
Soluble gum . .	12·5
Bassorin . . .	8·3
Starch . . .	19·75
Lignin	46·2
	100·

Ginger is one of the most agreeable of the hot aromatics, and is consequently much used as a condiment. It also enters into the composition of many medicines, where it acts as a carminative.

Z. Zerumbet, the Broad-leaved Ginger, is a native of the East Indies, and has delicate stems; bifarious, sessile, lanceolate leaves; broad obovate bracts, and a 3-lobed lip. This plant is much used in the East for cataplasms and fomentations, but is not taken internally.

The genus *Alpinia* has an uncrowned anther, the interior limb of the corolla with one lip, the capsule a berry, the seeds with an aril. This genus was named by Willdenow in honour of Prosper Alpinus, an Italian physician and botanist, who lived in the sixteenth century. He was physician to the Venetian consul at Cairo, and during his stay in Egypt made several excursions into the interior of the country, and collected more information with regard to the natural history than had been done by any previous traveller. On his return from Egypt he published several works on the natural history of that country, and especially on the plants of other countries which he had collected there, through the commerce of that part of the world. He was professor of botany at Padua, and died in 1617, at the age of 64.

This is one of the largest genera of Zingiberaceous plants, and one of the species, *Alpinia Cardamomum*, yields a part of the seeds known by the name of Cardamoms. [CARDAMOMS.] They are all splendid plants, and form a handsome addition to our hothouses. They require in their cultivation a rich soil, a moist heat, and plenty of room. *A. racemosa*, a handsome species, is best cultivated as an aquatic.

Hedychium is a beautiful genus of plants. They have a grateful smell, and the species are called Garland-flowers. The anther is naked, the tube of the corolla is long and slender, with both limbs tripartite, and the capsule dry. In cultivation, the species, of which *H. angustifolium* is one of the handsomest, they require a light rich soil, and large pots to make the plants flower well.

Kæmpferia, a genus named after Engelbert Kæmpfer, the Japanese traveller, has the anther with a 2-lobed crest, and the tube of the corolla long and slender, with both limbs tripartite. The plants belonging to this genus have no stem. There are several species, all of them natives of the East Indies, and all are known by the name of Galangales. Some of the species have the aroma of the order, with a sharpish acid taste, and are used as condiments and medicines.

Roscoea, a small genus of the order, was named in honour of William Roscoe, the historian of the ‘Medici,’ who published a monograph of the plants belonging to the order Zingiberaceæ.

The genus *Globba* contains species which produce spikes of smoky-coloured berries, which are about the size of grapes, and are sometimes eaten.

(*Cyclopædia of Plants*; Lindley's *Natural System*; Christison's *Dispensatory*; Burnett, *Outlines*.)

ZINNIA, a genus of plants belonging to the natural order Compositæ, and to the tribe Helianthese, and the division Heliopsideæ of that tribe. It was named by Linnæus in honour of Dr. John Godfrey Zinn, professor of physic and botany at Göttingen, and author of a work entitled 'Catalogus Plantarum Horti Academici et Agri Göttingensis,' which was printed in 1757. He also wrote several treatises on various points of physiology. He was a pupil of Haller, and followed his master in the adoption of his system, in opposition to that of Linnæus. He died in 1758, at the age of 32.

This genus very closely resembles Rudbeckia, with which it was originally confounded by Zinn himself. It has a chaffy receptacle, the seed-down consists of two erect unequal awns, the calyx imbricated, somewhat ovate, the florets of the radius from 5 to 10, permanent and undivided. All the species are natives of South and North America; they are annuals, and form handsome border-plants in gardens. They may be propagated by seeds, which should be sown on a slight hotbed early in the spring. When the plants are three or four inches high, they should be pricked out on another bed previously prepared to receive them, where they may remain till the summer is advanced, when they may be planted out in the borders.

ZINZENDORF, NICOLAUS LUDWIG, COUNT VON, the founder (restorer) of the sect of the Moravian Brothers, or Herrnhuters [MORAVIANS], was the son of Count Georg Ludwig von Zinzendorf, chamberlain and state-minister of Augustus II., elector of Saxony and king of Poland. He was born on the 26th of May, 1700. He lost his father at an early age. His mother made a second marriage with the Count von Natzmer, a Prussian field-marshal; and young Zinzendorf was educated under the care of his maternal grandmother, the widow of Baron von Gersdorf, a pious and learned lady, who wrote some hymns and treatises on religious subjects, and corresponded in Latin with several distinguished divines and scholars. This lady lived on her estate in Lusatia, where she was frequently visited by pious men: the celebrated Jacob Spener was her most intimate friend, and it was the influence of this divine, who was considered the head of the Pietists, which produced in the mind of young Zinzendorf that religious tendency which made him noticed when a mere child, and in later years led him to reform the Protestant faith. In 1710 Zinzendorf was sent to the Paedagogium at Halle, which was then directed by Francke, to whose particular care he was intrusted. In that school Zinzendorf remained six years, and as Pietism was the ruling principle there also, he abandoned himself entirely to religious pursuits, and founded a mystical order among his fellow-pupils, which he called Der Orden von Senfkorn, or the Order of the Grain of Mustard-seed, in allusion to the passage in St. Matthew (xiii. 31, 32). His family however was not pleased with the theological occupations of a young nobleman, whom they wished to bring up as a statesman, and not for the church, which had been deserted by the Protestant nobility of Germany since the bishoprics and rich prebendaries had been abolished by the zeal of the secular princes. Zinzendorf was accordingly sent to the university of Wittenberg (1716), where there was a spirit in religious matters quite opposite to the Pietism of Halle; but far from giving up his pursuits, he continued to hold religious meetings in his house and elsewhere, and resolved to take orders and devote himself entirely to the church. It is however said that his life there presented a striking contrast with his principles; he was as often seen in gaming-houses as in conventicles; he dressed in the most fashionable style, and being possessed of great personal beauty, imagination, and vivacity, he became the favourite of women whose moral character was suspicious. It is said that he endeavoured to reclaim them to better principles, but it is also true that the doctrines which he afterwards preached presented a strange mixture of idealism and sensualism, and exposed him not only to vulgar slander, but to the reproach of a bad life and hypocrisy, with which he was charged by several of the gravest divines of his time. It was only for a short time that Zinzendorf led this equivocal course of life. During his stay at Wittenberg he formed a lasting friendship with Frederick von Watteville, a young patrician of Bern, who afterwards became the protector of the Moravians in Switzerland; and as early as 1715 he made the acquaintance of Ziegenbalg, the German missionary, on his return from the coast of Malabar, where he had been sent by the Danish government. Ziegenbalg was accompanied by a young native of Malabar, whom he had converted to Christianity; and it is said that the sight of this proselyte inspired Zinzendorf with the idea of propagating the Christian religion among the heathens, a design which he never lost sight of, and which he ultimately carried into execution. In 1719 Zinzendorf left Wittenberg, and travelled to Holland and France, for the purpose of making the acquaintance of distinguished divines. His religious principles at that time were pure, and in accordance with the Confession of Augsburg: he was of course not yet a sectarian, and distinguished himself from his fellow-believers only by his greater zeal and more fervent piety. At Utrecht he was highly distinguished by the jurist Vitriarius and by Basnage, both of whom encouraged him to preach, which he did with the greatest success. From Holland he went to Paris, accompanied by his friend the count of Reuss-Ebersdorf. Having been introduced to the nobility and at the court, he availed himself of the opportunity, and endeavoured to convert them to the Lutheran church. On some his sermons had a good effect, others styled him a Jansenist and Pietist; but to the majority he was an object of laughter and mockery. None however ventured to ridicule him to his face. Instead of an ordinary preacher of awkward manners and uncouth Teutonic expressions, they saw a nobleman accustomed to frequent the most aristocratic societies, who spoke French elegantly, and who, notwithstanding his youth, showed so much talent, learning, and self-possession, that wherever he appeared he was an object of general attraction. He maintained serious discourses on religion in the midst of the most frivolous society in the world; he was much noticed by the first men in Paris, and was frequently at the court of the Duke of Orleans, then regent of France. Lord Stair, the English ambassador at Paris, treated him with great respect. Father De la Tour, the general of the order of the Oratory, introduced him to the archbishop of Paris: the prelate and the count endeavoured to convert each other, but neither succeeded. From Paris Zinzendorf went to Switzerland, and thence returned to Saxony in 1721. Being now of age, he was intrusted with the management of his extensive estates, and the elector of Saxony appointed him a member of his state council. The count however was seldom seen at its meetings, and he resigned his place in 1728. As early as 1722 he married the sister of his friend the count of Reuss-Ebersdorf, and retired with her to his seat of Berthelsdorf in Upper Lusatia. One day a man called upon him, named Christian David, a carpenter from Moravia, who had travelled much: he belonged to the obscure sect of the Moravian Brothers, who professed the doctrines of John Huss in some remote corners of Moravia. David, who was a pious man, having informed the count of the oppression under which they lived under the Austrian government, Zinzendorf invited him to settle on his estate, and to bring thither such of his friends as would prefer liberty of conscience in a foreign country to religious oppression at home. David accepted the proposal, and returned in the course of the summer of 1722, with three men, two women, and five children, to whom the count gave some land and a wooden house situated at the foot of the Hutberg, or 'pasture-hill.' Such was the beginning of the celebrated colony of Herrnhut; for this name, which signifies 'the lord's guard,' was given by Zinzendorf to the settlement in allusion to the double meaning of the word 'Hut,' which signifies 'guard,' as well as 'a place where flocks are guarded,' that is, 'a pasture-ground.' [HERRNHUT.] The first settlers were so poor, that the countess presented them with some clothes and a milch cow, to prevent the children from starving; but they were industrious and good people, and soon got into better circumstances.

It was on this occasion that Zinzendorf first conceived the idea of forming a sect, and he published the principles of the new creed in several pamphlets, which sometimes contradict one another, but from which we may nevertheless see that he did not intend to separate from the Augsburg Confession. Herrnhut was destined to become the centre of that sect, and he invited other Moravian brothers, whose religious principles seemed to him to correspond best with his own, to settle in the new colony, to which he gave his solemn benediction. He supported the settlers with gre liberality, and he and his flock soon attracted the attenti of Germany and other Protestant countries. The num of his adversaries increased with that of his followers: he was attacked publicly and privately; but he also received proofs of respect and esteem from the highest quarters: the emperor Charles VI. invited him to his court at Vienna, but Zinzendorf declined this honour as well as many others. Faithful to his plan of converting the heathen, Zinzendorf went to Copenhagen in 1731, for the purpose of inquiring into the state of the Danish missions in Greenland, and the East and West Indies; and he despatched several of his disciples as missionaries to those countries. This is the origin of the system of the Moravian missions which are now scattered over the world. The king of Denmark, Christian VI., rewarded his zeal with the Knight Cross of the Order of Dannebrog, which Zinzendorf accepted; but he sent it back five years afterwards. In 1734 Zinzendorf went to Stralsund for the purpose of being ordained a minister of the Lutheran church. As his enemies were numerous, he adopted the name of Ludwig von Freideck, and engaged himself as tutor in the house of a merchant named Richter. After having been examined by the members of the consistory at Stralsund, he received ordination and preached in the chief church of that town. It is said that he became a tutor because he had devoted all his property to the establishment of his colony of Herrnhut, and wanted a livelihood; but this is scarcely credible. If he had lost his property, his devoted adherents would have supported him; or his brother-in-law, the count of Reuss-Ebersdorf, who was his sincere friend, would have supplied him with the necessary means. Besides, Zinzendorf continued to travel about the world; and although he was often in temporary want of money, because he spent large sums at once, he was never obliged to give up his plans for want of funds. In 1735 he intended to go to Sweden, but, on his arrival at Malmoe, he was ordered to leave the kingdom immediately. Upon this he attacked the king of Sweden, Frederick of Hesse-Cassel, in a pamphlet, of which he sent copies to the principal courts of Europe. This made him new enemies, and in 1736 he was banished from Saxony on the charge of having introduced novelties and preached dangerous principles in meetings of a suspicious character, which tended to weaken the authority of the government and to bring into contempt the services of religion as practised by the Protestant church. Zinzendorf took refuge with his brother-in-law, the count of Reuss-Ebersdorf, who was a sovereign member of the empire; and it was only in 1747 that he was allowed to return into Saxony. In the same year, 1736, he went to Holland, at the request of the princess-dowager of Orange, and founded the colony of s' Heerendyk (the lord's dyke), which was afterwards transferred to Zuyst. Thence he went to Livonia and Esthland, caused the Bible to be translated into the Livonian and Esthonian languages, and established several Moravian colonies there. On his return he was invited to Berlin by the king of Prussia, Frederick William I., who had a very unfavourable opinion of Zinzendorf, whom he believed to be a vulgar fanatic; but no sooner was the count introduced to the king, and spoke to him with that gentle and noble persuasion which had always distinguished him, than the king changed his opinion. Their conversation lasted three days, and the king was so pleased with him that he promised to acknowledge him as bishop of the Moravians, if the count would be ordained. Zinzendorf having agreed to the proposal, the Reverend Jablonski, who held the office of the king's first court preacher, ordained him bishop (May, 1737). The ordination of a bishop, by one who was not a bishop, was hardly in concordance with the canon law; but as Luther had ordained a bishop (Amsdorf), although he himself was no bishop, the practice seemed to be justified; and the ordination finally contributed to raise Zinzendorf in the opinion of the world, although, strange enough, the king of Prussia would not allow him to preach in public.

About this time Zinzendorf was informed that he might return to Saxony if he would sign a paper declaring himself guilty of several charges which had been brought against him by slanderers, but he nobly refused to do so, and continued to live in exile. In the same year (1737) he went to London, and held private meetings in his house, which were attended by a great number of both pious and curious persons, and led to the establishment of a Moravian congregation. Wesley received him with great kindness and esteem: and it is said that each of them tried to convert the other, but of course without effect. They were often engaged in discussions on religious subjects, and they argued particularly the question, whether men could attain perfection in this world, which Wesley affirmed, but Zinzendorf denied. From London Zinzendorf proceeded to the Danish colony of St. Thomas in the West Indies, and on his arrival there found that the Moravian missionaries who had been sent thither a few years before had been thrown into prison, and their chapels shut up by order of the local government. He succeeded in obtaining their liberty, and defended his and their cause with so much eloquence that the governor promised not to obstruct the religious services of the brotherhood. He now returned to Germany, made a tour to Switzerland, where Vernet and other French writers and philosophers received him with a kind of respectful curiosity, but avoided any intimacy with him; and in 1742 he set out for his great tour to the British colonies in North America. He was accompanied by his daughter, who was then only sixteen. No sooner had he arrived in Pennsylvania than he was assailed by accusations of the most disgusting and revolting description, which he supported with his usual calmness and forbearance. At Germantown he performed divine service regularly every Sunday, and made himself so popular that the inhabitants, who were mostly Germans, chose him their minister. He accepted the office with visible satisfaction, and being afterwards obliged to continue his travels, wrote to Herrnhut, and caused one of the preachers there to come over to America at his own expense, and to take his place as minister at Germantown. He also ordered a church to be built there at his own expense, for the use of the Moravian congregation, who had hitherto assembled in a barn. At Philadelphia Zinzendorf delivered a Latin speech in presence of a numerous auditory, to whom he declared that he considered his title of count to be inconsistent with his holy functions, and that he would henceforth be called Von Thumstein, which was the name of one of his estates. The Quakers in Philadelphia acted very kindly towards him and defended him warmly against his detractors; they used to call him 'friend Louis.' After having visited the Indians in the interior of the country, and founded the celebrated colony of Bethlehem, he returned to Europe (1743). During his absence the Moravian brothers in Livonia had endeavoured to establish their faith in an arbitrary manner in all the Lutheran churches of that country, and Zinzendorf was accused of having encouraged them to such proceedings. However, so far was he from having ever had the slightest idea of propagating his creed by other means than those of reasonable persuasion, that he immediately proceeded to Russia in order to justify himself. On arriving at Riga he received an order from the empress Elizabeth to leave the empire immediately, and he was put under a military escort, which accompanied him on his return as far as the Prussian frontier, and prevented him from holding any communications with the inhabitants. A few years after this he was allowed to return to Saxony (1747). During his exile the brethren had increased in number and in wealth, and their good conduct and industry had made them many friends among people of rank, so that the government gradually treated them with less severity. Zinzendorf's numerous and powerful friends also pleaded in his favour, and the government was finally fully persuaded of the reformer's honesty by an offer of the brethren to buy the castle of Barby and its territory, which belonged to the crown, but were of no use, as the castle was half in ruins and the soil barren, and for which the brethren offered to give one hundred and fifty thousand thalers (25,000l.), if they might be allowed to establish there a school of divinity. The Saxon government assented, full liberty of religion was granted to the brethren, and Zinzendorf returned to Herrnhut. In 1749 he went to England, and through the protection of Archbishop Potter, General Oglethorpe, and several other men of influence whose attachment to the church could not be doubted, he obtained an act of parliament for the establishment of Moravian colonies and missions throughout the British possessions in North America. He now set out for America to carry his plan into execution, and after an absence of some years returned to Herrnhut. His last great tour was in 1757, when he visited his friend Von Watteville at Montmirail, in the canton of Bern in Switzerland, whence he proceeded to Holland. He finally returned to his flock, and the Countess of Reuss, his wife, being then dead, he married Anne Nitschmann, the daughter of one of the first Moravians who had settled at Herrnhut, and who for many years had been superintendent of the spinsters at Herrnhut. Zinzendorf passed the last years of his active life in perfect quiet and retirement at Herrnhut, and when he died, after a short illness, on the 9th of May, 1760, he was buried in the cemetery of that place; thirty-two Moravian preachers from all the countries in the world, some even from Greenland, bore his coffin, which was followed by two thousand brethren and a crowd of people of all ranks and confessions.

Zinzendorf's activity was unbounded, but he had excellent health. He wrote more than one hundred pamphlets, all directed to the propagation of his creed, or to the defence of himself or his brethren. The following are some of them:—'Attici Wallfahrt durch die Welt' ('Atticus' Travels through the World'), a description of his first tour to Holland and France; 'Das gute Wort des Herrn' ('The good Word of the Lord'), a kind of catechism; 'Die wahre Milch der Lehre Jesus' ('The true Milk of the Doctrine of Jesus'); 'Der Deutsche Socrates' ('The German Socrates'), a periodical, &c. Many of them are anonymous. He also wrote a great number of hymns, which are in the song-books of the Moravians; they are of a remarkable mystical tendency; the versification is often harsh and the style broken, but they are wonderfully adapted to the organ and to singing in chorus. His writings may generally be characterized as a compound of beauty and tastelessness, of clearness and mystical dimness, of deep thoughts and common-places wrapt up in grand words. Dr. Jahr, the eminent homœopathist, who was formerly a Moravian preacher, used to say that he had made the hymns of Zinzendorf the subject of his particular studies, but that he could not unriddle many of his allusions and mystical words, though he was initiated into what is commonly called the mysteries of the Moravian creed. There is another defect, but only in the earlier writings of Zinzendorf, which deserves censure, although the author made apology for it, and regretted his aberrations in his later and cooler years. This is the pious obscenity which poisons many of his hymns and sermons, and is particularly conspicuous in such as treat of the mystical marriage of Christ with his bride the church, and the unctions of the Holy Ghost as a spiritual mother. Most of his sermons were not published, nor even written by him, but by others who took short-hand notes of them which they afterwards caused to be printed. Zinzendorf as a poet is the founder of a particular school of hymn-writers.

(Varnhagen von Ense, *Leben des Grafen N. von Zinzendorf*, in the fifth volume of his 'Denkmale;' this is the best biography of Zinzendorf; the author is considered to hold the first rank among German biographers; Spangenberg, *Leben des Grafen N. von Zinzendorf*, from which extracts have been published by Reichel and Duvernois; Spangenberg was one of the earliest friends and disciples of Zinzendorf, and his work is not impartial; an English abridgment of it was published under the title of 'Memoirs of the Life of Count Zinzendorf, Bishop of the Moravian Brethren,' by Spangenberg, translated by Samuel Jackson, with an Introductory Essay by Latrobe, London, 1838, 8vo.; Müller, *Das Leben des Grafen N. von Zinzendorf*, in the third volume of his 'Bekenntnisse berühmter Männer.')

ZI'PHIUS. [WHALES, p. 297.]

ZIRCON.—*Hyacinth; Jargoon.*—Occurs in attached, imbedded, and loose crystals. Primary form a square prism. Cleavage parallel to the lateral planes, indistinct. Fracture conchoidal, undulating, brilliant. Hardness, scratches quartz. Brittle. Colour white, grey, red, reddish brown, brownish orange, yellow, pale green; streak white. Lustre adamantine. Doubly refractive in a very high degree. Transparent; translucent; opaque. Specific gravity 4·505.

Before the blow-pipe infusible, but loses its colour; with borax fuses into a transparent glass.

Found at Expailly, in France; Ceylon; at Friedrichsuärn, Norway; Greenland, the United States, &c.

Analysis of the zircon from Expailly, by Berzelius:—

Silica . . .	33·3
Zirconia . . .	66.7
	100·

ZIRCO'NIA. [ZIRCONIUM.]

ZIRCO'NIUM, a peculiar metal obtained from the earth or metallic oxide zirconia. It is procured by heating the double fluoride of potassium and zirconium with potassium in a glass or iron tube. When the cooled mass is treated with water, a black powder very much like charcoal remains, and this is zirconium, containing however some hydrate of zirconia, from which it is freed by hydrochloric acid: being afterwards washed with hydrochlorate of ammonia and alcohol, it remains nearly pure.

The properties of zirconium are,—that under the burnisher it assumes the lustre of iron, and is compressed into scales resembling graphite. When heated in the air, even below redness, it takes fire; and by combining with oxygen is converted into oxide of zirconium, or zirconia. Alkalis or acids, except the hydrofluoric acid, produce little effect upon zirconium, but this dissolves it with the evolution of hydrogen gas.

Oxygen and Zirconium, constituting the earth *zirconia*, exist in the state of silicate in the zircon, and also as a titaniate in the æschynite. [TITANIUM.] Its properties are,—that it resembles alumina in appearance: is inodorous, insipid, and insoluble in water. It is sufficiently hard to scratch glass. When heated by the blow-pipe, it phosphoresces vividly.

It appears to be composed of—

One Equivalent of Oxygen .	. 8
One Equivalent of Zirconium	. 22
Equivalent .	. 30

Zirconia forms salts with acids, which possess the following characters:—They have an astringent taste; they are precipitated by the caustic alkalis potash and soda, and an excess of them does not redissolve the precipitate. When boiled with sulphate of potash, a subsalt of zirconia is formed, and being insoluble subsides. Infusion of galls produces a yellow precipitate, and phosphate of soda a white one: carbonate of zirconia, when recently precipitated, is soluble in bi-carbonate of ammonia and of potash.

ZIRKNITZ. [CIRKNITZ.]

ZISKA, or more correctly ZIZKA, OF TROCZNOW, JOHN, the celebrated leader of the Hussites, was born under an oak-tree in the open fields, near the castle of Trocznow, in the circle of Budweis, in Bohemia, about 1360, or, as some say, about 1380. His father, the lord of Trocznow, was a Bohemian noble of more credit than wealth. John Zizka lost one eye at an early age, and hence it was said that he was called Zizka, which would signify 'one-eyed' in the Bohemian language. But this fiction; Zizka was the name of his family, and it does not signify one eyed either in Bohemian or in Polish.* At the age of twelve John Zizka was received among the pages of Wenceslaus, king of Bohemia and emperor of Germany, and he became distinguished among his fellow-pages by his gloomy temper and his love of solitude. Disgusted with the trifling and capricious character of Wenceslaus, Zizka left the court, and sought his fortune abroad. For some time he served as a volunteer in the English army, and distinguished him- against the French. He afterwards went to Poland, and commanded a body of the Bohemian and Moravian auxiliaries of King Wladislaw II., Jagiello, in his war against the Knights of the Teutonic Order. The dreadful battle of Tannenberg (15th of July, 1410), in which the grand-master Ulrich von Jungingen was slain, with 40,000 knights and soldiers, was decided in favour of the Poles by those auxiliaries, and John Zizka distinguished himself so much that King Wladislaw rewarded him with a chain of honour and other rich presents. The war being terminated by that battle, Zizka fought against the Turks in Hungary, and having again entered the English army, won fresh laurels at the battle of Azincourt (1415). After this he returned to Bohemia, and accepted a place as chamberlain at the court of King Wenceslaus, against his own inclination, and for reasons unknown.

Zizka was an adherent of the doctrines of John Huss, and the fate of this reformer and his friend Jerome of Prague, who were burnt at Constance, in 1415, was considered by him as an insult to his faith and his country. His hatred of the Roman Catholic clergy was increased when his favourite sister was seduced by a monk. He became conspicuous among those Bohemian nobles who urged King Wenceslaus to revenge the insult, and to protect the followers of Huss against the decisions of the synod of Constance. The king, seeing him one day from the window of his palace walking in a thoughtful mood, asked him what he was meditating about. 'Upon the bloody affront,' answered Zizka, 'which the Bohemians have suffered at Constance.' 'It is true,' replied the king, 'that we have been insulted, but I fear it is neither in my nor in your power to revenge it. If you can do so, I give you my royal permission.' It is said that this circumstance first inspired Zizka with the resolution of defending with his sword the religious liberties of his country. But Wenceslaus was a man of so little steadiness and energy, that he was alarmed at his own resolves, and his perplexity was augmented when he was informed that the Bohemian nobles had resolved to take up arms in defence of the dignity of his own person. Their leader was Nicholas of Hussynecz, and Zizka was among them. They did not venture to appear before the king though they acted with his permission. Zizka however persuaded them to follow him, and having been received by the king, spoke to this effect:—'Sire, behold a body of your majesty's faithful subjects. We have brought our arms, as you commanded. Show us your enemies, and you shall acknowledge that our weapons can be in no hands more useful to you than in those which hold them. 'Take your arms,' replied the king, after a moment's hesitation, 'and use them properly.' Zizka's conduct on this occasion recommended him to the confidence of his party. But the king's energy was not real; he did not protect the followers of Huss; and the Roman Catholic party became still more insolent. On the 30th of July, 1419, there was a public procession at Prague, and some quarrel having broken out between the Roman Catholics and the Hussites, a Hussite priest was wounded by a stone thrown by a Roman Catholic. The discontent of the Hussites now burst out, and, as the government of the town was in the hands of the Roman Catholics, they proceeded to the town-hall, where the magistrates were assembled, and, led by Zizka, stormed it, and threw thirteen aldermen from the windows into the court-yard, where they were torn in pieces by the mob. When Wenceslaus was informed of it, he fell into a fit of passion, and died. [WENCESLAUS.] This was the beginning of the Hussite war, the first great religious contest that desolated Germany. Zizka was proclaimed commander-in-chief by the Hussites, and he found no opposition to his authority.

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* There are still Zizkas living in Bohemia.

Siegmund, king of Hungary and emperor of Germany, considered himself as the lawful successor of his brother Wenceslaus in Bohemia; but the Hussites, who knew the emperor's character, and had not forgiven him his faithless conduct towards Huss, did not acknowledge his title. They resolved to exclude him from the throne, they prepared for resistance, and protected the doctrines of Huss throughout the kingdom. In 1420 Siegmund entered Bohemia at the head of 40,000 men, and Pope Martin V. endeavoured to increase his adherents by preaching a crusade against the Hussites. Encouraged by some advantages over Zizka, the emperor behaved with cruelty to the Hussite priests, who were burnt alive by his order wherever they fell into the hands of the Imperialists. But the party of the Hussites grew daily more dangerous, and Zizka not only disciplined their troops, but secured them against sudden attacks by building fortresses in proper situations. His principal fortification was near Bechin. A short distance from this town the Moldau winds round a craggy hill, and forms a spacious peninsula, the neck of which is scarcely forty feet wide, and on that side only is the peninsula accessible. The hill was fortified with great skill, and a strong body of Hussites encamped there in tents; but the tents soon became houses, in the midst of which stood the palace of Zizka. The name of the hill was Tabor, and hence the Hussites called themselves Taborites, by which name they afterwards distinguished themselves from some sects which sprung up among them, as the Calixtines, the Orebites, and the Orphanites. Zizka began his victories with the conquest of Prague, except the castle; and he took up a fortified position on Mount Wittkow in order to protect the town againt Siegmund, who approached with 30,000 men: Zizka had only 4000. When he was attacked, on the 14th of July, 1420, he not only drove the Imperialists back, but entirely routed them. That mountain is still called the Zizka-mountain. The emperor having been obliged to retreat from Bohemia, Zizka laid siege to the castle of Prague, which he took in 1421, and there found four cannons, the first which he had in his army. But he soon increased his artillery, and he procured a great quantity of small fire-arms, which had hitherto been very little used in warfare. He gave fire-arms to a considerable part of his army, and from this time they gradually became the common arms of the infantry of all nations. Zizka was also very deficient in cavalry, and, in order to protect his infantry against the attacks of cavalry, he invented, or rather introduced again, an antient kind of barricado, made of baggage-carts, which is known by the German name of 'Wagenburg' (cart-fort). These were not the sole inventions of Zizka, whose name will ever be conspicuous, not only as a general, but also as an engineer. In the same year (1421) Zizka lost his other eye by an arrow during the siege of the castle of Raby; but he nevertheless continued to head his troops, in front of whom he was carried in a cart, and he arranged the order of battle according to the description of the ground made by his officers. In this difficult business he was greatly supported by his excellent memory and his complete geographical knowledge of Bohemia. Meanwhile Siegmund had levied a new army in Germany, the flower of which was a body of 15,000 Hungarian horse, who were considered the best in Europe, and were commanded by an Italian officer of great experience. A pitched battle was fought on the 18th of January, 1422. Historians speak of the onset of Zizka's troops as a shock beyond all credibility, and it appears that they have not exaggerated it. The imperial infantry made no stand at all, and the horse took to flight after a feeble resistance: they were beaten by terror rather than by the sword. They retreated towards Moravia, and were so hard pressed by Zizka that they crossed the frozen Igla in large bodies, and, as the ice broke, about 2000 of them were drowned. In the same year Zizka obtained a decisive victory at Aussig, over a Saxon army commanded by the Electors of Saxony and Brandenburg. The Saxons however were excellent soldiers, and on their first onset the Hussites were so well received that they retired in confusion, and then stood still facing their enemy with silent amazement. They had never met with such resistance, and they believed that nobody could resist them. Upon this Zizka approached on his cart and said:—'Well, my brethren, I thank you for all your past services: if you have now done your utmost, let us retire.' This noble rebuke roused their fanatical courage, and in a second attack the Saxons were routed and left 9000 dead on the field. Siegmund now saw that he could never conquer Bohemia, and he proposed an arrangement, to which he was the more inclined as some of the Bohemian states had offered the crown to Witold, grand-duke of Lithuania, who accepted it and sent Prince Korybut to Prague as his viceroy. But Korybut, being only supported by part of the Hussites, could not maintain himself, and was compelled to return to Lithuania. On the other hand there were good reasons for Zizka making peace, for although his own authority was never shaken, the animosity between the minor sects of the Hussites was too great to allow the prospect of a lasting political union among them. Siegmund promised to grant full religious liberty to the Hussites, and to appoint Zizka governor of Bohemia and her dependencies with great power and privileges. But Zizka did not live to complete the treaty, which was ready to be concluded after an interview had taken place between him and the emperor, with whom the blind general treated on terms of equality and with the confidence of a sovereign king. Hostilities were continued during the negotiations: Zizka laid siege to the castle of Przibislaw, in the district of Czaslau; and a kind of plague having broken out, he was seized, and died on the 12th of October, 1424. Zizka was victorious in thirteen pitched battles and more than one hundred engagements and sieges: he was only once beaten in the open field, at Kremsir in Moravia; but he retreated in such good order that his defeat was not followed by any bad consequences for him.

The only stain on his character was his *cruelty*. He believed himself the instrument of divine vengeance, and he called the cries and lamentations of the monks and priests who were burnt by his order the bridal-song of his sister. He was buried in a church at Czaslau, and his iron war-club, with which he is represented in many engravings, was hung up over his tomb. When the emperor Ferdinand I. came to Czaslau, in 1554, and saw the tomb, he asked who was buried there, and being informed that it was Zizka, he cried out in Latin, 'Phui, phui, mala bestia, quæ mortua etiam post centum annos terret vivos!' (Lo, the wicked beast, one hundred years dead, and still frightens the living!) The emperor was actually so frightened that he left the church immediately, and would not stay the night at Czaslau, but proceeded on his journey. There is a common but idle tale that Zizka on his deathbed ordered his skin to be tanned, and put over a drum in order to frighten his enemies after his death; and it is also said that the Hussites used that drum in many a battle: all this is fabulous.

After Zizka's death the negotiations with the emperor were broken off: the Taborites chose Procop the Holy for their leader; the Orebites, Krussina; and the Orphanites, Procop the Little, who continued that awful war for eleven years more, till it was finished by the treaty of Prague, in 1435, in consequence of which Siegmund was acknowledged king of Bohemia.

(Millauer, *Diplomatisch-historische Aufsätze über Johann Zizka von Trocznow*, Prague, 1824; Koelerus, *Eulogium Joh. de Trocznow cognomento Ziskae*, Göttingen, 1742; *The Life of Zizka*, in Gilpin, *The Lives of John Wiccliff and of the most eminent of his Disciples, Lord Cobham, John Huss, Jerome of Prague, and Zizka*.)

ZITTAU, a town of Upper Lusatia, in the kingdom of Saxony, in 50° 52′ N. lat. and 14° 45′ E. long., is pleasantly situated in a small valley on the river Mandau, not far from its junction with the Neisse. It is surrounded with walls and a moat. Having been nearly destroyed in 1757 by the Austrians, who besieged it, on which occasion 600 houses were burnt, it was rebuilt in a much better manner, and is reckoned, after Dresden and Leipzig, one of the handsomest towns in Saxony. It has 1100 houses, nearly all of stone, and 8500 inhabitants, all Protestants. It is the centre of the linen manufacture, and of the linen and damask trade of Saxony, and, on account of its great traffic, has been called Little Leipzig. There are manufactures of linens, woollens, cotton yarn, leather, dyeing-houses, calico-printing establishments, bleaching-grounds, &c. The magistrates have extensive privileges, with jurisdiction over 45,000 inhabitants, for thirty-five mostly large manufacturing villages, and large estates, belong to the town. The public revenue is therefore considerable, and all the institutions well provided for. There are five churches, a gymnasium, an admirable town free-school, a seminary for schoolmasters, a school of industry and Sunday-school, numerous well-conducted charitable institutions, an orphan asylum, a savings'-bank, the rich hospital of St. James, with a church annexed to it, and a theatre. Some of the churches are handsome buildings, especially the new church of St. John. The city library, the largest in Upper Lusatia, contains 13,000 volumes; a cabinet of natural history; and many curiosities, among which are the letters patent granted on the 11th of June, 1609, by the emperor Rudolph II. to the Bohemian Protestants, securing to them the free exercise of their religion. The revocation of these letters patent by the emperor Mathias, in 1608, was one of the first and principal causes of the Thirty Years' War. There is still a Bohemian Protestant community of 1000 persons in the suburb, who have a church in the town. The town is surrounded by fine public promenades, planted with trees, from which there are extensive views towards Bohemia.

The export trade is very considerable: that of linens and damasks is to the amount of 500,000 rix dollars annually. There is likewise a profitable transit-trade to Bohemia. Near Zittau is the Lausche, a mountain belonging half to Bohemia and half to Saxony, from the summit of which there is a very fine and extensive prospect of Upper Lusatia, and part of Meissen, Bohemia, and Silesia.

(Engelhardt, *Vaterlandskunde im Königreiche Sachsen*; Brockhaus, *Conversations Lexicon*; Cannabich, *Lehrbuch*.)

ZIZA'NIA (from *ζιζάνιον, zizánium*), the Greek name of *Lolium temulentum*, the modern Darnel. This plant has always been troublesome amongst wheat, and is mentioned in the New Testament, and in the English version zizanium is translated 'tares.' The name has now been adopted by Gronovius and Linnæus for a very different genus of plants. This practice however cannot be too much condemned, as it has in many cases led to very considerable misunderstanding.

This genus is monœcious; the male flowers have no calyx, and their corolla is a 2-valved blunt glume, which are mixed with the female flowers; the female flowers have no calyx, and their corolla is a 2-valved glume, cucullate, and awned; the style is 2-parted; the seed single, enveloped in the plaited corolla.

Z. aquatica, Canadian Wild Rice, has a pyramidal compound panicle, with numerous male flowers in the lower part; spiked and female above. This plant is common in all the waters of North America from Canada to Florida. It flowers in July and August, and is known by the name of *Tuscarora*, or Wild Rice. It was introduced into this country by Sir Joseph Banks, in 1793, who cultivated it for many years in the ponds of his villa at Spring Grove. The seeds of this plant afford a nutritious article of diet, and are eaten by the wandering tribes of North-West America. The water-fowl of North America also feed on the grains of this plant. It has been acclimated in some parts of this country, and grows abundantly on the margins of ponds and shallow streams. It is however inferior as an article of diet to the kinds of corn usually grown in this country. Some of the species of this genus have been described, but they have the same general character, and are perhaps only varieties of the present species. This plant may become of importance as an article of diet, as it will grow in situations where other nutritious grains will not.

(*Cyclopædia of Plants*; Smith, in Rees's 'Cyclopædia.)

ZIZEL. [SOUSLIK.]

ZI'ZYPHUS (from *zizouf*, the Arabic name of the Lotos; Greek, *ζίζυφον*), a genus of plants belonging to the natural order Rhamnaceæ. It has a 5-cleft spreading calyx; 5 obovate, unguiculate, convolute petals; a pentagonal flat disk, expanded and adhering to the tube of the calyx; a 2-3-celled ovary immersed in the disk; the styles 2 to 3; the fruit fleshy, containing a 1-2-celled nut; the seeds sessile, compressed, and very smooth. The species of this genus are shrubs, with alternate 3-nerved leaves, spiny stipules, and mucilaginous fruit, which is eatable.

Z. vulgaris, the Common Jujube, has ovate, retuse, toothed, smooth leaves; prickles absent or twin; and an ovate oblong drupe. This plant is a native of Syria, from whence it has been introduced into Europe. It is now cultivated in many parts of the south of Europe, where its fruit is known by the name of Jujube. It has yellow-greenish flowers, two or three of which grow together. The fruit is of a blood-red or saffron colour, and has a sweet granular pulp. In Italy and Spain it is eaten as a dessert when fresh, and in the winter season as a dry sweetmeat. It is also sold in great quantities in the markets of Constantinople. The Jujube is commonly planted by the Turks of Constantinople before their coffee-houses for the sake of its shade. Du Hamel recommends the general cultivation of the tree on account of its foliage. The taste of the fruit is somewhat acid; the flesh is firm, and, when dried, forms an agreeable sweetmeat. A syrup made with it is recommended in coughs and catarrhs, and lozenges of it are used for the same purpose. The fruit does not ripen in Great Britain nor in Paris, but it does in the south of France. This plant was introduced into England in 1640. Although it attains a height of 20 or 30 feet in its native countries, it does not grow to anything like that height here. It prefers a soil that is dry to one that is moist. It is easily propagated by cuttings of the roots, or by suckers, which it throws up in great abundance. The seeds obtained from plants grown in Italy will germinate freely when sown in this country.

Z. sinensis, Chinese Jujube, has ovate oblong, acute, serrated leaves, glabrous, except beneath, along the nerves; pubescent branches; reflexed petals; twin straight prickles; and ovate drupe. This plant is a native of China, and has greenish white flowers. It has a brownish, ovate, fleshy fruit, which is eatable, and is sold in the markets of Canton during the autumn.

Z. spina-Christi, Christ's Thorn, has ovate, toothed, smooth leaves, pubescent beneath; prickles twin, one straight, the other incurved; the peduncles corymbose; the drupe ovate-globose. This plant is about eight feet high, and is a native of the North of Africa, of Palestine, Ethiopia, and Egypt. The flowers are yellowish green. The fruit is oblong, about the size of a sloe, and much eaten in Egypt and Arabia. This plant has pliant branches, and is round and surrounded by numerous long filiform tentacula. The *Iluanthus Scoticus* was found in four fathoms of water in Loch Ryan.

4. *Actinia*, Linnæus, now restricted to such species as have simple tubular retractile tentacula, and adhere by a broad base. Ehrenberg has separated such *Actiniæ* as have a glandular epidermis, under the name of *Cribrina*. From the glands protrude long filaments, the uses of which are unknown. The tentacula of all the species are (contrary to the supposition of Ehrenberg) perforate at their extremities. [ACTINIA.] The subgenus *Adamsia* has been constituted, by Professor E. Forbes, for the reception of the curious parasitical *Actinia maculata*, which envelopes the mouths of dead shells, generally selecting such as have been previously invested by the *Alcyonidium echinatum*. As such shells are frequently inhabited at the same time by the Hermit Crab, not a few naturalists have mistaken the coincidence for some necessary and mysterious friendship of the zoophyte for the crustacean.

5. *Anthea*, Johnston, includes such Actiniæ as have not the power of retracting their tentacula. Several of the species grow to a large size.

Example, *Anthea Tuediæ*, Johnston, 'Brit. Zoophytes,' p. 222, fig. 33.

6. *Actinoloba*, Blainville (*Metridium*, Oken). Species in which the oral disk is divided at the margin into more or less rounded lobes, which bear short simple tentacula.

Example, *A. dianthus*, 'Phil. Trans.,' lvii., tab. 19, fig. 8.

7. *Capnea*, Forbes, of which one species only is known. The disk is round with several circles of exceedingly short tubercular retractile tentacula, and the body is in part invested with a peculiar epidermis, which is divided at the margin into eight lobes.

Example, *C. sanguinea*. 'Annals of Natural History,' vol. vii., pl. 1, fig. 1. Irish Sea.

C. Sea-Anemonies having more or less pinnate tentacula.

8. *Actineria*, Quoy and Gaimard. Such as have the entire disk covered by very small villose ramified tentacula.

Example, *A. villosa*, Quoy and Gaimard. 'Voy. Astrolabe, Zooph.,' pl. 49, figs. 1, 2. Tonga Islands.

9. *Actinodendron*, Quoy and Gaimard. Species having very long arborescent tentacula disposed in one or two series on the oral disk.

Example, *A. alcyonoideum*. 'Voy. Ast.,' pl. 48, figs. 1, 2. This animal is more than a foot in height, and secretes a stinging mucus.

10. *Thalassianthus*, Leuckart. One species only known, the *T. aster*, an inhabitant of the Red Sea, figured in the plates to Rüppell's 'Voyage.' Its tentacula are numerous, short, and pinnate. It is probably identical with the *Epicladia* of Ehrenberg.

11. *Heterodactyla*, Ehrenberg. The tentacula are of two sorts, some simple and others pinnate.

Example, *H. Hemprichii*. Red Sea.

12. *Megalictis*, Ehrenberg, founded on an animal from the same locality with the last, and characterized by having all the tentacula arborescent, but the internal ones are the larger and more pinnate, and have their exremities hollowed into a sort of socket.

Example, *Megalictis Hemprichii*.

Family III. *Zoanthidæ*.

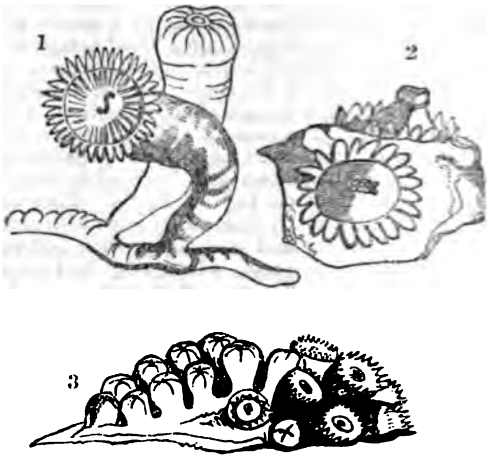
The genera of this family are few, and the animals included in them have by some been mistaken for *Alcyonia*.

1. *Zoanthus*, Cuvier.—The body is elongated, and pedunculated, springing from a base comm several individuals. The mouth is linear and trans in the centre of a disk bordered by short slender tent

Example, *Z. Solanderi*. West Indies.

2. *Mamillifera*, Lesueur (*Polythoe*, Lamoureux). body is coriaceous, short, and mammiliform ; slight larged at its buccal extremity, and provided with s rows of marginal tentacula. It is subpedunculated a base, and springs from a common expansion.

Example, *M. auriculata*. West India Islands.



1, Zoanthus Solanderi; 2, Corticifera glareola; 3, Mamillifera auri

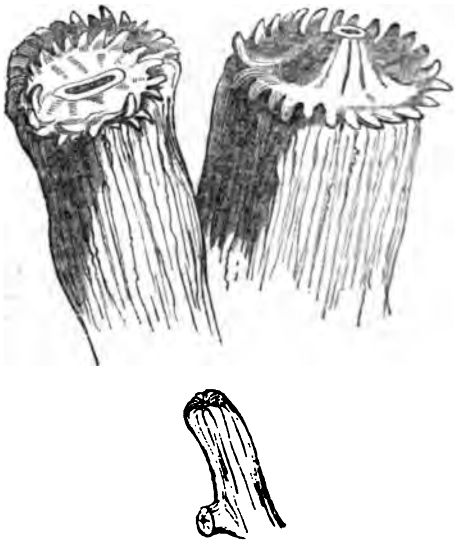
3. *Corticifera*, Lesueur. Body short, cylindric, a longitudinal mouth surrounded by petaliform ten at one extremity, and merged at the other into a co mass with numerous similar individuals, so that a poliferous crust is formed. Thus there is a tra through this genus from the soft Actiniæ to the cora

Example, *C. glareola*. Guadaloupe.

The best account of the *Zoanthidæ*, with a figures, will be found in the papers of Lesueur, i first volume of the 'Transactions of the Philad Academy.'

Family IV. *Madreporidæ*.

The animals which form the harder and larger closely resemble the *Actiniæ*. Generally, as far as have been examined, there is but little variety a them ; but judging from the differences presented b or two types, it is probable that future research show a greater diversity of form in this family than present admitted. Thus though the usual form c coral animal is that of a cylinder terminated by a dis rounded by simple tentacula, in *Fungia* we have the tacula irregularly scattered over a broad expansion in *Desmophyllum* they are reduced to the appearan irregular folds.



Animal of Cladocora cæspitosa. (From an original drawing.)

The following revision of M. de Blainville's table of Stony Zoophytes exhibits the number and relations of genera of the *Madreporidæ.*

- Tribe I. Madrephylliæ
  - Sect. 1. Madrephylliæ
    - Cyclolites
    - Montivaltia
    - Lithactinia
    - Fungia
    - Polyphyllia
    - Anthophyllia
    - Turbinolia
    - Diploctenia
    - Turbinolopsis
    - Caryophyllia
    - Cyathina
    - Cladocora
    - Desmophyllia
    - Lithodendron
    - Sarcinula
    - Columnaria
    - Stylina
    - Catenipora
    - Syringopora
    - Dendrophyllia
    - Lobophyllia
    - Meandrina
    - Dictiophyllia
    - Agaricia
    - Tridacophyllia
    - Monticularia
    - Pavonia
  - Sect. 2. Madrastreæ
    - Astrea . .
      - Astroidea
      - Phyllastrea
      - Tubastrea
      - Siderastrea
      - Thamnastrea
      - Turbinastrea
      - Dipsastrea
      - Montastrea
      - Favastrea
      - Strombastrea
      - Cellastrea
      - Cystiphyllum
    - Echinastrea .
      - Explanaria
      - Favia
    - Oculina . .
    - Branchastrea
- Tribe II. Madreporæ
  - Dentipora
  - Astreopora
  - Sideropora
  - Stylopora
  - Coscinopora
  - Geminipora
  - Montipora
  - Madrepora
  - Millepora
  - Heliopora
  - Alveopora
  - Porites
  - Seriatopora
  - Pocillopora
  - Chaetites

For figures and descriptions of the more remarkable of these genera, see ASTRÆA, MADREPHYLLIÆA, and MADREPORÆA.

Fossil Zoantharia.

Until lately it was supposed that no traces of pre-existing species of the soft Zoophytes existed; and indeed the structure of the *Actiniadæ* rendered it improbable that any such should be found. Professor Bailey however has described, in the 'Boston Journal of Natural History' (1843), some microscopic fossils, which he considers as analogous to the spiculæ which are found in the epidermis of certain American species of Actiniadæ.

Fossils of the family *Milleporidæ* are very abundant, and among the most important of organic remains, considered in a geological point of view. In Mr. Morris's Catalogue of British Fossils (1843), nearly 150 species are enumerated as described remains in British strata. Of these by far the greater part are derived from the oldest rocks, and are among the strongest evidences we have of a universal warm climate during the earlier epochs of the world's history.

ZOBEL, BENJAMIN, the inventor of marmotinto, was born in 1762, at Memmingen in Bavaria. He received his education at the government school of that city, and acquired the rudiments of drawing from one of the monks belonging to the convent of Ottobeuern. In 1781 he went to Amsterdam, where he resided for two years, occupying himself chiefly in portrait-painting. In 1783 he came to London, where he formed acquaintance with Morland and Schweickhardt, the latter of whom was employed at Windsor Castle by George III.'s 'table-decker.' It was then the custom to ornament the royal dinner-table by having a silver plateau extending along the centre, on which were strewed various coloured sands or marble dust, in fanciful designs of fruit, flowers, arabesque-work, &c. For this an artist of considerable talent and of great freedom of hand was required. On the retirement of Schweickhardt, Zobel was appointed; and he continued to fill the office for a considerable period. Ornamenting the royal table in the manner just described was a daily occupation, the sands not being cemented by any substance. From this occupation arose the idea in the mind of Zobel of producing a finished and permanent picture, by the use of some substance by which the sands might be fixed. After various experiments, a composition (in which gum-arabic and spirits of wine formed the chief ingredients) was found to answer the best. The subject of the picture having been designed either on pannel or milled board, a coating of the glutinous substance was spread over it; the different coloured sands were then used in a similar manner as that employed in decking the royal table, viz. by strewing them from a piece of card held at various elevations, according to the strength or softness of the tint required. Thus was formed a picture, not subject to decay, and perfectly permanent in all its parts, and this was called by the inventor, Marmotinto. Some of the best specimens of this peculiar art were formerly in the possession of the late Duke of York, but were sold, at his death, at Oatlands. Several are still among the collections of paintings belonging to the Duke of Northumberland and Sir Willoughby Gordon.

Painting on gold and silver grounds in transparent colours for the representation of cabinets of humming-birds, &c. was also practised with eminent success by Zobel. He died in 1831.

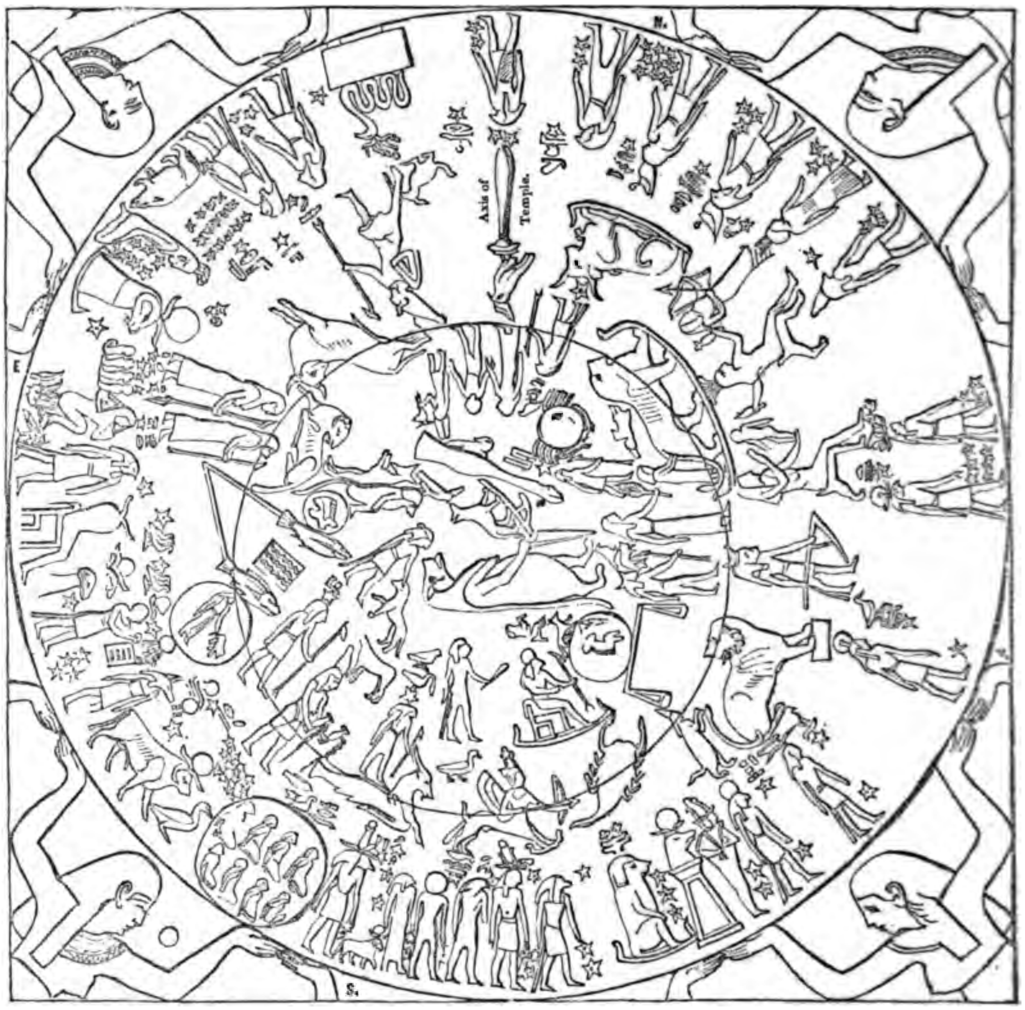
ZO'DIAC (in Greek *ὁ Ζῳδιακός κύκλος*, 'the Zodiac circle') is a name given to a zone of the visible heavens, extending in breadth to certain equal distances on both sides of a great circle of the celestial sphere, in the plane of the earth's orbit produced. This circle, with which the apparent annual path of the sun coincides, is called the ecliptic; at present it makes with the plane of the earth's equator an angle equal to about 23° 27′ 35″, and it is divided into twelve equal parts, called *signs*, which receive their denominations from those of the figures intended to designate the constellations or groups of stars about it. Most of the figures being those of animals, the name of zodiac (from *ζῴδιον*, *zódion*, the diminutive of *ζῷον*, *zöon*, 'an animal') has, in consequence, been applied to the zone.

The planes of the orbits of all the planets, when produced to the celestial sphere, are supposed to be comprehended within the breadth of the zodiac, and that breadth is determined by two small circles parallel to the plane of the ecliptic. Before the discovery of the planets Ceres, Pallas, Juno, and Vesta, the greatest inclination of the orbit of a planet to the ecliptic scarcely exceeded 7 degrees, and therefore the breadth of the zodiacal zone was imagined to be about 16 degrees, or 8 degrees on each side northward and southward of the ecliptic. The orbit of Pallas (that which deviates most from the ecliptic) is inclined about 35 degrees to that plane; and it might now be understood that the breadth of the zone is about 70 degrees.

The line in which the plane of the ecliptic intersects that of the terrestrial equator, being produced indefinitely, cuts the celestial sphere in two points diametrically opposite to each other; and one of these meeting the heavens, in the age of the earliest Greek astronomy, near certain stars forming a constellation to which the figure of a ram (Aries) was assigned, is generally called the first point of Aries. From this point are reckoned, on the ecliptic, the longitudes of celestial bodies; and on the equator, their right ascensions. The twelve equal parts or signs into which the ecliptic is divided are distinguished by the names of the constellations which, in the age above alluded to, fell within their respective extents in longitude; and the names both of the signs and constellations are as follow:—Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, and Pisces.

The distribution of all the visible stars into groups or constellations was the first step in laying the foundation of astronomical science. It must have taken place in the earliest ages of the world; and there is the highest degree of probability that the zodiacs of all nations have been derived from a common source, though in passing from one people to another it may be easily conceived that the figures would suffer changes from the vanity or caprice of individuals. Among the antients, the place of the sun in the zodiac served to regulate the seasons of the year; the representations of the figures associated with the groups of stars were almost constant ornaments of the religious edifices; and superstition assigned to the regions of space influences on the lives and characters of men depending upon the qualities of the animals or objects which distinguished the constellations in the corresponding parts of the celestial sphere.

The loss of the writings of the antient Babylonians, and the entire destruction of their edifices, have deprived the world of every monument by which light might be thrown on the state of astronomy among a people whose priests, according to Strabo, were mostly engaged in the study of the science. In fact our information respecting it consists chiefly of the notices given by Ptolemy concerning a few of their observations, and from the evidence of Geminus. Diodorus Siculus states (*Biblioth. Histor.*, ii. 30) 'that the Babylonians had twelve chief deities, to each of whom they assigned a month, and one of the so-called twelve animals,' by which he means the twelve parts of the zodiac; and from this it may be inferred that they divided the zodiac into twelve signs. Sextus Empiricus (*Adversus Math.*, lib. v.) makes a like statement, and shows how, by means of a clepsydra, the division was or may have been made. With respect to the astronomical monuments which adorned their edifices, a few fragments only of stone, having on them figures which may or may not have been intended as representations of those which distinguish the constellations, have been dug up near Bagdad; and the most remarkable of these is one having on its face a solar disk accompanied by a serpent: the figure may have designated Ophiuchus, and it is possible that it may have been part of a Chaldæan planisphere. The division of the zodiac into twelve signs may have been originally made for the convenience of distinguishing the portions which the sun passes through in the several months; and a division into twenty-eight parts is alluded to by Geminus (Εἰσαγωγὴ εἰς Φαινόμενα), which was probably made to denote the space daily described by the moon by her proper motion. The former division was used by the Egyptians, the Greeks, and by all the civilized nations of Asia; and the latter is found among the Persians, Arabs, Hindus, and Chinese: the twenty-eight parts are called the *stations* or *abodes* of the moon because this luminary is in some one of them each day.



During the invasion of Egypt by the French, in 1798, General Desaix discovered some remarkable sculptures on the ceiling of an apartment in the great temple at Denderah (the antient Tentyra), and MM. Jollois and Devilliers almost immediately perceived among them figures nearly similar to those which are traced on celestial globes at the present time. The whole of the astronomical figures are within the circumference of a circle above five feet in diameter; and the apartment in which they were found is in the upper part of the building: adjoining it is an apartment of equal size, which is open to the sky; the ascent to both being by steps in the interior. Bas-reliefs, apparently of an astronomical character, are found in several other apartments within the same temple; and in the ceiling of its portico are figures resembling constellations, among which are those of the zodiac disposed in two lines, one near each extremity of the portico, and parallel to the longitudinal axis of the temple.

The zodiacal figures in the apartment first mentioned are disposed nearly within the breadth of an annulus formed by two circles, whose common centre is at some distance southward from the centre of the whole; the figure which is conceived to represent Cancer is however within the space inclosed by the interior circumference of the annulus, and nearly opposite the interval between Gemini and Leo; that interval being occupied by a human figure with a bird's head, above which is a bird and certain hieroglyphical symbols. The figure of Cancer is also surmounted by a hieroglyphical symbol, which, according to Visconti, seems to express a proper name.

Except the zodiacal figures, scarcely any in the ceiling resemble those which are now assigned to the constellations; and a great effort of the imagination is required to discover in what manner they may be considered as emblems of the latter. From the zodiacal figures only has [illegible] been possible to form opinions concerning the nature of the projection employed in the execution of the work, and the epoch to which the aspect of the heavens represented by it is to be referred.

The first discoverers of this antient monument immediately perceived that the horary or declination circles [illegible] drawn upon it, would be represented by straight lines diverging from the centre, the latter is consequently the [illegible] of the equator; but we are indebted to M. Biot (*Recherches sur l'Astronomie Egyptienne*) for the very probable [illegible] that the space within the exterior circle represents a development of the whole surface of the celestial sphere, the radii of the circle being equal to half the circumfere[illegible] the hour-circles, so that the exterior circle represents [illegible] south pole of the equator in the heavens. The [illegible] the constellations are supposed to be placed [illegible] corresponding to the circumferences of the [illegible] passing through the groups of stars to which the [illegible] belong, and at distances from the centre of the [illegible] equal to the angular distances of the figures [illegible] north pole of the equator. The distortion [illegible] such a development of a spherical surface is [illegible] great near the margin; but a spectator [illegible] structed, on comparing the figures near the [illegible] the groups of stars about the north pole [illegible] might distinguish those to which the figures [illegible] to refer; and the apartment without a [illegible] which contained the planisphere, is supposed [illegible] intended for the purpose of facilitating [illegible] One property of the species of projection [illegible] just mentioned is, that in the direction of [illegible] through the centre, or pole, the distance [illegible] points corresponding to two which are [illegible] ite to one another in the heavens is equal [illegible] umference of a great circle of the sphere [illegible] und that this condition is satisfied in the [illegible] arly as can be expected in a representation [illegible] admit of great precision.

n order to ascertain, if possible, the [illegible] here, M. Biot assumed as correct the [illegible] upon it, which, being accompanied by [illegible] by hieroglyphical symbols, [illegible] ished on account of some [illegible] m; and concluding from [illegible] nearest zodiacal signs that [illegible] ut, Antares, Arcturus, and [illegible] by the near agreement of [illegible] ach other [illegible] by cop[illegible] heave[illegible] by [illegible]

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appeared as if moving from east to west; that is in the direction of the apparent diurnal motion of the heavens. The longer axis of the temple is inclined to the meridian in an angle of about 17 degrees, and the walls are directed so that the points at which the remarkable stars Sirius and Antares must have seemed to rise coincided with the directions of the north and south ends of the building. A temple near Esne (Latopolis), in the portico of which is a representation of the zodiacal signs, is disposed so that the longitudinal walls tend to the points at which Antares and Sirius set; and though no great stress ought to be laid upon this circumstance, there is some probability that the dispositions may have been intentional, since no reason can be assigned why, otherwise, the temples should not, like the pyramids, have had their walls directed to the cardinal points of the horizon. The golden circle of Osymandyas, which is mentioned by Diodorus Siculus (i. 49) as being placed in the tomb of that antient king at Thebes, was 365 cubits in circumference, and to each cubit was assigned one of the 365 days of the year, with the risings and settings of the stars for each day marked on the several divisions.

The ceiling of the portico belonging to the temple at Denderah is nearly covered with sculptured figures, many of which resemble those in the circular planisphere, and the twelve signs of the zodiac are distinctly represented in two bands parallel to the axis of the building: six of the figures appear to be entering the temple on the eastern side of the portico, and of these Cancer is the last; the other six, of which the first is Leo, appear to be quitting it on the western side, so that (the front of the portico being towards the north) the direction of their motion corresponds to that of the apparent diurnal rotation. Within the two lines of figures are those which belong to the northern constellations, and beyond them, near the eastern and western extremities of the portico, are figures relating to the southern constellations. Among the former is a human figure surrounded by seven stars, disposed similarly to those of Ursa Major in the heavens, and near them is a lotus-stem surmounted by a hawk, like that which in the circular planisphere is in the place of Sirius: this emblem in the planisphere of the portico is therefore supposed to be an indication of Sirius; and the opinion is confirmed by the fact that it is preceded by a cow (Isis) and a great hieroglyphical inscription.

In the planisphere of the portico, as well as in that of the temple, the figure supposed to be that of Cancer is placed on one side of the position which it should occupy among the zodiacal constellations; and this circumstance has given rise to a doubt concerning the justness of that supposition. Some persons have imagined that the figure might have been intended for the mythological scarabeus; but as in this temple, as well as in those at Esne, it has eight feet, while the scarabeus has but six, it is more probable that it represents the zodiacal sign; and that, agreeably to the hypothesis of Biot, the displacement was in order to make room for some emblem. In fact, the place of Cancer is, in the portico, occupied by a head of Isis, which is plunged in the solar rays; and, since Sirius was consecrated to Isis, it is reasonable to suppose that the emblem was intended to express that, at the epoch of the planispheres, the star Sirius rose heliacally. By calculation it is ascertained that about 700 years before Christ, in the latitude of Denderah, Sirius rose with the stars of Cancer when the sun was in that constellation, that is, at the summer solstice.

The two temples at Esne have, in the ceilings of their porticoes, representations of the twelve zodiacal constellations in two lines parallel to the axes of the buildings. In the smaller temple six of the figures appear to be entering on the southern side, and six to be issuing on the northern side: the front of the portico being towards the east, the direction of their movement corresponds, consequently, to that of the diurnal rotation, as in the temple at Denderah; but there is this difference in the division of the figures, that, at Esne, Leo is the last to enter, and Virgo the first to quit the temple. M. Biot endeavours to account for this difference by the different inclinations which the axes of the two temples have to the meridian; the axis of the temple at Denderah deviating 17 degrees, and that of the small temple at Esne 71 degrees, both of them being from the north towards the east. He observes that, in the former temple, a meridian line passing through the centre of the circular planisphere cuts the zodiacal band in Cancer towards the north, and in Capricorn towards the south; thus dividing the twelve figures so that the six which are on the western side constitute all those which at a certain hour are descending towards the west, and those which are on the eastern side are ascending towards the meridian. At the head of this descending series is Leo, which is the first to pass the inferior meridian and enter the eastern series; and at the head of the ascending series is Aquarius, which is passing the upper meridian: this distribution corresponds to that which is represented in the zodiac of the portico. A like correspondence would be found to exist in both the temples at Esne if a circular planisphere were supposed to be placed in the ceiling of each, with the lotus-stem in the longitudinal axis, towards the north, and the planisphere were cut by a meridian-line so as to divide the figures into such as ascend and such as descend.

That there were among the antient Egyptians a variety of sculptured representations of the heavens is evident, since the planisphere described by Scaliger, in his 'Notes on Manilius,' contained, among many animals having no correspondence in form or situation with those which have been mentioned, the figure of a man holding a scythe, and of another who is killing a bear; and in the 'Mémoires de l'Académie des Sciences,' 1708, there is described by M. Bianchini, a fragment of an Egyptian planisphere consisting of a circular space surrounded by five concentric bands: in the centre are two bears separated by a serpent, as in the present spheres; and in the nearest band are twelve figures representing constellations, most of which differ from the zodiacal signs above described; the place of Gemini, for example, being occupied by a serpent. In the two next bands are the signs of the Greek zodiac, and on the exterior of these is a band divided into 36 parts, in each of which is a deity: these are the spaces of 10 degrees into which, in the East, the zodiac was sometimes divided.

There can be little doubt that the Egyptians and Chaldæans distinguished the groups of stars in the visible heavens by the figures or symbols of the deities which they worshipped, and of the men who, among them, had signalized themselves by great actions; but it has been also assumed, that the names of the zodiacal constellations were given from circumstances relating to the apparent motion of the sun, to the labours of husbandry, or to the productions of nature in different seasons. Macrobius mentions (*Saturnal.*, lib. i.) that the constellation in which the sun is, at the season when he ascends from the winter solstice towards the equator, received the name of Capricornus, because the goat is an animal accustomed to ascend to the highest points of ground; and that the constellation in which the sun is when he returns from the summer solstice towards the south was designated Cancer from the crab being an animal which is said to have a backward movement. Bishop Warburton in this country, and M. Pluche in France, carrying out the same idea, have imagined that the constellations Aries, Taurus and Gemini received their names from the young of animals being brought into the fields in the spring; that Leo indicates the violent heats of summer, and Virgo, presumed to be a gleaner, denotes the time of harvest, and so on. M. Dupuis assuming that the zodiacal constellations were first imagined in Egypt, and that they indicated circumstances connected with the labours of husbandry in the different months of the year, endeavoured to ascertain at what epoch, in the climate of Egypt, the symbols would be in accordance with the circumstances which they were supposed to represent; and the result of his inquiry was, that the agreement could have subsisted only when the vernal equinox was in the constellation Libra. At present it is in the constellation Pisces; and computing the time during which, by the effect of precession, the equinoctial points would move over about half the circumference of the ecliptic, he assigned 15,000 years before the Christian æra for the time of the invention of the zodiac. This extravagant epoch he afterwards reduced to about 4000 years before Christ. (*Origine des Cultes*, 1796.)

M. Fourier, in his 'Recherches sur les Sciences et le Gouvernement de l'Egypte,' assumes that the representation of the head of Isis partly plunged in the solar rays near the figure of Cancer, among the sculptures in the portico of the temple at Denderah, is an emblem of the heliacal rising of Sirius when the sun was in the sign, or in the constellation Cancer; and observing that Cancer is the last of the figures which appear to enter the portico of that temple, while in the zodiacs at Esne the lion is the last which enters, he conceives that the latter circumstance is an indication of the sun being in Leo when Sirius rose heliacally. Supposing, then, that the epochs of the zodiacs at Denderah and Esne are such as the positions of the sun denote, he determines, by a computation founded on the progressive displacement of the point of the heliacal rising, that the interval between them is 1800 years, the sculptures at Esne referring to the more ancient period. This result must however be considered as overthrown by the calculations of MM. Ideler and Biot, who have determined the longitudes of the sun at the terminations of three sothiac or canicular periods of 1460 years, within which the heliacal risings of Sirius return to the time of the summer solstice; and have found that between the year 2782 B.C., and 139 A.C. the sun was in the constellation Leo and in the sign Cancer at all the three epochs. M. Biot concludes therefore that the zodiacs at Denderah and Esne do not indicate that the sun had passed from one constellation to the next in the interval between the epochs to which they are supposed to refer.

In the temple at Denderah, according to Dr. Young, Leo may be intended to represent the leading sign of the zodiac, or the sign preceding that in which the sun was on the first day of the *annus vagus* (year of 365 days); and on this supposition it would follow, from the known rate at which the place occupied by the sun in the ecliptic at the commencement of such year retrogrades, and also from the fact that the year of 365 days began on the day of the vernal equinox in the year 130 B.C., that the epoch of the planisphere is between 11 B.C. and 108 B.C., or in an age earlier by 1500 years. If Virgo were the leading sign, as it may be supposed to be in the small temple at Esne, the epoch of the zodiac would be the year 900 B.C., or 1500 years earlier.

It has been ascertained by MM. Champollion and Letronne from the Greek inscriptions on the temples of Denderah and Esne, that those edifices were constructed, or finished, during the times of the Roman emperors (*Précis du Système Hieroglyphique, Recherches, &c.*): yet, as it is known that during the reigns of the Ptolemies, and even after the conquest of the country by the Romans, the Egyptians continued to build temples, which they consecrated to their deities, with decorations similar to those which were executed in more antient times, it may be presumed that the present sculptured zodiacs are copies of others which were the works of the earliest artists; so that though they determine nothing respecting the time of the construction of the temples, they may still serve as indications of the manner in which the heavens were represented in the East in the infancy of astronomical science. The circular planisphere which once adorned the interior of the temple at Denderah was brought to France in 1821.

The country from whence the Greeks derived the figures of the constellations is not with certainty known: that all the extra-zodiacal signs in their descriptions of the heavens did not, from the first, receive their designations from subjects connected with the Greek mythology is evident, since in the notices given by the earliest writers on astronomy two of them, which subsequently received the appellations of Hercules and Cygnus, have the general names ἐν γόνασιν, *a kneeling figure*, and ὄρνις, *a bird;* and that some of the figures were borrowed from the Chaldæans is probable, since in the time of Herodotus it was supposed that the Greeks acquired from the Babylonians the knowledge of the *polus* (πόλος), the gnomon or style, and the division of the day into twelve parts. (Herod., ii. c. 109.) It may be imagined that, from the intercourse between the Egyptians and Greeks in very early times, a great resemblance should be found among the figures employed by the two people to represent the groups of stars; but that they differed in some respects from one another may be inferred from the testimony of Achilles Tatius, who states that the Egyptians had not the constellations Draco, Cepheus, and Cassiopeia; and it follows that these must have been introduced by the Greeks, or at least that the latter people substituted them for corresponding figures in the Egyptian sphere. It may be remarked however, that in the oldest descriptions of the Greek zodiac σκορπίος and χηλαί, the *scorpion* and the *claws*, make one constellation; whereas in the Egyptian zodiacs the corresponding part of the heavens is divided between the scorpion and the balance, the latter occupying the place of the claws. Now, in a work on the 'constellations,' ascribed to Eratosthenes, who lived in the time of Ptolemy Euergetes, it is stated that the great length of the constellation caused astronomers to divide it into two parts; and in a poem attributed to a certain Manetho, supposed to be the priest of that name, and dedicated to one of the Ptolemies, it is expressly stated that 'the claws of scorpio' were by the priests changed into 'the balance.' It would seem therefore that the Egyptians, on or before the time of Manetho, adopted in their zodiac a name which had been given by the Greeks: yet as an argument in favour of the great antiquity of the sign it may be observed that, according to Ptolemy, the Chaldæans designated by a word signifying a balance the constellation called by the Greeks χηλαί: it may be however, that he alluded then to the Chaldæans of his own time.

The designations which are given to the constellations in the writings of the Greeks apparently indicate persons or objects connected with the Argonautic expedition; and it is reasonable to suppose that, about the epoch of that expedition, the Greeks, having acquired a knowledge of the manner in which the Chaldæans or Egyptians represented the visible heavens, transformed such of the figures as they did not reject into others having relation to the actions of their own heroes. On this hypothesis it has been assumed that Aries represents the ram whose golden fleece was the object of the expedition; Taurus, the bull or bulls which were tamed by Jason; Gemini, Castor and Pollux, and so on. The ship, among the southern constellations, is supposed to be the Argo; and Ursa Major, the nymph Callisto. The history of Perseus is imagined to be represented by Perseus, Andromeda, Cepheus, Cassiopeia, and Cetus; and the labours of Hercules, by Draco, Leo, and the constellation bearing the name of that hero. Newton, in his 'Chronology,' appears however to assume too much when he considers that Chiron, whom he supposes to have given the names to the constellations, disposed Aries, Cancer, Libra, and Capricornus so that the equinoctial and solsticial colures passed through their middle points: the precise determination of these points was beyond the science of the Greeks long subsequently to the age of Chiron.

Hesiod mentions (*Opera et Dies*) the Pleiades, Arcturus, and Orion, stating that land should be ploughed at the heliacal setting, and corn reaped at the heliacal rising of the Pleiades (about the middle of April); he directs also that corn should be threshed at the rising of Orion, and vines pruned when Arcturus rises in the evening. Homer also mentions the Pleiades, Hyades, the Bear or Wagon,

> ἄρκτον θ' ἣν καὶ ἄμαξαν ἐπίκλησιν καλέουσιν,

and Orion in the description of the shield of Achilles (*Il.*, xviii., 487); it is evident therefore that already in the time of Homer those constellations were introduced in the sphere of the Greeks. Plutarch asserts that Anaxi mander (probably about 600 B.C.), constructed a dial; and that representations of the clusters of stars, together with figures of the constellations, were frequently executed in Greece in the time of Hipparchus, is evident from a passage in the commentary of that astronomer on the poem of Aratus: planispheres, he observes, are constructed for men's use, and therefore the figures on them are traced just as they appear in the heavens to the view of the spectator.

In the work of Autolycus, entitled 'On Risings and Settings' of the Stars (Περὶ Ἐπιτολῶν καὶ Δύσεων), and in the 'Phænomena' (Φαινόμενα) of Euclid, the signs of the zodiac are mentioned, and the parts into which that band of the heavens was divided are called dodecatemories, or twelfths; but it is in the astronomical poem of Aratus that the most complete knowledge of the celestial sphere of the Greeks is to be obtained. This writer lived about 270 years before the Christian æra, and his poem is a paraphrase of two works which were composed by Eudoxus of Cnidus, who lived 100 years previously, that is, in the age of Autolycus and Euclid.

In describing the constellations, Aratus begins with those immediately about the north pole of the equator, and proceeds from thence to the zodiac, nearly in the directions of the declination or hour-circles of the sphere.

He mentions Ursa Major and Ursa Minor, observing that they are placed so that the tail of one corresponds to the shoulders of the other, and he adds that the constellation Draco winds between them. Near the head of Draco he places the figure of a man, who is said to be on his knees (Hercules, whose attitude has since been changed), and behind him the northern crown. Near the kneeling figure is Ophiuchus, the serpent-carrier, and under the latter are the great claws (of Scorpio). Behind Ursa Major is Arctophylax (Bootes), with the star Arcturus below his girdle; and under his feet is the constellation Virgo. Near the head of Ursa Major are Gemini (Δίδυμοι); under his body is Cancer, and under his feet Leo. Auriga and the star Capella are said to be on the left of Gemini, opposite Ursa Major; and at the foot of Auriga are the horns of Taurus, whose head is indicated by a cluster of stars (the Hyades). Cepheus is behind Ursa Minor, and near him is Cassiopeia, the stars of which are said to be arranged in the form of a key: Cassiopeia has her hands raised above her head as if bewailing the fate of her daughter Andromeda, who is placed below her. The arms of the latter are extended and chained (to a rock); and under her head is Pegasus. Aries is below the girdle of Andromeda, and, as well as the claws of Scorpio and the girdle of Orion, it is in the equator; the triangle (δελτωτὸν), is above Aries. The constellation Pisces is below the triangle; and Perseus stands with his hand near the chair of Cassiopeia. Below his left knee are the Pleiades, and the names of the seven daughters of Atlas are given to the stars of the cluster. Aratus observes that there are but six stars in the cluster; but Hipparchus, in his commentary on the poem, states that against a dark sky seven may be seen. The bow of Sagittarius tends towards the tail of Scorpio. The Lyre, and the eagle which carries it, is between Perseus and the head of the bird (ὄρνις). (This is the constellation Cygnus, which also by Manetho and Ptolemy is called the Bird. The name Cygnus is first applied to it in a work on the constellations which is ascribed to Eratosthenes.) Cygnus extends towards the other eagle (Aquila), and near the head of Pegasus is the right hand of Aquarius, which, it is remarked, rises before Capricornus. Over the latter is the Dolphin. All the above constellations are stated to be between the zodiac and the north pole; and the zodiacal constellations are afterwards mentioned in order, beginning with Cancer and ending with Gemini. Libra (elsewhere called ζυγόν) is not mentioned, while Scorpio and the Claws are described as if they formed two constellations.

In the description of the constellations between the zodiac and the south pole, it is stated that Orion is placed obliquely to Taurus, and that Canis Major is at his feet. Under him is said to be Lepus, and at the tail of the dog is the head of the ship Argo. Under Aries and Pisces, and above the river (Eridanus), Cetus advances towards Andromeda, and below Capricornus is the Southern Fish. Under Sagittarius is a circle of stars (the Southern Crown), and below the sting of Scorpio is the Altar. Under the Scorpion is Centaurus, while farther on is Hydra, having its head under Cancer, and its tail above Centaurus; about the middle of its body is Craterus, and near the tail is Corvus. The bright star Procyon is under Gemini.

Such, nearly, is the description given by Aratus of the celestial sphere, and the constellations are, in general, the same as those which are represented on the modern globes: some inconsistencies which exist in it were pointed out by Hipparchus, who lived about 100 years before Christ, and wrote a commentary on the poem. It is plain that the descriptions have been compiled from observations made by persons at different places, and probably in different ages; for in one part of the work it is stated that the extremity of Draco, and in another the girdle of Cepheus, touches the horizon, while in a third place Bootes is said to go below that circle, except his hand: and these circumstances are quite incompatible with observations made in the same latitude. It should be remarked that, in the Greek sphere, the stars are not always placed in the same parts of the figures as they occupy at present: thus the principal star of Aries is placed by Hipparchus in the front foot of the animal, while on the modern globes it is placed in the head.

It would be desirable to ascertain from the poem of Aratus the position of the equinoctial or solsticial points, in order to find the epoch of the observations on which the description is founded, but it is to be regretted that nothing satisfactory can be discovered concerning the subject. It is stated in the poem that the southern tropic cuts the middle of Capricornus, and hence the equinoctial colure should pass through the middle of Aries: now, in the presumed age of Eudoxus, the first remarkable star γ in Aries was nearly at the point in which the trace of the ecliptic in the heavens cuts that of the equator; and if we suppose the extent of the constellation to be 30 degrees, the middle point, reckoning from that star, would be nearly at the fifteenth degree of longitude. The longitude of that star is now about 30°, and hence the equinoctial colure would have retrograded as much as 45 degrees, which at the known rate of the precession would take place in about 3200 years; consequently the epoch would be about the year 1400 B.C. Or, if with Ptolemy it is supposed that the extent of the constellation between the first star γ of Aries and the first star of Taurus (now δ Arietis) is only 18 degrees, the middle point would be in the ninth degree of longitude, and the retrogradation would be 39 degrees, which would place the epoch about the year 970 B.C. Nothing however can be more uncertain than conclusions drawn from such data.

The taste for ornamenting buildings with sculptures representing astronomical subjects appears to have existed in antient Rome, as well as in Egypt and in the East; for in 1708 a fragment of a planisphere was discovered in that city. It has in its centre a serpent, probably an emblem of time, and near it two animals, apparently bears; about the serpent are the remains of three concentric rings divided into compartments containing figures, among which are some of the zodiacal constellations.

That the Romans adopted the Greek sphere is evident from the descriptions of the constellations in the 'Astronomicon' of Manilius: those of the zodiac, in particular, are given in the verses 'Aurato princeps aries in vellere fulgens,' &c: and the poem contains a detailed account of their astrological dispositions and qualities. The twelve signs are divided into masculine and feminine alternately, and are appropriated to different deities; there is also a division of the zodiac into twelve parts, which are designated Athla, or labours, and relate to the occupations or professions of men (lib. iii., v. 93). Four constellations, comprehending a space equal to one-third of the circumference of the zodiac, are said to constitute a trigon; three a tetragon, and so on; and there are four trigons arising from the different constellations, which may coincide with the angles of an equilateral triangle supposed to be inscribed in the zodiac: the like is to be understood with respect to the tetragon, hexagon, &c. Each sign of the zodiac is supposed, in the poem, to give a certain number of years to the life of a man; and his profession or fortune is imagined to depend on the particular sign which is rising at his birth, according to the qualities or uses of the animal by which the sign is distinguished (lib. iv., v. 122). It is also asserted that the characters of men depend on the qualities of the extra-zodiacal constellations: thus persons born when the ship Argo rises are said to become seamen or to have an interest in naval affairs (lib. v., v. 39).

Scaliger, in his notes on Manilius, has given, from a manuscript of Aben-Ezra, a description of three planispheres, of which one is supposed to have related to the astronomy of the antient Persians, and another to that of the Hindus: the third is supposed to be either Egyptian or Greek. The significations of the figures in the Persian sphere are very uncertain, but among those which have been recognised are Ursa Major and Ursa Minor, and a winged horse, besides Virgo, Leo, and Taurus. The figures of men and women are without designations, but among the former is one on a throne, which is thought to represent Cepheus, and one in a kneeling posture, which may be Hercules: of the latter, there is one which is presumed to represent Cassiopeia or Andromeda. A figure of a ship is also distinguished. It is asserted in the 'Zend-Avesta' (a work of uncertain antiquity, and ascribed, erroneously, to Zoroaster) that the antient Persians divided the zodiac into twenty-eight constellations, or houses of the moon, and also into twelve signs: to these last are assigned names which correspond to those at present given to the constellations in that region of the heavens; and the cluster called the Hyades (in Taurus) is described as a bull with gilt horns. The division of the zodiac into twenty-eight lunar mansions prevailed also among the Arabian astronomers in or before the ninth century. It is mentioned by Alfragan, who states (*Elementa Astron.*, A.D. 850) that the first was called Xartan, and that it commenced near the three principal stars in Aries.

The Hindu zodiac, which is described in the 'Philosophical Transactions' for 1772, consists of twelve figures disposed on the four sides of a square. In this the place of Gemini is occupied by a figure of a man apparently with a shield on each arm; Virgo is represented by a female figure naked and seated; Libra is represented by a pair of scales similar to those in common use at present; and in place of Capricornus are figures of a ram and a fish, which are close together, but do not, as in the modern sphere, constitute one body. A globular vessel represents Aquarius; and for Pisces, one fish only is delineated. The figure in the place of Scorpio cannot be made out. This remarkable monument was discovered in the ceiling of a choultry or pagoda at Verdapettah, in Madura; and the separation of the figures in Capricornus seems to indicate that it is of great antiquity, as it may be reasonably supposed that such a disposition preceded in order of time that of a union of the two bodies in one.

In the second volume of the 'Asiatic Researches' there is given, by Sir William Jones, a paper containing a description, from the Sanscrit of Sripeti, of an antient zodiac, which is divided into twelve parts, each of 30 degrees, corresponding to the modern signs. The ram, the bull, the crab, the lion, and the scorpion are said to have the figures of those animals, and in the plate which accompanies the memoir the entire figure of the bull is given: the twins consist of a male and a female figure, and in the description, the woman is said to play on a musical instrument, while the man holds a club, but the figures are not so represented in the plate. Virgo is represented by a woman in a boat; in one hand she holds a lamp, and in the other a blade of corn. Libra is represented by scales, which are held by a man who appears to be placing a weight in one of them. Sagittarius is the figure of an archer, whose legs are like those of a horse. Capricornus is the figure of a gazelle. Aquarius is represented by a man pouring water from a vessel which he carries on his shoulders; and lastly, Pisces consists of two fishes, the head of one being turned towards the tail of the other. The zodiac is also divided into twenty-seven parts, constituting the mansions of the moon: these are not represented in the plate, but their names, as well as those of the twelve signs, are given. The age in which Sripeti lived is unknown.

The zodiacs of India and of antient Persia may be presumed to have been originally the same as that of the Greeks or Egyptians; for although all of them differ from one another in the details, the points of coincidence are too numerous to be accidental, and it is probable that in the course of time the primitive sphere was altered in the countries eastward of Egypt and Chaldæa, as it was by the people of Europe. On the subject of the Indian zodiac the reader may consult Bohlen, 'Das Alte Indien,' vol. ii., p. 252, &c., and the references in the notes.

The representations of the heavens which have been found among the people of northern India, China, and Japan correspond to those which were in use in the western parts of Asia, in the zodiac being divided into twelve parts, which are called mansions of the sun, and also into twenty-eight parts; but, according to the accounts of the Jesuit missionaries, the Chinese at one time gave to these the names of the seven planets, each of which was repeated four times. In the antient Chinese histories mention is frequently made of machines exhibiting the apparent movements of the heavens; and Père Mailla has given a plate representing a sphere which is supposed, though without sufficient reason, to have been executed about the year 2385 B.C. From those histories it appears that the Chinese were, at a time long subsequent to the commencement of the Christian æra, instructed in astronomy by a people from the west; and it is therefore probable that they thus acquired a knowledge of the method followed by the Persians and Arabians in the division of the zodiac. A table of the twenty-eight constellations into which the Chinese have divided the zodiac, with their names and the extent which each occupies, is given in Delambre's 'Histoire de l'Astronomie' (tom. i., p. 380), from the work of Père Souciet entitled 'Observations Mathématiques, Astronomiques,' &c., 1729; and it is stated that the first, which is named *Pi*, commenced, in 1683, with the fourth degree of Aries. Delambre has also given a table of the twelve constellations; and from the records of the eclipses which the Chinese have observed, it is evident that the place of the sun has always been referred by that people to the signs of the zodiac. From a very early period they made their year commence when the sun is near the winter solstice, and they designated that part of the zodiac the resurrection of the spring, or of the year. The rat, the bull, the leopard, the hare, the dragon, the serpent, the horse, the sheep, the ape, the hen, the dog, and the hog are names supposed to be given, both in China and Japan, to the zodiacal signs; but it is more probable that they are applied to the twelve years of a cycle which is frequently used in the East, or to the twelve hours into which, in those countries, the day is divided.

The extra-zodiacal stars are distributed in constellations, which are distinguished in general by the names of the emperor and his ministers or courtiers; but that which in Europe is designated Ursa Major is represented by a vessel for measuring corn; the four stars of the quadrilateral figure forming the body and the others the handle. Biot relates, from information communicated by M. Remusat, that in the Chinese sphere the constellation which corresponds to Orion is designated by a name signifying a conqueror.

That a few coincidences should exist among the names given by different people to the groups of stars in the heavens may be conceived without supposing that any of the people borrowed from one another: it may therefore be considered as purely accidental that the Iroquois called the stars of Ursa Major by a name which in their language signifies a bear (Lafitteau, *Mœurs des Sauvages*, tom. ii.), and that the people living about the Amazon designated the stars in the head of Taurus by a word signifying a bull (Condamine, *Mémoires de l'Académie des Sciences*, 1745). But it is remarkable, and may be deduced as a proof, among many others, of the descent of the antient Mexicans from the people of Asia, that the former should have executed sculptured representations of their calendar, and placed them as ornamental objects in their religious edifices. It has been ascertained that the Toltecans and Azteks made the year consist of eighteen months of twenty days each, to which they added five complementary days, introducing a period of thirteen days at the end of fifty-two years in order to complete the cycle; and this division of the year is represented in a chronological table executed by the latter people. (Carreri, *Giro del Mundo.*) Among the ruins of Palenka have been found sculptured figures of serpents, which have been thought to indicate the existence of the Ophite worship in that part of the country, the seat of the Toltecans; and at the same place has been found a piece of sculpture, supposed to be a planisphere, on which are eighteen compartments representing months, which are disposed three together in the interior of a ring ornamented with hieroglyphical figures. In 1790 there was discovered, in the city of Mexico, among the foundations of the temple of Mexitili, a block of porphyry, on which are described symbolical figures, apparently constituting a planisphere or a chronological table, in which the several days of the year are distinguished by particular names and objects, and a few of them are stated to correspond nearly to the signs on the Chinese planispheres. M. de Humboldt remarks (*Researches*, &c.) that the name of the first day is also the name of water, and that the symbol of the day consists of undulating lines resembling those which indicate Aquarius in the Greek and Egyptian zodiacs.

ZODIACAL LIGHT, a luminous appearance seen at certain times after sunrise and before sunset, from which it is inferred that there is a slight degree of nebulosity about the sun, if indeed it do not arise from the denser parts of that medium which [COMET] is more than conjectured to occupy the spaces in which the bodies of our system move.

A few months ago, when the comet of this year (March, 1843) was visible in lower latitudes, its tail only appearing (except for a very short time) above the horizon in England, some persons contended that this tail was only the zodiacal light. This produced a letter from Sir John Herschel to the 'Times' newspaper, in which a description of that light was given. We have before expressed our opinion that celestial phenomena should be described in the words of those who are observers themselves. We therefore subjoin the following extract from the letter in question:—'The zodiacal light, as its name imports, invariably appears in the zodiac, or, to speak more precisely, in the plane of the sun's equator, which is 7° inclined to the zodiac, and which plane, seen from the sun, intersects the ecliptic in longitude 78° and 258°, or so much in advance of the equinoxial points. In consequence it is seen to the best advantage at, or a little after, the equinoxes, after sunset at the spring, and before sunrise at the autumnal equinox, not only because the direction of its apparent axis lies at those times more nearly perpendicular to the horizon, but also because at those epochs we are approaching the situation when it is seen most completely in section.

'At the vernal equinox the appearance of the zodiacal light is that of a pretty broad pyramidal, or rather lenticular, body of light, which begins to be visible as soon as the twilight decays. It is very bright at its lower or broader part near the horizon, and (if there be broken clouds about) often appears like the glow of a distant conflagration, or of the rising moon, only less red; giving rise, in short, to amorphous masses of light, such as have been noticed by one of your correspondents as possibly appertaining to the comet. At higher altitudes its light fades gradually, and is seldom traceable much beyond the Pleiades, which it usually however attains and involves; and (what is most to my present purpose) its axis at the vernal equinox is always inclined (to the northward of the equator) at an angle of between 60° and 70° to the horizon; and it is most luminous at its base, resting on the horizon, where also it is broadest, occupying, in fact, an angular breadth of somewhere about 10° or 12° in ordinary clear weather.'

ZOËA. [Branchiopoda, p. 339.]

ZOËGA, GEORG, was the eldest of the three sons of a Lutheran clergyman of Jutland, said to have been of Italian descent, and was born 25th December, 1755, at the village of Dahlen in the county of Schackenburg and the diocese of Ripen, where his father was then minister, although he soon after removed to the parish of Mœgeltondern, near the town of Tondern in the same county. After having been carefully educated at home, under the eye of his father, Zoëga was sent, in 1772, to the gymnasium of Altona, whence the next year he proceeded to the university of Göttingen. On finishing his academic course, in 1776, he set out on a tour through Germany and Switzerland, which he was eventually led to extend to Italy, and he did not return to his native country till he had visited both Venice and Rome. He then passed a winter at the university of Leipzig; after returning home from which he spent some time in the office of a brother of his father, who held a post under the government at Copenhagen; but at last, in October, 1778, he accepted the situation of a family tutor in the little town of Kierteminde, on the eastern coast of the isle of Fünen. After a few months however he was offered the appointment of travelling tutor to a young gentleman who proposed to make the tour of Germany, Italy, France, and England; this scheme exactly suited the taste of Zoëga, who was already devoted to the study of the fine arts. After a year's residence with his pupil at Göttingen, where he renewed his intimacy with his old professor Heyne, with whom he had been always a favourite, they set out together in March, 1780, and after having visited Cassel and Frankfort, and traversed Hesse, the Palatinate, Suabia, and Bavaria, went down the Danube to Vienna, and thence crossed the Tyrol and Carinthia to Venice, whence they proceeded through Lombardy and Tuscany to Rome, and from Rome to Naples. Returning to Rome, they spent two months more in that city; and then, in May, 1781, were about to take their departure, by the way of Milan and Turin, for France, when an unexpected death suddenly recalled them to Denmark. Soon after his return home Zoëga was introduced to the Danish minister Guldberg, who, struck with his merit, appointed him to make a numismatic tour at the charge of the king in Germany and Italy. Upon this enterprise he set out in April, 1782: and after spending six months in the Imperial Museum at Vienna, he arrived once more at Rome, in January, 1783. From this date Italy, and chiefly Rome, continued, with the exception of a short visit which he made to Paris in 1784, to be the residence of Zoëga to the end of his life. The sudden death of his patron Guldberg, the news of which reached him while he was at Paris, in May, 1784, reduced him for a time to great straits; and his difficulties were made the more serious by his having some time before both clandestinely married a young Italian lady, Maria Pietruccioli, the beautiful but penniless daughter of a painter, and become a convert to popery. He had however on the introduction of the Austrian papal nuncio Garampi, whose acquaintance he had made at Vienna, been received with distinguished favour by the celebrated Stefano Borgia, then secretary to the Propaganda College, afterwards cardinal; and he soon, through Borgia's interest, received from the pope the appointment of interpreter of modern languages to the Propaganda College. He now engaged in the preparation of a critical catalogue of the series of Egyptian coins struck by the Roman emperors, mostly as contained in the rich museum of Borgia at Velletri, which was at last published in 4to. at Rome, in 1787, with the title of 'Numi Ægyptii Imperatorii prostantes in Museo Borgiano Velitris, adjectis præterea quotquot reliqua hujus classis numismata ex variis museis atque libris colligere obtigit.' This work attracted great attention, and soon made the name of Zoëga known throughout Europe. It was followed by his greatest work, his treatise on Obelisks, prepared at the desire of Pope Pius VI., and the printing of which, after it had been going on for five years, was at last completed in 1797. But after the labours and anxieties of so many years, which pressed the more heavily upon Zoëga inasmuch as he had to contend at the same time with many other distractions and vexations, straitened circumstances, frequent attacks of illness, the still worse health of his wife, and the death of many of his children, eight of whom out of eleven, he is stated to have lost in eighteen years, the publication of the work was for a time prevented by the hurricane of the French revolution, which had already swept the north of Italy, and in the beginning of 1798 enveloped Rome, throwing down or scattering pope and cardinals, wresting from the libraries and museums many of their most precious treasures, threatening in short to break up the whole system of things in which the great archæologist lived and moved and had his being. At first Zoëga thought of taking flight, as his patron Cardinal Borgia had done; but, mainly, it is probable, from irresolution, he remained till the French liberating army, as it called itself, made its entry; and then, caught for the moment by the prevailing contagion, he joined in hailing what seemed to his excited imagination, and that of many others, the resurrection of old Roman freedom. But this enthusiasm did not last long: after a few months he is found in his letters expressing his repentant regret for having ever for an instant approached what he calls the popular volcano. Meanwhile he had been appointed a member of the newly established Roman National Institute, with the other most eminent of the Italian men of letters; and he afterwards read several learned discourses before this body. At last, in 1800, after the return of his friend Cardinal Borgia with the new pope, Pius VII., the treatise on Obelisks appeared in a magnificent folio volume, bearing the date of 1797, and the title of 'De Origine et Usu Obeliscorum; ad Pium Sextum Pontificem Maximum, auctore Georgio Zoëga.' A thousand copies were printed. This may probably be considered as the earliest modern work upon the subject of Egyptian antiquities which still retains any value, and as the proper foundation and commencement of all the sound investigation which that department of archæology has yet received. Zoëga now, broken down by infirmities though as yet only in his forty-fifth year, and having secured no provision for his family, began to turn his eyes to his native country; and with his great reputation he found little difficulty in obtaining from the king of Denmark an appointment to a professorship in the university of Kiel. This arrangement was made in the beginning of 1802; but in fact he could not bring himself to leave Rome, and at last, in 1804, after he had repeatedly obtained leave to postpone his departure on various grounds, he was permitted to remain where he was, with the title of professor and the same advantages which he would have had at Kiel, retaining at the same time the appointment of agent to his Danish majesty, which he had held for some years past. His salary altogether is stated to have amounted to 900 crowns; but then it was paid in paper, and the Danish paper-money at this time, and still more at a later date, was much depreciated. Zoëga's next work was a catalogue of the Coptic MSS. in the library of Cardinal Borgia: 'Catalogus Codicum Copticorum Manu Scriptorùm qui in Museo Borgiano Velitris adservantur; auctore Georgio Zoëga, Dano, Equite Aurato ordinis Danobrogici, fol., Romæ, Typis Sacræ Congregationis de Propaganda Fide.' The whole of this work, with the exception only of three pages of corrigenda, was printed in 1805, but the sudden death of Cardinal Borgia, which took place at Lyon in the end of 1804, and the embarrassment into which Zoëga was thrown by that event, which involved him in a law-suit with the heirs of the cardinal and the Propaganda College about the expenses of carrying the book through the press, prevented it from being published till 1810, after his decease, when the case was decided in favour of his children. Meanwhile he had commenced, in conjunction with Piranesi and the engraver Piroli, an account of the antique bas-reliefs existing at Rome—'Bassirilievi Antichi di Roma,' the first 4to. volume of which, published in numbers, was completed in May, 1808; a second volume was carried on for some numbers by Zoëga. without the assistance of Piranesi, but was left unfinished at his death, which took place on the 10th of February, 1809. Eight days after his death the announcement was received by his family of his having been appointed by the king of Denmark a knight of the order of Dannebrog. A German translation of his last work, in two vols. small folio (one of letter-press, one of plates), was published at Giessen in 1811-12, by F. G. Welcker, then professor of Greek in the university there, with the title of 'Die Antiken Bas-reliefe von Rom. In den originalkupferstichen von Tomaso Piroli in Rom, mit den Erklärungen von Georg Zoëga. Uebersezt, und mit Ammerkungen begleitet. von F. Gr. Welcker,' &c. In 1817 Welcker published an 8vo. volume of detached dissertations by Zoëga; and in 1819 a collection of his Letters, in 2 vols., in German, with a memoir of his Life. There is a very long notice of Zoëga, by M. Guigniaut, in the *Biographie Universelle*, vol. lii., pp. 388-408, from which, and from his works, the facts in the preceding abstract have been taken. The work on 'Egyptian Antiquities' in the 'Library of Entertaining Knowledge' contains a notice of the contents of Zoëga's work on Obelisks and his labours on the hieroglyphics. Besides his exact and extensive learning in every branch of archæology, including Egyptian as well as Greek and Roman antiquities, Zoëga is held in the highest esteem for his sagacity and judgment, the purity of his taste, and the truth with which he had seized the spirit of antient art.

ZO'FFANY, JOHANN, R.A., a very distinguished painter of the latter part of the eighteenth century. He was by descent a Bohemian, but his father, who was an architect, had settled in Germany. Johann Zoffany was born, according to Fiorillo, at Regensburg in Bavaria, or, according to another account, at Frankfort on the Main, in 1735: the latter probably is the correct account. Young Zoffany was sent early by his father to Italy, where he studied some years: after his return to Germany he practised some time as an historical and portrait painter at Coblenz on the Rhine, from which place he came to England a few years before the foundation of the Royal Academy, for he was elected one of its first members, in 1768. In England Sir Joshua Reynolds and Garrick became valuable patrons to him, and his first pictures which attracted notice in London were a portrait of the Earl of Barrymore and some theatrical portraits. He painted Garrick in Sir John Bute, and as Abel Drugger in Ben Jonson's 'Alchymist;' Foote, as Sturgeon, in the 'Mayor of Garret;' Weston and Foote in Dr. Last; and Garrick in the 'Farmer's Return,' in which the character and drawing are very good; the colouring is less successful.

In 1771 Zoffany painted the royal family on a large canvas, to the number of ten portraits, which has been scraped in mezzotinto by Earlom. He painted likewise two separate portraits of George III. and his queen, which were scraped in mezzotinto by Houston. Shortly after this time he revisited Italy, and took a recommendation from George III. to the Grand-Duke of Tuscany at Florence, where he painted an interior view of the Florentine picture-gallery, which was purchased by George III. In 1774 he painted a clever picture of the 'Life-school' of the Royal Academy, in which he introduced two naked models and thirty-six portraits; it has been engraved in mezzotinto by Earlom. In 1781 or 1782 Zoffany went to the East Indies, and lived some years at Lucknow, where he met with the greatest success, and he painted three of his best works there, all of which have been well engraved in mezzotinto by Earlom. One is the Embassy of Hyderbeck to Calcutta, who was sent by the Vizier of Oude to Lord Cornwallis; he went with a numerous retinue by Patna to Calcutta: the picture is a rich display of Indian costume, and contains, besides about 100 figures, several elephants and horses: the scene is placed in Patna. The others are an Indian Tiger-Hunt; and, as a companion to the Embassy, a Cock-fight, at which there are many spectators.

Zoffany returned to London, about 1796, with a large fortune, and died at Kew, in 1810.

(Fiorillo, *Geschichte der Mahlerey*, &c.; Pilkington, *Dictionary of Painters.*)

ZO'ILUS (Ζώϊλος), a Greek rhetorician and grammarian, is called by some a native of Ephesus (Scholiast *ad Hom. Iliad.*, v. 7), though the majority of antients describe him as a native of Amphipolis on the Strymon, whence Heraclides Ponticus calls him a Thracian. (Ælian, *Var. Hist.*, xi. 10; Suidas; Heraclid. Pont., *Allegoriae Homeric.*, p. 427.) Ælian describes Zoilus as a pupil of Polycrates, who wrote an accusation of Socrates, and seems to have lived about B.C. 390. Vitruvius (*Praefat.*, lib. vii.), on the other hand, makes him a contemporary of Ptolemy Philadelphus, B.C. 283-247. Suidas (*s. v.* 'Αναξιμένης) states that Anaximenes of Lampsacus was a pupil of Zoilus, and we know that this Anaximenes must have lived shortly after the time of Alexander the Great. These different statements of the age at which Zoilus lived do not allow us to draw any more definite conclusion than that he must have lived during the period that followed the death of Philip of Macedonia, that is, after B.C. 336, for we know that he wrote a history which came down to the death of that king. Some modern scholars have had recourse to the usual expedient in such cases, namely, to suppose that there were two persons of the name of Zoilus—the one a grammarian who attacked Homer, and the other a rhetorician, though a careful examination of the passages in which Zoilus is mentioned leaves no doubt that they all refer to the same person. We have thus no alternative except to suppose that some of the antients fixed the date of Zoilus incorrectly. From Heraclides Ponticus it appears that Zoilus was originally a slave, but he afterwards acquired great reputation as a rhetorician. He was notorious for the bitterness and severity of his attacks, whence he was nicknamed 'the rhetorical dog' (*κύων ῥητορικός*). He attacked Homer for introducing fabulous and incredible stories in his poems, and also Plato and Isocrates. (Scholiast *ad Hom. Iliad.*, v. 7, 20, &c.; Longinus, *De Sublim.*, ix. 14; Scholiast *ad Plat. Hipparch.*, p. 240; Dionys. Hal., *Demosth.*, 8; *Isaeus*, 20.) For this reason his name appears to have become proverbial for a detractor in general. (Ovid. *Remed. Amor.*, 366.) But Dionysius of Halicarnassus (*Epist. ad Pomp.*, c. 1) gives him the honourable testimony of having attacked no one except in defence of what he considered the truth, and he places him by the side of Aristotle and other great men. The story of his having been ill-used by Ptolemy Philadelphus for having censured Homer, and of his miserable death, of which three traditions are enumerated by Vitruvius, is probably a mere fable; and the account of Suidas, that he was killed at Olympia by the assembled Greeks for his hostility towards Homer, deserves just as little credit. The following works of Zoilus are mentioned by Suidas and others: 1, a work in nine books against the poetry of Homer (Suidas; Dionys. Hal., *Isaeus*, 20); 2, an oration against Homer, Ψόγος 'Ομήρου (Suidas); 3, an historical work in three books, beginning with the theogony and ending with the death of Philip of Macedonia (Suidas); 4, a work on Amphipolis (Suidas); 5, an encomium on the inhabitants of Tenedos (Strabo, vi., p. 271); and 6, a work on the figures of speech, of which a fragment is still extant (Phoebammon, *De Figuris*, p. 588, ed. Aldus; comp. Quintilian, ix. 1, § 14).

(Fabricius, *Biblioth. Graec.*, i., p. 560, &c.; Wolf, *Prolegom. ad Homer.*, p. 192; Vossius, *De Hist. Graecis*, p. 130, &c., ed. Westermann.)

ZOLLIKOFER, GEORG JOACHIM, one of the greatest German pulpit orators of the eighteenth century, was born on the 5th of August, 1780, at St. Gallen in Switzerland. His early education was conducted by his father, a distinguished and much respected lawyer; and after having for some time attended the public school of his native place, young Zollikofer was sent to the gymnasia of Frankfort on the Main and of Bremen. When he had completed his preparatory courses, he went to the university of Utrecht, where he studied chiefly theology, but devoted also much time to the study of the antients, of philosophy, and belles-lettres. Soon after his return to Switzerland, he was appointed, in 1754, pastor at Murten in the Pays de Vaud, but he did not remain there long. After having successively been removed to Monstein and Isenburg, he was invited, in 1758, to the office of pastor of the Reformed (Calvinistic) congregation at Leipzig. In this place he continued until his death, on the 25th of January, 1788, although several very honourable offers were made to him. His position at Leipzig was particularly favourable, for his congregation was one of the most enlightened in Germany, and his intercourse with the distinguished professors of the university had a great influence on the development of his talent as a pulpit orator. He also exerted a very beneficial influence not only upon his congregation, but upon the young theologians of Leipzig, to whom his upright and pious conduct was a model of what a pastor should be. His knowledge, though very extensive, was not always profound, and he attached a higher value to the practical part of religion than to learning and theological speculation. He taught his flock by word and example the practical influence which Christianity should have upon their conduct. His method of preaching was always calm and dignified, impressive and convincing without being rhetorical. Although his sermons were not exactly what we call popular, they were always clear and lucid, and won their way to the heart through the understanding. He counteracted the prevailing prejudices and evils of the time, and endeavoured to correct the vulgar notions of morality, and to enlighten his audience in the true sense of the word. What rendered his influence as a teacher the more efficacious was, the fact that his own life was a perfect exemplar of what he taught. As regards his doctrinal views, he did not hesitate to attack the common opinions where he thought them incompatible with reason and good sense; and, although he was not a neologian, yet he differed in several points from the common Calvinistic views. The best of his sermons, amounting to about 250, were published and received with great favour, and they are still much read in Germany. Zollikofer himself published several collections of them: one at Leipzig, in 1769-71, in 3 vols. 8vo.; a second in 1784, 2 vols. 8vo., reprinted in 1790 and 1795; and a third in 1787, 8vo., of which a third edition appeared in 1789. After his death a collection of unpublished sermons was edited by F. von Blankenburg, Leipzig, 1788-89, in 7 vols. 8vo., to which two more volumes were added by J. G. Marezoll, Leipzig, 1804, 8vo. About the same time there appeared a complete collection of all Zollikofer's sermons, in 15 vols. 8vo., Leipzig, 1789-1804. Besides these sermons, he published:—1, a new Hymn-book for the use of the Reformed Churches (Leipzig, 1766, 8vo.); some of the hymns are of his own composition, and the great popularity of them is manifest from an eighth edition being published in 1789, 8vo. 2, 'Abhandlung über die Erziehung,' Leipzig, 1783, 8vo. 3, 'Anreden und Gebete zum Gebrauch bei dem gemeinschaftlichen und auch dem häuslichen Gottesdienste,' Leipzig, 1777, 8vo., reprinted in 1785. 4, 'Andachtsübungen und Gebete zum Privatgebrauch für nachdenkende und gutgesinnte Christen,' Leipzig, 1785, 2 vols. 8vo. A third and fourth volumes appeared after his death, in 1792 and 1793, and a new edition of the two last volumes in 1802, &c. Zollikofer also translated several works from the French and English, with which languages he was thoroughly conversant. From the English he translated P. Brydone's 'Travels in Sicily and Malta,' of which a third edition appeared at Leipzig in 1783. Zollikofer's sermons were translated into English by William Tooke, 10 vols. 8vo.

(C. Garve, *Ueber den Character Zollikofer's*, Leipzig, 1788, 8vo.; Jördens, *Lexikon Deutscher Dichter und Prosaisten*, v., pp. 663-690.)

ZOMBOR, an imperial free town, in the county of *Baes in Hungary*, is situated in 45° 45′ N. lat. and *19° 12′ E. long.*, at the distance of half a league from *the Danube*, and 23 miles from Maria-Theresianopol, in a plain on the banks of the Francis Canal. It contains 3600 houses (most of them low and covered with thatch), and 22,000 inhabitants, of whom about 12,000 are schismatic Greeks and the remainder Roman Catholics. The latter have a large church, once belonging to the Franciscans, and given to the Roman Catholics by the late emperor Francis I. The Greeks have two churches and a chapel. The principal public buildings are the churches, the very handsome county-hall, which was completed in 1804, and where the estates of the county assemble; the town-hall, likewise a handsome building, the barracks, and a large quadrangle of buildings, containing the offices of royal commission for the management of the affairs of the crown in the county. There are good Roman Catholic schools, and a seminary for schoolmasters for the schismatic Greeks and Illyrians. There are many nobles resident in the town. A great number of the inhabitants follow various mechanical professions. The trade of the town is very great, chiefly in corn and cattle. This trade is greatly facilitated by the Francis Canal, which unites the Danube and the Theiss, and is nearly 70 miles in length. It was opened in May, 1802. This canal shortens the distance between the Danube and the Theiss by 230 miles. The fall is 27 feet, which is distributed among five locks.

(J. C. von Thiele, *Das Königreich Ungarn; Beschreibung der Königreiche Ungarn, Croatien, und Slavonien*; anonymous.)

ZO'NARAS, JOANNES (Ἰωάννης Ζωναρᾶς), a Greek historian and theologian of the twelfth century of the Christian æra. He was a native of Constantinople, and lived in the reign of the emperor Alexius Comnenus. He was at first invested with the high office of praefect of the emperor's body-guards and that of protoasecretis (πρωτοασηκρῆτις), but he afterwards entered a monastery. During this last period of his life, which falls in the reign of Joannes Comnenus, he devoted himself entirely to literary pursuits, and produced several great works, partly historical and partly theological. He is said to have died on Mount Athos, at the age of 88. He is spoken of by his contemporaries, as well as by subsequent writers, in terms of the highest praise, both as a man and a philosopher. We subjoin a list of those of his works which have been printed, and begin with the most important:—1, Χρονικόν, or annals from the creation of the world down to the death of Alexius Comnenus, in A.D. 1118, at which point Acominatus Nicetas takes up the history. The work is divided into two great parts, and subdivided into eighteen books. It is a compilation from the earlier Greek historians, whose statements are sometimes only transcribed and sometimes abridged, so that the work is a substitute for many others which have perished. The Annals of Zonaras were first edited by H. Wolf, with a Latin translation by A. Fugger (Basle, 1557, 3 vols. fol.). This edition was followed by a much better one by Du Fresne du Cange (Paris, 1686, &c., 2 vols. fol.), with an improved Latin translation and notes. A reprint of this edition is contained in the Venice collection of the Byzantine writers of 1729, &c., in 23 vols. fol. In the Bonn collection of the Byzantine writers Zonaras is edited by Pinder, but only the first volume has yet appeared. 2, Ἐξήγησις τῶν ἱερῶν καὶ θείων κανόνων, &c., that is, an exposition of the sacred canons and those of the apostles, councils, synods, and ecclesiastical fathers. The commentary on the canons of the apostles was edited in a Latin translation by J. Quintinus (Paris, 1558), and that on the councils and fathers, likewise in a Latin translation, by A. Salmatia (Milan, 1615). The Greek original of the latter, with the Latin version, was published at Paris in 1618, fol. The whole of Zonaras's commentaries, both in Greek and Latin, was edited by G. Beuergius, Oxford, 1672, fol. 3, Λόγος πρὸς τοὺς τὴν φυσικὴν τῆς γονῆς ἐκροὴν μίασμα ἡγουμένους. It is published in E. Bonefidius's 'Jus Orientale,' iii., p. 261, &c., both in Latin and Greek, and also in Leunclavius and Freher's 'Jus Graeco-Romanum,' i., p. 351, &c. 4, Τὸ προσώπου τῶν ἀρχιερέων περὶ τοῦ μὴ δεῖν δυ' ἐξαδέλφους τὴν αὐτὴν ἀγαγέσθαι πρὸς γάμον: that is, a treatise to show that two nephews should not be allowed to marry the same woman. It is printed in Latin and Greek in Cotelerius's 'Monumenta Ecclesiae Graecae,' ii., p. 483, &c. There are several other works of Zonaras, and among them several homilies and letters which have not yet been printed, or only in a fragmentary way: a complete list of them is given by Fabricius.

(*Biblioth. Graec.*, xi., p. 222, &c.; vii., p. 465, &c.: compare Cave, *Historia Literaria*, i., p. 648, &c.)

ZONE (the Greek ζωνη, 'a belt'), a portion of a sphere intercepted between two parallel planes. When, on the globe of the earth, one plane is the equator, and four others are drawn parallel to the equator, two of which contain the circles in which the sun is vertical at the summer and winter solstices, and the two others, the circles of which are as far distant (on the earth) from the poles as the former are from the equator [ARCTIC CIRCLE], the earth is divided into six zones (the polar segments being called by that name as well as the others). Of these the portions which contain the two poles are called the north and south *frigid zones:* throughout these zones the sun never rises during a part of the winter, and never sets during a part of the summer. The parts intercepted between the arctic circle and the summer solstice parallel, and between the antarctic circle and the winter solstice parallel, are called the northern and southern *temperate* zones: in every part of these there is always rising and setting of the sun for every day in the year; but in no part of them is the sun ever vertical. The parts between the summer solstice parallel and the equator, and between the winter solstice parallel and the equator, are called the northern and southern *torrid* zones: in these there is always night and day, and at every point the noonday sun is vertical twice in the year.

The torrid and frigid zones deserve their names; but the temperate zones partake of both excessive heat and cold in those parts which are near the boundaries of the torrid and frigid zones. Every zone, in fact, partakes of all the qualities of the adjacent zone, in those parts which are near the boundary. Thus near the arctic circle there are places where the shortest day is only ten minutes, and the shortest night no longer; near the solstice parallels there are places at which a part of the sun's body may be vertical, though the centre of the sun can never be so; all being within the temperate zone.

ZONOTRI'CHIA, Mr. Swainson's name for a subgenus of *Fringilla*, arranged by him in the subfamily *Fringillinæ*, of the family FRINGILLIDÆ.

Subgeneric Character.—Bill as in *Fringilla;* the commissure straight. *Wings* not lengthened; the first quill shorter than the four next, which are of nearly equal length. *Tail* rather lengthened, slightly divaricated; the outermost feathers shortened. Lateral toes slightly unequal. Tarsus and middle toe of equal length. America only. (Sw.)

Example, *Zonotrichia leucophrys*, Wils., *Am. Orn.*, pl. 31.

ZONU'RUS, Merrem's name for a genus of Saurians, thus defined by Mr. J. E. Gray:—

Generic Character.—Lizard-like; ears exposed. Legs four; femoral pores distinct. Head depressed, broad behind, supra-orbital plate expanded. Tail depressed, with whorls of large square-keeled spinous scales. Back with keeled subspinose, belly with smooth scales. Five toes on each foot.

Geographical Distribution.—Old World.

Mr. Swainson, who gives this character, and places the genus in his family '*Lacertidæ, Long-tongued or True Lizards*,' remarks, in his *Classification of Reptiles*, that Mr. Gray's definition of this group makes him conclude that it is to be the exact representation of *Stellio* among the thick-tongued lizards; but, as Mr. Gray brings within it several genera which do not agree with the above definition, he (Mr. S.) is fearful of inserting the minor divisions.

MM. Duméril and Bibron arrange the genus under their first subfamily, *Ptychopleur Cyclosaurs*, of *Chalcidian Lizards*, and thus characterize it:—

Tongue arrow-point-shaped, free on its anterior half, hardly notched at the end, its surface velvety. No teeth on the palate. Maxillary and intermaxillary teeth equal, conical, simple, blunt, set against each other. Nostrils lateral, each pierced in a single plate—the naso-rostral. Eyelids. Tympanic membrane extended on the border of the auricular aperture. Four great parietal plates forming a square, at the centre of which is the interparietal. Four feet, each terminated by five unguiculated toes, which are unequal, slightly compressed, and carinated below. Femoral pores in one, two, or three rows.

MM. Duméril and Bibron observe that the *Zonuri* have a physiognomy which calls to mind that of the *Stelliones* and *Agamæ*. Their head is triangular, flattened, and wider than the neck; their trunk is short and depressed; their sides are enlarged, and arched from before backwards; their limbs are robust, offering a development proportioned to that of the other parts of the body; their tail it stout and of moderate extent.

The tongue of the *Zonuri* has the same form as the true lizards, of an arrow-point shape, that is to say, it is narrowed in front, whilst on the opposite side it is wide and divided into two, so as to represent a fork or the branches of a V, between which is situated the orifice of the trachea. The anterior extremity or point of the organ is rounded, and has a very slight crescentic notch. Its surface is covered with small, straight, filiform papillæ, more or less short, placed close to each other so as to produce a velvety appearance. There are no teeth on the palate, but each jaw contains forty, which are equal, conic or subcylindrical, with a simple and blunt summit. The upper surface of the head of these cyclosaurs is a true osseous buckler, furnished with plates, which, in number and disposition, present some differences from those of the other Chalcidians. The cephalic plates of the *Zonuri* consist of one rostral, two naso-rostral, one inter-naso-rostral, two fronto-inter-naso-rostrals, one frontal, two fronto-parietal, four large equal quadrilateral parietals, together forming a square, in the middle of which is situated an inter-parietal; this square, resulting from the disposition of the four parietals, is bordered on the right and left by three plates—the parieto-temporals—the two first rectangular and the third nearly square. There are, as in the lizards properly so called, four palpebral plates on each side; and the supraciliary region itself is invested with three or four oblong plates. The external orifices of the nostrils are pierced, one on the right, the other on the left, at the extremity of the muzzle, at the summit of the frenal region, in a single plate—the naso-rostral, behind which is a naso-frenal, which is often succeeded by the freno-ocular; for a post-naso-frenal rarely exists. The lips and the submaxillary branches are protected in the same manner as in the common Saurians. The temples are covered with plates, and form a projection behind, under which the ear, which is a little directed backwards, seems to be sheltered. This ear, at the entrance of which the membrane of the tympanum is extended, is very large, oval, and having its great diameter placed in the vertical direction of the head. Two eyelids, a small one above and a very large one below, protect the globe of the eye; the slit is longitudinal, but a little inclined forwards.

The toes are unequal; on the anterior extremities, the first toe is the shortest, the fifth comes next, then the second, and finally the third and fourth, which are of the same length. On the posterior extremities the four first toes are regularly graduated; the fifth, which is inserted very far back upon the tarsus, has its anterior extremity on the same line as the second.

The tetragonal tail is slightly depressed at its base, and rounded or slightly compressed for the rest of its extent.

Sometimes the skin of the lateral parts is completely hidden under the spiny scales which roughen it; sometimes dichotomic folds are seen there more or less developed; and again there are instances where it is invested by scaly granules. In general there is a small cutaneous fold in front of each shoulder, descending in an oblique line upon the middle of the edge of the breast, where it results in a sort of collar of a V shape, as in certain Eremias and Acanthodactyls. All the species of *Zonurus* have the lower surface of the thighs pierced with large pores, disposed either in a single row, in two, or even in three. In many there is, on each side, between the belly and the side, a rather deep furrow lined with granules. Sometimes the upper part of the neck and back have a sort of cuirass composed of quadrilateral scales in juxtaposition or slightly imbricated, disposed in transverse bands close-set against each other; in other cases this scaly covering does not descend on the sides, where it is replaced by granules. Other species have the upper and lateral parts of the trunk furnished with small, nearly oval, ridged scales, which are distributed in longitudinal series and transverse rows, leaving greater or less intervals between them filled with granules which are generally very fine. Above, the limbs are clothed with rhomboidal or lozenge-shaped scales, which are carinated and imbricated; and the carinæ of these scales on the thighs and legs are developed and prolonged into points to such a degree that these parts of the body are in truth bristled with spines. The belly is defended by a kind of plastron analogous to that of the crocodiles, that is to say, it is formed of a great number of quadrilateral, flat, united plates, disposed in longitudinal bands and transverse rows. The tail is surrounded by verticillations of great rhomboidal scales, which, most frequently, are very spinous.

MM. Duméril and Bibron further remark that Merrem has preferred the generic appellation here given to *Cordylus*, but which had previously been employed by Klein, Gronovius, Cuvier, Fitzinger, and some others—arbitrarily, however, for the word Κορδύλος (Cordylus) was used by Aristotle not to designate a species of *Zonurus*, but a larva of a Urodele Batrachian, probably that of *Triton cristatus*.

MM. Duméril and Bibron, taking the arrangement of the scales for their basis, follow Dr. Smith in dividing the *Zonuri* into three groups, subgenera of Smith.

1st Group.
(Cordylus.)

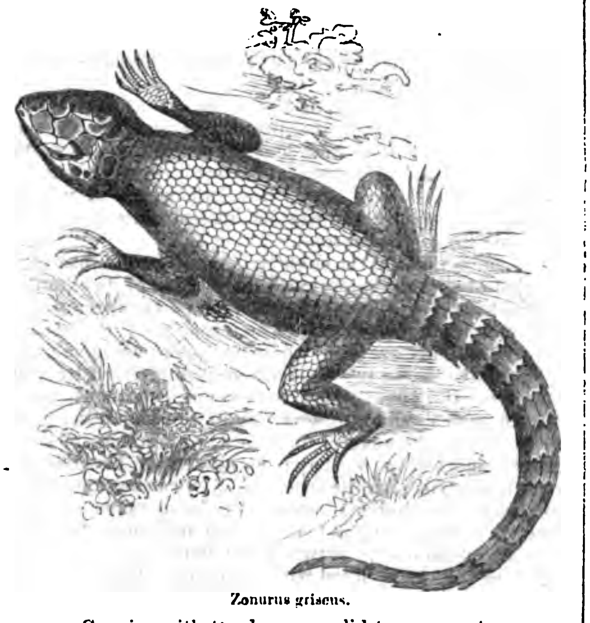
Character of the Group.—A small fold of skin hardly perceptible in front of each shoulder. Skin of the sides of the neck hidden by spinous scales, more or less strong, which bristle its surface. Cervical and dorsal regions covered with quadrilateral scales, slightly imbricated from without inwards, forming close transverse bands. Scales of the sides resembling those of the back: a furrow all along the lower region of each side.

Species with lower lid squamous and opaque.

Example, *Zonurus griseus*, Dum. and Bibr. Three varieties:—

1. Yellowish on the head and upper part of the limbs, orange on the neck, back, sides, and tail. Lower parts white. *Cordylus griseus*, Cuv.
2. Black above; below white, washed with black. *Cordylus niger*, Cuv.
3. Brown, more or less dark above, sometimes inclining to yellow, and nearly always on the medio-longitudinal line of the back a yellow stripe bordered on each side with small quadrilateral black spots. Under part of the body whitish.

Localities.—Cape of Good Hope, Senegal.



Zonurus griseus.

Species with the lower eyelid transparent.

Example, *Zonurus polyzonus*, Dum. et Bibr. (*Cordylus polyzonus*, Smith). Colour brown or black, sometimes mingled with brighter or deeper spots. A large oblong intense black spot on each side of the neck. Lower parts reddish brown.

Locality.—Cape of Good Hope.

2nd Group.
(Hemicordylus, Smith.)

Character.—*Skin* of the sides of the neck folded and covered by granules. Cervical and dorsal regions furnished with subimbricated scales, forming close transverse rows. Lateral parts of the trunk covered with granules,

Example, *Zonurus capensis*—*Cordylus* (*Hemicordylus capensis*, Smith. Colour dusky above, pale blackish blue below.

3rd Group.
(*Pseudocordylus*, Smith.)

Character.—In front of each shoulder a very marked fold descending to the middle of the anterior border of the breast. Skin of the sides of the neck forming projecting lines, and covered with granules. Cervical and dorsal regions furnished with suboval ridged scales, forming longitudinal series, separated by rows of granules. Scales of the sides similar to those of the back. No fold along the lower part of the sides.

Example, *Zonurus microlepidotus*, Gray; *Cordylus* (*Pseudocordylus*) *montanus*, Smith. Colour.—Brown, more or less deep above, inclining more or less to blackish. Upper parts and sides of the neck, trunk, and tail with transverse orange, yellowish, or greenish bands, which whiten when the animal is kept in alcohol. Under part of the head black, and the other under parts pale yellow or orange.

Localities.—Cape of Good Hope, Sierra Leone.

Zonurus in the arrangement of MM. Duméril and Bibron is immediately succeeded by *Tribolonotus*, Dum. and Bibr.

ZOOCARPES, the name given to certain organized bodies which have been variously classed by botanists and zoologists as animals or plants, and by some as partaking of the characters of each. By a reference to the great work of Ehrenberg on Animalcules, and to the 'Species Algarum' of Agardh, or Hooker's 'British Flora,' it will be found that the same genera which the one author has described as animals, the others have described as plants. We shall not here enter into an examination of the opinions which have led to the classification of these bodies either as animals or plants, as all naturalists are agreed as to the principal facts of the existence of these bodies. They are all agreed that these beings exist at a point in the organic kingdom of nature in which there is the greatest difficulty in seizing facts which, under ordinary definitions, could at once determine their position in the animal or vegetable scale. Definitions which are so easily employed higher up the scale are of no use here, and it is only by an accurate analysis, and comparison of the structure and functions of these organisms, that an approach to a correct classification can be made. The bodies to which the term Zoocarpeæ have been applied are placed by botanists in the natural order Algæ. Of the higher groups of Algæ we have spoken under Sea-Weeds and Water-Plants, but it is in the lower forms more particularly that the Zoocarps occur. These lower groups form the divisions Gloiocladeæ of Harvey and the Diatomaceæ of Greville. Most of the plants belonging to these divisions appear in the form of slime on the surface of stones, rocks, walls, &c. or of scums, froths,, &c. on water.

The Gloiocladeæ consist of plants with numerous globules or filaments, invested with a definite gelatine, and forming globose or filiform fronds. This division includes the Chaodineæ of Bory St. Vincent, whose general account of these formations is quoted by Lindley in his remarks on the natural order Algæ. He says the gelatine or slime in which these plants are enveloped 'resembles a layer of albumen spread with a brush: it exfoliates in drying, and finally becomes visible by the manner in which it colours green or deep brown. One might call it a provisional creation waiting to be organized, and then assuming different forms, according to the nature of the corpuscles which penetrate it or develop among it. It may further be said to be the origin of two very distinct existences, the one certainly animal, the other purely vegetable. This matter, lying among amorphous mucus, consists in its simplest state of solitary spherical capsules, which are afterwards grouped, agglomerated, or chained together, so producing more complex states of organization. Sometimes the mucus, which acts as the basis or matrix of the corpuscles when it is found in water, which is the most favourable medium for its development, elongates, thickens, and finally forms masses of some inches' extent, which float and fix themselves to aquatic plants. These masses are at first like the spawn of fish, but they soon change colour and become green, in consequence of the formation of interior vegetable corpuscles. Often however they assume a milky or ferruginous appearance; and if in this state they are examined under the microscope, they will be found completely filled with the animacules called Naviculariæ, Lunulinæ, and Stylariæ, assembled in such dense crowds as to be incapable of swimming. In this state the animalcules are inert. Are they developed here, or have they found their way to such a nidus, and have they hindered the development of the green corpuscles? Is the mucus in which they lie the same to them as the albuminous substance in which the eggs of many aquatic animals are deposited? At present we have no means of answering these questions.'

The following are the characters of the genera of this division, Gloiocladeæ:—

Tribe I. *Batrachospermeæ.*—The plants in this tribe are filiform or globose, composed of articulated, branched filaments, invested with gelatine. The fructification, so far as it is known, consists of capsules on the ultimate ramules. They are found under the influence of both salt and fresh water.

* Filiform.

Mesogloia. The axis is gelatinous; the periphery composed of branched subdichotomous filaments.

Batrachospermum. The filaments are hyaline, longitudinally striated, set with distant whorls of moniliform ramuli.

Draparnaldia. The filaments hyaline, emitting scattered pencils of coloured ramuli.

** Globose or lobed.

Chætophora. The frond gelatinous, globose, plane or lobed, formed of filaments issuing from the base.

Corynephora. The frond camoso-coriaceous, hollow, formed of filaments issuing from a central point.

Myrionema. The frond minute, gelatinous, parasitical, composed of short, erect, clavate, simple filaments, fixed at their base to a thin expansion.

Tribe II. *Rivularieæ.*—The plants are more or less globose (never filiform), camose, composed of continuous filaments annulated within. To this tribe belongs but one genus, *Rivularia.*

Tribe III. *Nostochineæ.*—The plants more or less globose, gelatinous or carose, including granules scattered through the mass or arranged in moniliform series.

Protococcus. The globules aggregated, naked, filled with granules, seated on a hyaline jelly.

Hæmatococcus. Minute gelatinous fronds, aggregated into a frustulose crust, and including scattered granules.

Palmella. A polymorphous gelatine, filled with distinct globular or elliptic granules.

Echinella. Minute gelatinous fronds, filled with elliptical corpuscles, radiating from a centre.

Nostoc. A gelatinous polymorphous frond, filled with crisp moniform filaments.

The species of *Mesogloia* are marine plants. They are of a purple, rose-red, or green colour. The *M. Hudsoni* is found on the coast of Devonshire. Mrs. Griffiths says of this plant—'The structure is very remarkable: the frond appears to be made up of tufts of fibres, radiating from a centre, each tuft, when separated in water under a glass, resembling a double Aster or Sea-Anemone. In the centre of the petal-like fibres are masses of purplish grains.'

The species of *Batrachospermum* and *Draparnarldia* are found in fresh-water streamlets and wells. They are not numerous. The latter genus was named after J. P. R. Draparnaud, a French botanist, who has paid much attention to the study of the Algæ. The Chætophoræ are generally of a green colour, and are little, round, jelly-like looking masses, and are found attached to pieces of stick and other objects in boggy pools, streams, and rivulets. *Corynephora* and *Myrionema* are small genera, and are found where the sea washes, on the pebbles of the shore, or on rocks and on sea-plants. The species of *Rivularia* are numerous, and are found both in the sea and in fresh water. The crust of these plants is sometimes so closely attached to the rock on which it grows, as scarcely to be distinguished from it except by its colour. They are mostly of a green colour. The genus *Protococcus* has only one species, the *P. nivalis.* This little plant has gained a large share of attention on account of its being supposed at one time to be the cause of red snow. Now however the animal kingdom has put in a claim for a share in the production of this phenomenon. [Snow, Red.] Most of the species of *Hæmatococcus* are of a red colour, and give an appearance like that of blood to the rocks on which they grow. These appearances have often been regarded with a superstitious eye, and looked upon as warnings or omens from heaven. One of the species of *Palmella*, the *P. cruenta*, has a dark blood-red colour, and on that account has been called 'gory dew.' It occurs on whitewashed walls, especially in damp cellars; and in such situations has sometimes given occasion for alarm, on account of its having the appearance of stains of blood. The other species of Palmella have various colours, as yellow, green, and black. They are found in fresh water-streams and on rocks on the sea-shore. Most of the species of *Echinella* have been referred by Ehrenberg to the *Baccillaria*, a family of polygastric animalcules. Many of them have certainly the power of locomotion during the whole period of their existence, and not like some of the Zoocarps, which only move about at the commencement of their organic life. The species of *Nostoc* are found on damp earth, as well as in sea and fresh water. Most of them are gelatinous, of a yellow or green colour, or transparent, and shrink almost to nothing in drying.

The division Diatomaceæ consists of granules of various forms, plane or compressed, more or less transparent, rigid, and fragile, arranged in a lengthened series or in circles, which are free, naked, or imbedded in a mucous mass, and at length separating into distinct segments.

Of the two divisions, this is certainly the most anomalous with regard to its relation to the animal or vegetable kingdom. Agardh in fact states that many of the organisms referred here have as much relation to the mineral as to the animal or vegetable kingdom. He says that some of his Diatomeæ are nothing more than vegetable crystals, bounded by right lines and collected into a crystalliform body, and having no other difference from minerals than that the individuals have the power of again separating. The following is the arrangement of the British genera of this family from Hooker's 'British Flora:'—

Tribe I. *Desmidieæ.*—Filaments cylindrical or angular, at length separating into segments, which are called *frustula.*

Meloseira. Segments forming simple pseudo-articulated filaments, constructed at the articulations, fragile, and easily separating.

Desmidium. Segments forming simple angular pseudo-articulated filaments, transparent at the crenated angles, at length separating.

Tribe II. *Fragillarieæ.*—The filaments plane, extremely fragile, composed of rectilinear segments.

Fragillaria. Segments forming plane pseudo-articulated, densely striated, fragile filaments, separating at the striæ.

Achnanthes. Frond stipitate, standard-shaped, composed of a few segments, which at length separate.

Diatoma. Segments forming pseudo-articulated plane filaments, at length separating and cohering at their angles.

Frustulia. Segments linear, free or imbedded in a shapeless mass, solitary or binate.

Tribe III. *Styllarieæ.*—Segments plane, wedge-shaped.

Styllaria. Segments wedge-shaped, separate, stemless, not united into plane laminæ.

Licmophora. Segments wedge-shaped, flabelliform, stipitate.

Meridion. Segments wedge-shaped, in plane sessile circles or segments of circles.

Tribe IV. *Cymbelleæ.*—Segments elliptical.

Gomphonema. Segments subgeminate, terminating a very slender simple or branched filament.

Homœocladia. Segments arranged in numerous, binate, distant, parallel series, within a tubular frond.

Berkleya. Segments in longitudinal series, within simple mucous filaments, which are free at the extremity, but united below into a roundish gelatinous mass.

Micromega. Segments arranged in longitudinal series within a cartilaginous or gelatinous frond.

Schizonema. Segments in longitudinal series, and inclosed in a simple or branched, filiform, mucous, membranaceous frond.

Cymbella. Segments elliptical, binate, free or imbedded in a mucous mass.

Such are the definitions of these genera, as given by botanists. With a somewhat different technology, the same genera with the same names are described by zoologists. Thus of the above genera, Ehrenberg, in his 'Infusions-thierchen,' claims the genera Frustulia, Achnanthes, Fragillaria, Schizonema, Desmidium, Gomphonema, Meridion, and Micromega, besides many species from other genera.

The minute bodies belonging to this division of organized nature are found wherever water exists in any quantity. The pebbles on the sea-shore, the rocks on the coast, and various forms of marine plants are frequently covered with them, and they can only be detected by the naked eye when collected together in such quantities as to alter the colour or apparent consistence of the substance in which they are found. They are not however at all confined to sea-water; but are found in streams and brooks, boggy pools, ponds of stagnant water, and mineral-springs, and many of them will make their appearance in solutions of salts and infusions set aside for only a few days. The forms of the segments or frustula are various; sometimes they are quite flat and angular, at other times they are more or less globose. In many instances these segments consist of silica, and when regarded as animals, this part of the body is called its skeleton. It is on account of their siliceous character that many of the species of Diatomaceæ have been detected in a fossil state, and already fossil species have been described that have not yet been determined to exist in a recent state. Although exceedingly minute, they sometimes collect in large quantities, and give a new character to objects to which they attach themselves. In the 'Proceedings of the Linnæan Society' for December, 1840, Dr. Lankester traced the apparently whitewashed appearance of the stones in the bed of the river Annan in Dumfriesshire, to the existence of one of these minute Diatomas. The species in this instance has been described by Ehrenberg as the *Synedra Ulna*, and by Greville as the *Diatoma truncatum*. These little bodies were parasitic on a Conferva that covered all the stones, and it was only when the river fell during the summer that the white appearance was observed on the stones. Many of the marine species so entirely cover the plants to which they are attached, as to give them a different appearance altogether. The segments are mostly transparent; they are however sometimes green, brown, yellow, or rose-colour. They are frequently marked in the inside with globules, granules, or striæ, and it is to these that Ehrenberg has assigned the functions of stomachs, ovaries, &c., and on the ground of this structure, together with their power of locomotion, has referred them to the class of animalcules. The history however of these organisms has not yet been sufficiently worked out to enable any one with certainty to refer them either to one division of the organic kingdom or the other. In the mean time an important field of inquiry is open to the naturalist in the reproduction, growth, and structure of these lower forms of organic life, by an increase in our knowledge of which we can alone expect to classify them with certainty according to their real relations.

For further information the reader should consult Agardh, *Species Algarum*; Greville, *Algæ Britan.*; Lindley, *Natural System*; Hooker, *British Flora*, vol. ii.; Nees von Esenbeck, *Die Algen des Süssen Wassers*; Gaillon, Desmazières, Unger, and Kutzing, in *Ann. des Sc. Nat.* for 1823, 1825, 1828, and 1834; Meyen, *Pflanzen Physiologie*; *Dict. des Sc. Nat.*

ZOOLOGY (from ζῶον, *zōon*, an animal, and λόγος, *logos*) literally means a discourse concerning animals, and is the science which teaches the nature, properties, and classification of the subjects of the animal kingdom. The constituents of an ANIMAL are treated of in the article LIFE: when the animal dies, the elements which compose its body are acted upon by the ordinary chemical affinities which that body had been able to resist when living, and the more or less rapid dissolution of its component parts is the consequence.

In a crude shape, zoology must have been one of the earliest sciences that forced itself upon the attention of the human mind. The very necessity for finding names for the more obvious divisions of living beings must soon have produced a classification into the natural groups of Quadrupeds [MAMMALIA], BIRDS, Fishes [FISH], and Insects [INSECTA]; and certain subordinate sections, as, for instance, the distinction between herbivorous and carnivorous beasts, granivorous and carnivorous birds, harmless and poisonous REPTILES, must have followed as a matter of course.

We have in the Bible and in the engraven and pictorial Egyptian records the earliest evidence of the attention which had been paid to Natural History in general. The 'navy of Tarshish' contributed to the wisdom of him who not only 'spake of the trees, from the cedar of Lebanon even unto the hyssop that springeth out of the wall,' but 'also of beasts, and of fowl, and of creeping things, and of fishes,'* to say nothing of numerous other passages showing the progress that zoological knowledge had already made.

The Egyptian records bear testimony to a familiarity not only with the forms of a multitude of wild animals, but with their habits and geographical distribution.

Although it must be admitted that HERODOTUS was behind the science of his day in physical knowledge, he who, despising the sneers of the half-learned at his wonderful stories, will bring to the perusal of his works a fair share of scientific acquirement, will find many instances of zoological information which have been taken for the mere tales of this excellent traveller and historian, but which modern investigation has confirmed. But it is to ARISTOTLE, justly termed the father of natural history, that we owe the first dawnings of system founded on the only sure basis, the organization or physiological character of animals.

Since his time, the principal endeavour of zoologists has been directed to a discovery of 'the natural system,' as it has been properly called—for there can be but one;—and the number of methods proposed one after another, some, it must be admitted, approaching apparently very nearly to the truth, show, indeed, that a great advance has been made, but that the problem is not entirely solved, although we are in possession of the key.

Some, indeed, seem to have expected that this system should burst forth at once, a sudden and complete apparition, whereas it must necessarily be of slow growth, and gradually developed by a careful collection and comparison of materials and the philosophical application of induction. Let any competent person look not only at the multitude of existing species, but at those which are extinct and known only by their fossil remains, that have been recognised since the last system was put forth—not a year passes without a considerable accession—and he may be pardoned for thinking that it is somewhat hasty to come to conclusions without having the whole of the premises before us.

Aristotle's method was founded on a division of organs which may be arranged, first, with reference to natural groups (κατὰ γένος or κατ' εἶδος), Birds or Fishes, for instance, which depend on a similar structure of parts; secondly, according to their excess and defect (κατ' ὑπεροχὴν καὶ ἔλλειψιν), as, for example, a division of Birds into those with long bills and those with short bills—those having crests and those having none; thirdly, according to their analogies (κατ' ἀναλογίαν)—take, for instance, the comparison of a hoof with a claw, the wing of a bird with the fore-foot of a quadruped, a feather with a scale; and fourthly, according to their situation (κατὰ θέσιν)—take, for example, animals which have pectoral mammæ—man, apes, and elephants; and animals which have abdominal mammæ—dogs and cats.

To the accuracy of Aristotle's descriptions those who are qualified by an acquaintance with the subject and the language will bear testimony; but it must be confessed that some of those who have attempted to explain his meaning have manifested small knowledge of Latin, less of Greek, and none of the science on which his invaluable work treats. His talent for observation and generalization was of the highest order; and never did man more worthily employ the ample means which the liberality of his royal pupil placed at his disposal.

Of Ælian [ÆLIANUS CLAUDIUS] it may be sufficient to say here that he seems to have kept a sort of general receptacle for any information relative to animals that he could collect, which he put together without knowledge of the subject. The industrious and entertaining PLINY, prone as he was to record fable, was an author of a very different capacity; but the little space that he gave to system was filled from the stores of Aristotle, on whom he drew largely for his zoological descriptions generally. In the almost equally amusing pages of ATHENÆUS will be found a scattered but copious collection of facts relative to animals, stated apparently more with a view to the pleasures of the table, the leading subject of the book, than to the advancement of natural history.

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* 1 Kings iv. 10.

In the interval which ensued between the age of the antients and the revival of letters much zoological as well as other scientific knowledge seems to have been preserved among the Arabs and in the East generally, where it became, however, highly charged with fable, as in the account of the Roc; magnitude, which is a principal element in the Oriental notions of the sublime, being the prevailing exaggeration.

ALBERTUS MAGNUS appears to have been the first European writer of note claiming the zoologist's attention, after the silence of the dark ages; and in his *Historia Animalium* are traces of access to antient authorities no longer extant.

BELON had deeply studied Aristotle; and the works of the French traveller on the natural history of birds and fishes not only contain much valuable information, but an attempt at classification. [BIRDS.]

GESNER, ALDROVAND, and JONSTON followed. The valuable volumes of the first of these authors include the labours of Belon and Rondelet, and carry arrangement still further. Aldrovand's voluminous compilations form a storehouse of learning from which subsequent writers have drawn deeply and not always gratefully. Buffon, in particular, ridicules his copious compilations and the never-ending collection of lore with which he illustrates the history of a cock or a bull; but without such a thesaurus before him, even Buffon would have found it difficult to write as he did.

To our countryman RAY we are principally indebted for the first clear zoological method. That great naturalist for originality and comprehensive philosophical discernment may, without hesitation, be placed next after Aristotle himself. [BIRDS; MAMMALOGY; REPTILES.]

The brilliant style of BUFFON fixed the attention of the civilized world upon the subject which his eloquence at once rendered captivating. A more severe writer might have done greater things for natural history as a science, but Buffon at once secured a willing audience and made all Europe his class. To him above all others may be conceded the merit of making the subject decidedly popular at once and for ever. The way was thus prepared for LINNÆUS.

In the last edition of the *Systema Naturæ*, revised by its great author, the Animal Kingdom is thus arranged:—

The Natural Division of the animal kingdom is indicated by internal structure.

Heart bilocular, with two auricles. *Blood* warm, red.	Viviparous ...	*Mammalia.*
	Oviparous	*Birds.*
Heart unilocular, with one auricle. *Blood* cold, red.	Arbitrary lungs	*Amphibia.*
	External gills .	*Fishes.*
Heart unilocular, with one auricle. Circulating fluid (*sanies*) cold, white.	With antennæ.	*Insects.*
	With tentacula.	*Vermes.*

I. Mammalia.

Heart bilocular, with two auricles; *Blood* warm, red. *Lungs* respiring reciprocally. *Jaws* incumbent, covered: *Teeth* inserted in most. *Penis* intrans viviparas, lactiferas. *Senses:* Tongue, Nostrils, Eyes, Ears, Papillæ. *Covering:* Hairs; very sparing in the aquatics. *Props* (Fulcra): Four feet, except in those which are merely aquatic, in which the posterior feet are conjoined in the fin of the tail. A tail in most.

II. Birds.

Heart bilocular, with two auricles; *Blood* warm, red. *Lungs* respiring reciprocally. *Jaws* incumbent, naked, exserted, toothless. *Penis* subintrans absque scroto oviparas crusta calcarea. *Senses:* Tongue, Nostrils, Eyes, Ears without auricles. *Covering:* Incumbent imbricated feathers. *Props:* Two feet; two wings. *Rump* heart-shaped.

III. Amphibia.

Heart unilocular, with one auricle; *Blood* cold, red. *Lungs* breathing arbitrarily. *Jaws* incumbent. *Penes* bini. Eggs generally membranaceous. *Senses:* Tongue, Nostrils, Eyes, Ears. *Covering:* cutaceous, naked. *Props:* various; null in some.

IV. Fishes.

Heart unilocular, with one auricle; *Blood* cold, red. *Gills* external, compressed. *Jaws* incumbent. *Penes* nulli; eggs without albumen. *Senses:* Tongue, Nostrils? Eyes (not ears). *Covering:* Imbricated scales. *Props:* Natatorial fins.

V. Insects.

Heart unilocular; *sanies* cold. *Spiracles*, lateral body-pores. *Jaws* lateral. *Penes* intrantes. *Senses:* Tongue, Eyes, Antennæ on a head without a brain (neither ears nor nostrils). *Covering:* cataphracta, sustaining an osseous cutis. *Props:* Feet, Wings in some.

VI. Vermes.

Heart unilocular, with one ventricle; *sanies* cold. *Spiracles* obscure. *Jaws* multifarious. *Penes* varii Hermaphroditis Androgynis. *Senses:* Tentacles (no Head, hardly Eyes, neither Ears nor Nostrils). *Covering* calcareous, or null except spines. *Props:* Neither feet nor fins.

This table concludes with the following summary, which will be best given in the original form:—

Vivarium Naturæ sic alit VI-plicis formæ Animalia.

Mammalia pilosa, in *Terra*, gradiuntur, loquentia. *Aves* plumosæ, in *Aëre*, volitant, cantantes. *Amphibia* tunicata, in *Calore*, serpunt, sibilantia. *Pisces* squamati, in *Aqua*, natant, popyzantes. *Insecta* cataphracta, in *Sicco*, exsiliunt, tinnitantia. *Vermes* excoriati, in *Humido*, panduntur, obmutescentes.

Further details of this system will be found in the articles MAMMALIA, BIRDS, INSECTS, and VERMES; and although the definitions given by Linnæus sometimes—as, for instance, when he says that Fishes have no ears—betray a want of knowledge which subsequent experiments have supplied, the student must be struck with their accuracy, considering the imperfect state of comparative anatomy when he wrote.

The *Amphibia* of Linnæus consist of the three orders, *Reptiles*, *Serpentes*, and *Nantes:* the two first of these are noticed in the article REPTILES, p. 404. The third order, *Nantes*, is thus defined:—

Finned: breathing also by means of lateral gills.

* Spiracles compound, numerous.

Petromyzon (Lamprey), Spiracles 7 lateral. *Raja* (Ray), Spiracles 5 underneath. *Squalus* (Shark), Spiracles 5 lateral. *Chimæra*, Spiracle 1 quadrifid.

* * *Spiracles solitary.*

Lophius (Angler), fins ventral 2; mouth toothed. *Accipenser* (Sturgeon), fins ventral 2; mouth toothless. *Cyclopterus* (Lump Fish), fins ventral 2. *Balistes* (File Fish), fins ventral 1. *Ostracion*, fins ventral 0; body with a bony cuirass. *Tetrodon*, fins ventral 0; abdomen muricated. *Diodon* (Globe Fish), fins ventral 0; body aculeated. *Centriscus*, fins ventral X.; body loricated with a spine. *Syngnathus*, fins ventral 0; body articulated. *Pegasus*, fins ventral 2; rostrum ciliato-dentated.

The *Pisces* of Linnæus embrace four orders:—

1. *Apodes*, ventral fins null.
2. *Jugulares*, ventral fins *before* the pectoral fins.
3. *Thoracici*, ventral fins *under* the pectoral fins.
4. *Abdominales*, ventral fins *behind* the pectoral fins.

I. Apodes.

Muræna, apertures of the gills at the sides of the thorax. *Gymnotus*, back finless. *Trichiurus*, tail finless. *Anarrhichas*, teeth rounded. *Ammodytes*, head narrower than the body. *Ophidium*, body ensiform. *Stromateus*, body ovate. *Xiphias*, body ensiferous.

II. Jugulares.

Callionymus, apertures of the gills at the nape. *Uranoscopus*, mouth wide and flat (simum). *Trachinus*, anus near the breast. *Gadus*, pectoral fins elongated into a point. *Blennius*, ventral fins didactylous, smooth (muticæ).

III. Thoracici.

Cepola, mouth wide and flat (simum); body ensiform. *Echeneis*, back of the head flat, furrowed transversely. *Coryphæna*, head anteriorly obtusely truncate. *Gobius*, ventral fins conjoined (coadnatæ) into an ovate fin. *Cottus*, head wider than the body. *Scorpæna*, head sprinkled with cirri. *Zeus*, upper lip arched (fornicatum) with a transverse membrane. *Pleuronectes*, both eyes on one side of the head. *Chætodon*, teeth setaceous, very close set, flexible. *Sparus*, teeth strong, incisors, molars. *Labrus*, dorsal fin marked with a ramentum behind the spines. *Sciæna*, dorsal fin capable of being hidden in a little furrow. *Perca*, opercula of the gills serrated. *Gasterosteus*, tail carinated at the sides; dorsal spines distinct. Scomber, tail carinated at the sides; many spurious pinnules. Mullus, scales, even those of the head, loose. *Trigla*, distinct digits, near the pectoral fins.

IV. Abdominales.

Cobitis, body hardly narrowed at the tail. *Amia*, head naked, bony, scabrous. *Silurus*, ray of the first dorsal and pectoral fins toothed. *Teuthis*, head truncated anteriorly. *Loricaria*, body mailed (cataphractum). *Salmo*, posterior dorsal fin adipose. *Fistularia*, beak cylindrical, capable of being shut with an operculum. *Esox*, lower mandible longest, punctated. *Elops*, branchiostegous membrane double, the external one shortest. *Argentina*, anus near the tail. *Atherina*, a lateral, longitudinal, silvery band. *Mugil*, lower mandible carinated within. *Mormyrus*, branchial aperture linear without opercula. *Exocœtus*, pectoral fins of the length of the body. *Polynemus*, digits distinct near the pectoral fins. *Clupea*, abdomen carinated and serrated. *Cyprinus*, branchiostegous membrane triradiate.

The orders of insects are defined by Linnæus from their wings:—

Wings 4.	Upper wings	crustaceous with a straight suture		*Coleoptera* 1.
		semicrustaceous, incumbent		*Hemiptera* 2.
	All .	imbricated with scales . .		*Lepidoptera* 3.
		membranaceous, ano	inermi	*Neuroptera* 4.
			aculeato	*Hymenoptera* 5.
Wings 2.	Balances (Halteres) in lieu of the posterior wings . .			*Diptera* 6.
Wings 0.	*i.e.* the body without wings and elytra			*Aptera* 7.

I. Coleoptera.

* *Antennæ clavate, thickened externally.*

Scarabæus, antennæ with a fissile clava; anterior tibiæ dentate. *Lucanus*, antennæ with a compressed clava, the widest side fissile. *Dermestes*, antennæ with a perfoliate clava; head inflected under the scarcely marginate thorax. *Hister*, antennæ with a solid clava; head retractile within the thorax. *Byrrhus*, antennæ with a solid ovate clava. *Gyrinus*, antennæ rather rigid; eyes four. *Attelabus*, head posteriorly attenuated. *Curculio*, antennæ insident; rostrum horny. *Silpha*, thorax and elytra marginate. *Coccinella*, antennæ with an obtuse clava; palps with a truncated clava.

** *Antennæ filiform.*

Bruchus, antennæ filiform, thickest externally. *Cassida*, body ovate; elytra marginate; head covered with a shield. *Ptinus*, thorax receiving the head; antennæ with the last joint the longest. *Chrysomela*, head ovate, immarginate. *Hispa*, antennæ extended (porrectæ), approximate, fusiform. *Meloë*, thorax subround; head gibbous, inflected. *Tenebrio*, thorax marginate; head exserted; body oblong. *Lampyris*, elytra flexible; shield of the thorax overshadowing and receiving the head. *Mordella*, laminæ at the base of the abdomen; head inflated. *Staphylinus*, elytra divided into two parts (dimidiata), covering the wings; two vesicles above the tail capable of being exserted.

*** *Antennæ setaceous.*

Cerambyx, thorax mucronate-callous at the sides. *Leptura*, elytra attenuated at the apex; thorax rather smooth. *Cantharis*, elytra flexible; abdomen plicato-papillose at the sides. *Elater*, point (mucro) of the breast resilient from a pore of the abdomen. *Cicindela*, jaws exserted, toothed: eyes rather prominent. *Buprestis*, head retracted within the thorax. *Dytiscus*, posterior feet ciliated and formed for swimming (natatorii). *Carabus*, thorax obcordate, truncated posteriorly. *Necydalis*, elytra dimidiate; wings naked. *Forficula*, elytra dimidiate; wings covered; tail with nippers (forcipata).

II. Hemiptera.

Blatta, mouth maxillose; wings coriaceous, flat; feet cursorial. *Mantis*, mouth maxillose; anterior feet serrated; claw single. *Gryllus*, mouth maxillose; posterior feet saltatorial. *Fulgora*, rostrum inflected; forehead (frons) produced, empty (inanis); antheræ capitate. *Cicada*, rostrum inflected; posterior feet saltatorial. *Notonecta*, rostrum inflected; posterior feet natatorial (ciliated). *Nepa*, rostrum inflected; anterior feet cheliferous. *Cimex*, rostrum inflected: feet cursorial. *Aphis*, rostrum inflected; abdomen two-horned. *Chermes*, rostrum pectoral; feet posterior, saltatorial. *Coccus*, rostrum pectoral; abdomen bristly behind in the males. *Thrips*, rostrum obsolete; wings incumbent on the reflexile abdomen.

III. Lepidoptera.

Papilio*, antennæ thickest externally; wings erect. *Sphinx*, antennæ thickest in the middle. *Phalæna*, antennæ thickest internally.

IV. Neuroptera.

Libella, tail with nippers; mouth multi-maxillose: wings extended. *Ephemera*, tail with two bristles; s. 3: mouth toothless; wings erect. *Myrmeleon*, tail with nippers; mouth bidentate; wings deflected. *Phryganea*, tail simple, mouth toothless, wings deflected. *Hemerobius*, tail simple, mouth bidentate, wings deflected. *Panorpa*, tail chelate, mouth rostrated, wings incumbent. *Raphidia*, tail with one thread (filo 1); mouth bidentate, wings deflected.

V. Hymenoptera.

Cynips, sting (aculeus) spiral! *Teuthredo*, sting serrated! bivalve. *Sirex*, sting serrated under the terminal spine of the abdomen. *Ichneumon*, sting exserted! triple. *Sphex*, sting punctorial; wings flat; mouth tongueless. *Chrysis*, sting punctorial; abdomen vaulted (fornicatum) beneath. *Vespa*, sting punctorial; superior wings plicated. *Apis*, sting punctorial, superior wings plicated. *Formica*, sting obsolete; no wings on the neuters. *Mutilla*, sting punctorial; no wings on the neuters.

VI. Diptera.

Œstrus, mouth closed; s. none. *Tipula*, mouth with lateral lips; four palps. *Musca*, mouth toothless with a proboscis. *Tabanus*, mouth with a proboscis and connivent teeth. *Culex*, mouth with a siphoniform, nutant rostrum: stemmata 0. *Empis*, mouth with an inflected rostrum. *Conops*, mouth with a projecting geniculate rostrum. *Asilus*, mouth with a subulate projecting rostrum. *Bombylius*, mouth with a projecting setaceous rostrum. *Hippobosca*, mouth with a subnutant, very short rostrum; stemmata 0.

VII. Aptera.

* *Six feet. Head distinct from the Thorax.*

Lepisma, tail with exserted bristles. *Podura*, tail bifurcated, inflected, saltatorial. *Termes*, mouth with two maxillæ. *Pediculus*, mouth with a sting (aculeus) capable of being exserted. *Pulex*, mouth with an inflected rostrum with a sting; feet saltatorial.

* * *Feet* 8—14. *Head and Thorax united.*

Acarus, eyes 2, feet 8, palps. *Phalangium*, eyes 4, feet 8, palps chelate. *Aranea*, eyes 8, feet 8, palps clavate. *Scorpio*, eyes 8, feet 8, palps chelate. *Cancer*, eyes 2, feet 10: first pair chelate. *Monoculus*, eyes 2, feet 12: two chelate. *Oniscus*, eyes 2, feet 14.

* * * *Feet multitudinous. Head distinct from the Thorax.*

Scolopendra, body linear. *Julus*, body subcylindrical.

It is impossible to read this arrangement without being struck with the comprehensive views of the author, when the imperfect light which existed at the time is considered. Reaumur, Swammerdam, Mouffet, Goedart De Geer, Bonnet, and Lyonnet indeed had done much before the last edition of the *Systema Naturæ* was published: but many of the leading characters of insect-organization were still involved in darkness. One great error will be manifest to all: the classification of the *Crustacea* among the insects under the designation of the genus *Cancer*, &c. The most cursory observation must have satisfied Linnæus that the *Crustacea* breathed by means of gills, and that therefore they could not be placed under the same category with animals whose respiration was carried on by '*Spiracula:* Pori laterales corporis,' to use his own definition. It is not however improbable that the terrestrial habits of the Land and Soldier Crabs [Birgus; Gecarcinus; Pagurus] might have weighed with him, in the absence of any demonstration as to their actual mode of respiration. But notwithstanding errors inseparable from the state of knowledge when he wrote, the philosophical accuracy of his generalizations taken as a whole is manifested by the retention of most of his orders and all his genera to the present day.

The scalpel was now taken up by able hands, and Pallas especially in his anatomy of the Glires, made a great advance in comparative anatomy. Among the most active and enlightened labourers in this department, our own John Hunter* stands pre-eminent in England, and Blumenbach in Germany.

But the fullness of time was now come when a great light was to arise; and George Cuvier, guided by his dissections, became the load-star of zoologists. The *Anatomie Comparée*, the *Ossemens Fossiles*, and, finally, the *Règne Animal*, were the results of his acute and comprehensive demonstrations. In his hands Comparative Anatomy became a new power among the dynamics of natural history, and by its aid he rebuilt the extinct fossil forms that before his time lay scattered over the face of our earth in wild and apparently inextricable disorder.

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* The catalogue of the Museum of the Royal College of Surgeons in London, by Richard Owen, Esq., the Hunterian Professor, is now complete, with the exception of the catalogue of fossils, which is in progress. This work forms a most valuable thesaurus for the zoologist and physiologist.

Well does this extraordinary man enunciate the valuable truth, that since Natural History has taken Nature for the basis of its distributions, its relationship with Anatomy has become more intimate. 'One of these sciences,' says he, 'cannot take a single step without the other profiting by it. The approximations which the first establishes often indicate to the other the researches that ought to be made.'[*] And again, with equal truth he declares, that 'the natural history of an animal is the knowledge of the whole animal. Its internal structure is to it as much as its external form, and perhaps more.'[†]

That Cuvier practised what he preached is evident from his own record of his mode of proceeding in constructing his system.

'I examined,' says the great French zoologist, 'one by one, all the species which I could procure; I associated those which did not differ from each other, except in size, colour, or the number of some parts of little importance, and on these materials founded what I have called a subgenus.

'Whenever I could, I dissected at least one species of each subgenus; and if those to which the scalpel could not be applied be excepted, there exist in my book[‡] very few groups of this degree, of the organs of which I cannot produce at least some considerable portion.'

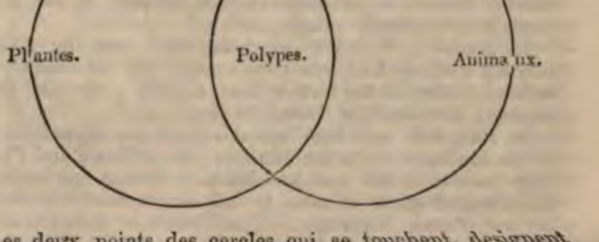
His system will be found in the article on Comparative Anatomy [ANATOMY, COMPARATIVE], and parts of it in most of the articles on the leading groups of the Animal Kingdom in this work. LATREILLE furnished the fourth and fifth volumes, containing the *Crustacea*, *Arachnida*, and Insects; and Cuvier acknowledges his obligations to the work of LAMARCK,[§] with reference to the shells and corals, noticing it with just praise. It must not however be supposed that Cuvier was the advocate of Lamarck's theory of gradual evolution or development, a theory to which the experience of every succeeding day becomes more and more opposed.

About this period, almost contemporaneously with a similar movement in botany, some of the more imaginative and philosophic minds began to perceive analogies in organs and parts of the animal frame which previously had only been regarded under their distinct or individual relations. The close connection between the brilliant generalizations of this nature which first made comparative anatomists acquainted with the bones of the cranium and the essential resemblances, or homologies, as they are termed, of the component elements of a vertebra under their varied forms, for the special purposes of the individual, is too closely connected with similar researches after resemblances and analogies in zoology to be omitted in the present sketch of the history of that science. Göthe, the founder of morphology, or the doctrine of organic analogies in plants, also made the first step in the advancement of similar, or, as they have been termed, transcendental views, in the anatomy of animals. The poet's discovery of the intermaxillary bones in man, the first fruits of this essentially synthetical mode of studying organized beings, has been succeeded by many similar brilliant appreciations of true analogies by his successors Oken and Geoffroy, and the disciples of their school, which have more than compensated for the less substantial results of exuberant imaginations, which have too often had the effect of deterring the sober student of nature from digesting the works of authors from which valuable information is to be obtained.

Germany and the Netherlands have reason to be proud of the names of Illiger, Temminck, and Wagler. Of these M. Temminck continues to enlighten zoologists with his excellent works; whilst Professor Lichtenstein and Dr. Rüppell still pursue their praiseworthy course.

In our own country and time the *Quinary System* has been brought forward and applied by one of our most accomplished zoologists in his 'Horæ Entomologicæ,' 'Annulosa Javanica,' his 'Remarks on the Comparative Anatomy of certain Birds of Cuba,' in the 16th vol. of the 'Transactions of the Linnean Society,' and his 'Illustrations of the Annulosa of South Africa,' forming part iii. of Dr. Andrew Smith's valuable 'Illustrations of the Zoology of South Africa.'

In his 'Remarks on the Birds of Cuba,' Mr. W. S. Macleay thus writes:—'As to new views or principles in natural history, this mode of studying the variation of structure in different animals, in preference to classing them according to an arbitrary division of organs, is perhaps the only one to which I can justly lay full claim. It is possible indeed that Hermann, in his very remarkable work entitled 'Tabula Affinitatum Animalium,' and published in 1783, may have intended to keep some such principle as this in view; but, as with him, unfortunately, the slightest analogy constituted an affinity, we may understand how he found it impossible to trace the mode in which structures vary, and much more so to apply the maxim of variation to arrangement. On a cursory glance at the principles of arrangement laid down by Aristotle at the commencement of his 'Historia Animalium,' he may also be supposed by some to have understood this doctrine of variation in animal structure; but it is easy to show, that although this extraordinary man understood it to a certain degree, he confined himself in the passage in question to the division of organs,—a course of reasoning that led him quite away from the conclusions he would indubitably have arrived at, had he followed the variation of general structure. Still I shall not be surprised if the originality of even this principle be some day disputed with me; for when the question was asked, "Is there anything whereof it may be said, See, this is new?"—the answer was, "It hath been already of old time which was before us." And certain it is, that the doctrines of quinary distribution, of the circular progression of a series of affinity, and of analogies, as distinct from affinities, have all been in some measure advanced by authors prior to the publication of the 'Horæ Entomologicæ.' Indeed it would add little to our conviction of these being great natural truths, to find that only one writer had observed them, and that others had taken them for granted upon his assertion. Accordingly we learn that the number five has had an importance in the construction of the universe given to it from the days of Plato and Cicero; that Linnæus, Pallas, and Desfontaines have mentioned certain analogies in nature as distinct from affinities; and that one of the most distinguished zoologists of the present age, and a foreign member of this Society, Professor Gotthelf Fischer, of Moscow, has stated the progression of certain series of affinity being in circles. I can safely say however, that as I arrived at a knowledge of these several truths by the observation of Nature alone, so I first saw their dependence upon each other, their general application, and their necessary derivation, from the practice of studying the method in which animal structures vary. How far shadowy and unconnected notions on the above subjects may affect the claims of the 'Horæ Entomologicæ' to public attention, I shall not pretend to determine; but it is my duty, on the other hand, to say, that I was surprised, on looking lately among the notes and explanations of the plates (p. 181) at the end of a work published at Moscow, in 1808, by Professor Fischer, and entitled 'Tabulæ Synopticæ Zoognosiæ in usum Auditorum editæ,' to find the following remarks:—"L'auteur trouve dans la Nature organisée une opposition remarquable qui pourroit être exprimée par deux cercles en mouvement, qui se touchent ou qui se croisent en deux endroits.



Les deux points des cercles qui se touchent, designent deux termes extrêmes, deux circonstances inexplicables pour le naturaliste. 1, La moisissure produite par la corruption des matières animales; 2, L'origine des animaux infusoires par celle des matières vegetales. Les bornes de cet ouvrage ne permettent pas un developpement plus ample de cette idée qui presente une verité à poursuivre." Again, in page 184 is the following passage:—"Il ne faut pas croire que la serie des Mammifères soit à considerer dans une direction droite comme une suite. J'ai fait voir à mes élèves qu'elle forme une galerie ou l'observateur se trouve au milieu, ayant les espèces d'animaux de ces côtes. C'est-à-dire, l'auteur s'imagine que chaque serie de la première division dont les doigts ou pieds ne sont reunis par une membrane, trouvera des analogues parmi les animaux de la seconde division, dont les doigts ou pieds sont reunis par une membrane. Une representation des genres de Mammifères en cercles entourant le centre ou est placé l'homme, et se touchant mutuellement, suivant que les proprietés de differens animaux se ressemblent seront peut-être la plus conforme à la Nature."'

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[*] 'Leçons d'Anatomie Comparée,' vol. i.

[†] Ibid., vol. iii.

[‡] 'Règne Animal.'

[§] 'Animaux sans Vertèbres.'

Mr. W. S. MacLeay has brought to bear on his intricate subject a comprehensive knowledge of natural history, much learning, and the close astute reasoning of a mind of no ordinary powers. The system has been applied in this country, by Mr. Vigors, to the Birds, and by Mr. Bennett, to the Mammalia and fishes. With certain modifications it has been applied, by Mr. Swainson, to the animal kingdom generally, who, in his arrangement in the several volumes of the 'Cabinet Cyclopædia' filled by him, has however left out Man.

On the Continent the Quinary System has never found favour, and it has now few if any followers in this country. But it may fairly be said of it, that, like the system of Linnæus, it has suffered more by its friends than its enemies. We have heard it lamented by some, that a man of genius should, unconsciously perhaps, have employed his powerful mind in a mode calculated to rivet the fetters that Bacon had struck off; but these could hardly have been aware of the earnestness with which Mr. MacLeay constantly impresses on his readers that zoology is a science which must always depend upon experience and observed facts; and that the grand object of comparative anatomy is the formation of such a collection of recorded facts of comparative organization as may determine in some degree the use of the various organs; and, above all, may lead us to the better knowledge of the natural arrangement of the animal kingdom.

Indeed of some of his critics it may be said that, like those who treated the Baconian or inductive method with contempt, and laughed and railed by turns at the author of the 'Novum Organum,' immediately after its publication, not many have read his works through; and of those, few have understood them.

That he was wrong in some of his notions may be true: for instance, he has most ingeniously endeavoured to show that the Cephalopod approximates to the Turtle (*Testudo*); but Professor Owen has proved to us by dissection that the Cuttlefish comes nearest to the *Myxine* and Lamprey among the *Vertebrata*.

It is not fair to make Mr. MacLeay answerable for the vagaries of his followers, and the Procrustes-like violence with which they occasionally force a form into what they conceive a proper place merely because that vacant place wants a form. If his injunction to inquire into the organization and habits, as a first and necessary step, had been attended to, *Catheturus* would never have been placed among the Vultures [VULTURIDÆ; TALEGALLA], nor the case of an insect among the *Mollusca* [THELIDOMUS].

A striking feature in the zoological character of the present period arises from the numerous monographs which have appeared or are still forthcoming. It is by such careful collections of materials that the path of the systematist is especially enlightened.

In America Wilson's delightful book and the magnificent work of Audubon have opened up the complete natural history of the birds of their country; nor must the amusing hand-book of Nuttall be forgotten.

In Italy Poli had familiarized us with the organization of the Mollusca in the Sicilian seas; Delle Chiaje and Philippi have followed him, and Madame Power has settled the disputed point relative to the secretion of the shell of the PAPER NAUTILUS. The Prince of Canino and Musignano, who had already so ably supplied what was wanting in Wilson's American work, has left nothing to be wished in his excellent *Fauna Italica*.

England had produced the prominent names of Willughby, Pennant, Latham, White, Leach, Bewick, Montagu, Selby, Gray, Swainson, Stephens, and Curtis; but a powerful stimulus to the science was given by the Zoological Society of London,* in the establishment of which SIR STAMFORD RAFFLES had the principal share. To the taste for zoology thus diffused may in a great measure be attributed the ready acceptation which the elegant hand-books of Yarrell, Bell, Forbes, and Owen have already found or are finding, and the well-merited patronage which has enabled Mr. Gould to publish his magnificent works. 'The Birds of the Himalaya Mountains,' 'The Birds of Europe,' the monographs on the *Ramphastidæ*, the *Trogonidæ*, and the *Kangaroos*, and though last, not least, 'The Birds of Australia,' now in the course of publication, prove the interest taken in the subject by the affluent; while the success of the cheaper publications shows that it is shared by all classes in this country.

The nobly illustrated French voyages, which have done so much for natural history, have at last caused the government of this country to lend their seasonable aid to the heavy expenses attending the publication of illustrated works of natural history; and the *Fauna Boreali-Americana*, the *Zoology of the Beagle*, and Smith's *Illustrations of the Zoology of South Africa*, have already borne testimony to the worthy manner in which that assistance has been applied. We anxiously look for the zoological results of Belcher's voyage and James Ross's southern expedition.

In France the spread of zoological knowledge has been most extensive; and all Europe has been deriving assistance from the useful and, in many instances, highly illustrated *Manuels* of the French zoologists. The *Mammalogie* and *Ornithologie* of Lesson, the *Manuel de l'Histoire Naturelle des Mollusques* of Rang, the *Crustacea* of Desmarest, the *Malacologie* and *Actinologie* of De Blainville, and the beautiful illustrations of Guerin, to name a few, have been of important use to every one engaged in the study. Of the *Suites à Buffon*, the *Reptiles* have been most elaborately worked out and illustrated by Duméril and Bibron, and the *Crustacea* by Milne Edwards. To crown all, the noble *Osteographie* of De Blainville, now in the course of publication, is a work which will confer honour on the French national school of zoology.

But we have been far from idle in England while following the steps of Cuvier in the department of palæontology. Conybeare, De la Beche, and Buckland bravely broke ground in the search for fossil animal forms; and although we cannot claim Agassiz as a countryman, we have had the satisfaction of aiding in the publication of his great work on fossil fishes. Professor Owen has enriched the fossil catalogue beyond hope in almost every class of *Vertebrata*, and, among these, the grand mammiferous additions, *Mylodon*, *Glyptodon*, *Toxodon*, a host of enormous reptiles, and, lastly, the gigantic *Dinornis*† of New Zealand, eminently stand out. In these researches Professor Owen has shown that the microscope may be brought to bear upon the largest as well as the smallest of created beings.

The articles relative to zoology in this work may be found by reference to the following index:—

Kingdom, ANIMALIA.
Sub-Kingdom, VERTEBRATA.
Class, MAMMALIA.
MAMMALOGY.
Sub-Class, PLACENTALIA.
Order, BIMANA.

Albinos. Man. Skeleton.

Order, QUADRUMANA.

Ape. Ateles. Baboon. Brachyteles. Cayou. Cebus. Cercocebus. Cercopithecus. Chimpanzee. Coaita. Colobus. Cynocephalus. Guenons. Hylobates. Jacchus.

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* In the article Wou-Wou the words 'Argus Pheasants' are erroneously printed for 'Argus Pheasant.' But one living Argus Pheasant, as far as we know, has ever reached England.

† SLOTH. The height of the enormous genus *Dinornis* has, like the length of the Dinosaurs, shrunk before the severity of comparative measurement. With the present materials, a greater height than ten feet can scarcely be assigned to the largest known species, *Dinornis giganteus*; but its bulk must have been enormous. The most perfect tibia will give a length of three feet: it is the comparative shortness of the tarso-metatarsal bone, which is a foot and a half in length, that brings the bird down. Professor Owen has satisfactorily made out five species, one of which is small. The almost mammalian structure of the bones of the neck has led Professor Owen to the conclusion that the species of Dinornis subsisted by wrenching up the roots of the edible New Zealand fern for their food.

Kahau. Lasiopyga. Lophotus. Macacus. Mandrill. Mangabey. Mico. Microcebus. Midas. Monkey. Mycetes. Nasalis. Orang-Utan. Ouistiti. Pithecus. Pithecia. Pygathrix. Rhesus Monkey. Sagouin. Saimiri. Sajou. Sakis. Sapajous. Semnopithecus. Siamang. Simiadæ. Ungka-Etam. Ungka-Puti. Wanderoo. Wou-Wou.

Galago. Galeopithecus. Lemuridæ. Lichanotus. Loris. Mongoose. Nocthora. Nycticebus. Otolicnus. Perodicticus. Propithecus. Prosimia. Slow Lemur. Stenops. Tarsius. Pleuroptera.

Potto. Kinkajou.

Cheiropoda. Primates.

Order CHEIROPTERA.

Bat. Cephalotes. Cheiromeles. Dinops. Glossophaga. Istiophori. Megaderma. Mormops. Noctilio. Nycteris. Nyctinomus. Nyctophilus. Plecotus. Pteropus. Rhinolophina. Rhinolophus. Taphozous. Thiroptera. Vampire. Vespertilionidæ.

Order INSECTIVORA.

Banxring. Erinaceus. Chrysochloris. Cladobates. Condylura. Gymnura. Hedgehog. Mole. Mygale. Myosorex. Scalops. Solenodon. Sorex. Sorecidæ. Talposorex. Talpidæ. Tendrac. Tenrec. Tupaia.

Order CARNIVORA.

Aard-Wolf. Arctic Fox. Beagle. Badger. Bear. Benturong. Blood-Hound. Bull-Dog. Calocephalus. Canis. Caracal. Cat. Civet. Couguar. Cryptoprocta. Crossarchus. Cynictis. Digitigrades. Dog. Enhydra. Ermine. Felis. Ferret. Fox. Galictis. Genetta. Glutton. Greyhound. Gulo. Halichœrus. Harrier. Helarctos. Helictis. Herpestes. Hyæna. Hyæna-Dog. Ichneumon. Ictides. Jaguar. Jackal. Leopards. Lion. Lycaon. Lynx. Machairodus. Mangoustes. Mastiff. Meles. Mellivora. Minx. Mirounga. Mustela. Mustelidæ. Mydaus. Nasua. Ocelot. Otaria. Otter. Otter-Hound. Ounce. Panda. Phoca. Phocidæ. Plantigrada. Pointer. Polar Bear. Polecat. Prionodon. Prochilus. Procyon. Proteles. Pug. Raccoon. Ratel Sable. Sea-Bear. Sea-Calf. Sea-Elephant. Sea-Leopard. Sea-Lion. Seals. Serval. Setter. Spaniel. Stemmatopus. Stenorhynchus. Stoat. Terrier. Tiger-Cats. Tigers. Trichechus. Ursidæ. Ursus. Viverra. Viverridæ. Walrus. Weasels. Wolf. Wolf-Dog. Wolverine. Zenik.

Order CETACEA.

Ambergris. Balæna. Balænoptera. Delphinopterus. Delphinorhynchus. Delphinus. Dolphin. Grampus. Monodon. Morse. Narwhal. Phocæna. Physeter. Rorqual. Rytina. Spermaceti. Whales. Zeuglodon. Ziphius.

Order PACHYDERMATA.

Adapis. Anoplotherium. Ass. Babiroussa. Behemoth. Chalicotherium. Chœropotamus. Dicotyles. Dinotherium. Dugong. Dzhikketei. Elephant. Equus. Halicore. Heterodon. Hippopotamus. Hog. Horse. Hyrax. Lamantin. Lophiodon. Mammoth. Manatee. Mastodon. Mule. Onagga. Palæotherium. Peccary. Phacochœrus. Proboscidians. Rhinoceros. River-Horse. Solipedes. Stellerus. Suidæ. Swine. Tapir. Toxodon. Zebra.

Order RUMINANTIA.

Addax. Ægagra. Alces. Anoa. Antelope. Arni. Auchenia. Axis. Bison. Bonassus. Bos. Bubalus. Buffalo. Caama. Calf. Cambing Outan. Camel. Camelopard. Capra. Cervus. Chamois. Deer. Duikerbok. Elk. Gauzou-Pouco. Gazelle. Giraffe. Gnu. Goat. Guanaco. Guazu-Bira. Guazu-Pita. Guazu-Puco. Gyall. Ibex. Ixalus. Kalseepee. Kevel. Kleenebok. Klipspringer. Koba. Koodoo. Lamb. Llama. Macrauchenia. Meminna. Moose. Moschidæ. Muntjac. Nyl-Ghau. Oryx. Ourebi. Ovibos. Ovis. Ox. Prox. Red Deer. Reindeer. Roebuck. Saîga. Sheep. Stag. Strepsiceros. Stylocerus. Sylvicapra. Urus. Wapiti. Zurnapa.

Order BRUTA (EDENTATA, CUV.).

Aard-Vark. Ai. Ant-Bear. Ant-Eater. Armadillo. Bradypus. Cabassou. Cachicame. Cholœpus. Chlamyphorus. Dasypus. Manis. Megalonyx. Megatheriidæ. Mylodon. Myrmecophaga. Onychotherium. Orycteropus. Pachytherium. Pangolin. Scelidotherium. Sloth. Tamandua. Tardigrada. Unau.

Order RODENTIA (GLIRES, Linn.).

Acanthion. Acouchy. Agouti. Aperea. Arctomys. Arvicola. Beaver. Biscacho. Cabiai. Campagnols. Capromys. Castor. Castor Fiber. Chinchillidæ. Chloromys. Cœlogenus. Couia. Coypou. Cricetus. Ctenodactylus. Ctenomys. Dasyprocta. Dendromus. Fiber. Georychus. Gerbillus. Guinea-Pig. Hamster. Helamys. Heteromys. Hipudæus. Hydrochœrus. Hydromys. Hystrix. Jerboa. Kerodon. Lagomys. Lagostomys. Lagotis. Lemming. Leporidæ. Lepus. Lipura. Loncheres. Marmot. Meriones. Mouse. Muridæ. Mus. Musk-Rat. Musquash. Myopotamus. Myoxus. Ondatra. Orycterus. Otomys. Paca. Palæomys. Pedetes. Phlæomys. Porcupines. Pseudostoma. Pteromys. Rabbit. Rat. Saccomys. Sciuridæ. Souslik. Squirrels. Tamias. Wistonwish. Zemni. Zizel.

Cheiromys.

Unguiculata. Ungulata. Unicorn.

Sub-Class IMPLACENTALIA.

Order MARSUPIALIA.

Balantia. Bandicoot. Cayopollin. Cheironectes. Dasyurus. Didelphidæ. Halmaturus. Hypsiprymnus. Kangaroo. Koala. Lipurus. Macropus. Myrmecobius. Opossum. Perameles. Petaurus. Phalanger. Phalangista. Phascolotherium. Phascogale. Phascolaractos. Phascolomys. Potoroo. Sarcophilus. Sarigue. Thylacinus. Thylacotherium. Wombat.

Order MONOTREMATA.

Echidna. Duckbill. Ornithorhynchus. Platypus.

Class AVES.

Birds. Gizzard. Nictitating Membrane. Ornithology. Oviparous. Song of Birds.

Order RAPTORES.

Bald-Buzzard. Bubo. Burrowing Owl. Buzzard. Caracara. Catharistes. Cathartes. Circaetus. Condor. Eagle. Falcon. Falconidæ. Gerfalcon. Goshawk. Gypaëtos. Gypogeranus. Gyps. Hæmatornis. Haliæëtus. Harfang. Harpy. Harrier. Hawks. Hierax. Hiero-Falco. Ibycter. Kestrel. Ketupa. Kite. Lanner. Lophotes. Merlin. Milvus. Noctua. Nyctia. Nyctipetes. Oricou. Otus. Owls. Pandion. Percnopterus. Pernis. Phene. Polyborus. Racaminæ. Rapaces. Raptatores. Ringtail. Ringtailed Eagle. Sarcoramphus. Scops. Scotophilus. Scotornis. Secretary-bird. Strigidæ. Surnia. Syrnium. Thrasaëtos. Tinnunculus. Turkey-Buzzard. Ulula. Ululina. Urubu. Vulturidæ.

Order INSESSORES.

Aberdevine. Alauda. Alcedo. Anthus. Ara. Baltimore-Bird. Barbets. Barita. Batara. Beccafico. Bee-Eater. Bentivi. Bethylus. Bird of Paradise. Blackbirds. Black-Bonnet. Black-Cap. Black-capped Tom-Tit. Blue-Bird. Blue-Breast. Brachypteryx. Brachypodinæ. Bob-O-Link. Bombycilla. Bucco. Buceros. Bullfinch. Buphaga. Butcher-Bird. Calyptomene. Calyptorhynchus. Campylopterus. Canary. Caprimulgidæ. Carduelis. Caryocatactes. Casmarhynchos. Cat-Bird. Cephalopterus. Certhia. Certhiadæ. Certhilauda. Ceyx. Chaffinch. Chalybæus. Chloropsis. Chough. Cincinnurus. Cinclosoma. Cinclus. Cinnyridæ. Cinnyris. Cirl Bunting. Cissopis. Coccothraustes. Cock of the Rock. Coccyzus. Cockatoo. Cœreba. Colaptes. Colaris. Colibri. Colius. Colluricincla. Collurio. Conirostres. Coracina. Corvidæ. Corythaix. Cotinga. Coua. Couroucou. Cracticus. Creeper. Crossbill. Crotophaga. Crows. Crucirostra. Crypserina. Cuckoo. Cuculidæ. Cuculinæ. Curruca. Cynanthus. Cypselus. Dacelo. Dacnis. Dasyornis. Dendrocitta. Dendrocolaptes. Dendrocopus. Dendroplex. Dentirostres. Dicæum. Dicrurus. Dipper. Dolichonyx. Dorr-Hawk. Edolius. Emberizidæ. Eopsaltria. Epimachus. Erucivora. Erythaca. Eulabes. Eudynamys. Eurylaimus. Eurystomidæ. Falcunculus. Fauvette. Ficedula. Fieldfare. Figulus. Finch. Fissirostres. Fournier. Fringillidæ. Furnarius. Galbula. Galgulus. Garrulus. Geocichla. Glaucopis. Goatsuckers. Golden-crested Wren. Goldfinch. Gracula. Grakle. Greenfinch. Grosbeak. Guacharo Bird. Gymnocephalus. Gymnoderus. Gymnops. Hæmatops. Hawfinch. Hirundinidæ. Hoopoe. Hornbill. Humming-Bird. Hydrobates. Hypsipetes. Ianthocincla. Icterus. Indicatorinæ. Iora. Irena. Ispida. Ixos. Jacamar. Jackdaw. Jay. Kingfishers. Lampornis. Lamprotes. Lamprotila. Lamprotornis. Laniadæ. Larks. Lathria. Leiothrix. Leiotrichanæ. Leptosomus. Linnet. Lonchura. Lophorina. Loxiadæ. Lory. Lyra. Mænura. Magpie. Malaconotus. Malurus. Manakins. Manuco diata. Megalophus. Megastoma. Meiglyptes. Melanerpes. Melasoma. Meliphaga. Meliphagidæ. Melithreptus. Melozophilus. Melophus. Meropidæ. Merops. Merulidæ. Metopia. Microglossus. Micropogon. Micropus. Missel-Thrush. Mocking-Bird. Molothrus. Monacha. Monassa. Motacilla. Muscicapidæ. Musophagidæ. Myiagra. Myocincla. Myophorus. Myothera. Myrafra. Myrmothera. Myzomela. Nectariniadæ. Nestor. Night-Jars. Nightingale. Nucifraga. Nutcracker. Nuthatch. Nyctibius. Nyctiornis. Nymphicus. Ocypterus. Œnanthe. Oreocincla. Oriole. Oriolinæ. Orpheus. Ortolan. Orthonyx. Orthorhynchus. Orthotomus. Ox-Eye. Oxylophus. Oxynotus. Oxyrhynchus. Oxystomus. Oxyurus. Pachycephala. Pachycephalinæ. Pachyrhynchus. Paddy Bird. Palæornis. Pardalotus. Parotia. Parrot. Parus. Passerella. Pastor. Pellorneum. Petrocincla. Petroica. Petrophila. Pezoporus. Phibalura. Philedon. Philemon. Philomela. Philomelinæ. Phœnicircus. Phœnicophanæ. Phœnicophaus. Phœnicornis. Phœnicura. Phœnisoma. Phœthornis. Phonigama. Phyllastrephus. Phytotoma. Phytotominæ. Piahau. Picidæ. Picus. Pipra, Pipridæ. Pithys. Pitta. Pitylus. Platycercus. Platylophus. Platyrhynchus. Platystera. Platyurus. Plectrophanes. Ploceus. Plyctolophus. Plyctolophinæ. Podargus. Pomatorhinus. Praticola. Prinia. Prionites. Prionops. Procnias. Proithera. Promeropidæ. Psaris. Psarisomus. Psilopogon. Psittacidæ. Psittirostra. Pteroglossus. Pteruthius. Ptilochloris. Ptilogonys. Ptiloleptus. Ptilonorhynchus. Ptiloris. Ptilostomus. Ptilotis. Ptiloturus. Pyrenestes. Pyrgita. Pyrrhoceras. Pyrrhocorax. Pyrrhodes. Pyrrhula. Pyrrhulinæ. Pyrrhulauda. Querula. Querulinæ. Ramphastidæ. Raven. Red-Breast. Redstart. Regulus. Rhipidura. Rice-Bird. Rifle-Bird. Rock Manakin. Roller. Rook. Rose-coloured Ouzel. Royston Crow. Rupicola. Rupicolinæ. Sand Martin. Saurophagus. Saurothera. Saxicola. Saxicolinæ. Scythrops. Sea-Swallows. Sedge-Warblers. Seicircus. Seisura. Seiurus. Shrikes. Sialia. Sitta. Soui-Manga. Spermestes. Spermophaga. Spermospiza. Starling. Stonechats. Strobilophaga. Sturnidæ. Sun-Birds. Swallows. Sylviadæ. Sylvicola. Sylviparus. Syma. Symplectes. Synalaxis. Syndactyles. Tamatia. Tanagers. Tanagrinæ. Tanysiptera. Tardivola. Telephonus. Temia. Temnurus. Tenuirostres. Tephrodornis. Textor. Thamnobia. Thamnophilinæ. Thamnophilus. Throstle. Thrushes. Tiaris. Tichodroma. Tiga. Tijuca. Timalia. Timalinæ. Tinactor. Titlarks. Titmice. Titwarblers. Todiramphus. Touraco. Trichas. Tripsurus. Trochilidæ. Trochilus. Troglodytes. Troglodytinæ. Trogon. Trogonidæ. Turdidæ. Turdus. Tyranninæ. Tyrannula. Tyrannus. Tyrant Shrikes. Upupa. Upupidæ. Vanga. Vidua. Vireo. Vireoninæ. Wagtails. Warblers. Water-Crow. Water-Ouzel. Weaver-Birds. Wheatear. Whip-Poor-Will. Whitethroat. Wood-Chat. Wood-Lark. Woodpeckers. Wood-Swallows. Wood-Wren. Wren. Wryneck. Xanthomyza. Xanthornus. Xenops. Yunx. Zanclostomus. Zanthomyza. Zonotrichia. Zosterops. Zygodactyli.

Order RASORES.

Black-Cock. Bonasia. Bustard. Capercailie. Cassowary. Chamæpelia. Coturnix. Cracidæ. Cock. Cock of the Woods. Columba. Columbidæ. Cryptonyx. Crypturus. Diplectron. Dodo. Dove. Dronte. Ectopistes. Ectopistinæ. Emu. Francolin. Gallinæ. Gallus. Grouse. Guan. Guinea Fowl. Hemipodius. Hoatzin. Hocco. Hylactes. Lagopus. Lophophorus. Lophyrus. Lyrurus. Megapodiidæ. Meleagris. Numida. Nycthemerus. Odontophorus. Opisthocomus. Ortalida. Ortygis. Ortyx. Ostrich. Otis. Ourax. Partridge. Pauxi. Pavonidæ. Peacock. Pearl-Hen. Penelope. Perdicidæ. Perdicinæ. Perdix. Peristera. Peristerinæ. Phasianidæ. Pheasants. Pigeons. Polyprectron. Ptarmigan. Pterocles. Ptilopachus. Ptilophorus. Quails. Raphus. Ring Dove. Rouloul. Sand Grouse. Sphenurus. Struthionidæ. Syrrhaptes. Talegalla. Tetrao. Tetraogallus. Tetraonidæ. Tetrax. Thinocorinæ. Thinocorus. Tinamidæ. Tinamotus. Tinamou. Tragopan. Turkey. Turnix. Turtle-Dove. Vinago. Walck-Vogel. Wood-Pigeon. Zenaida.

Order GRALLATORES.

Abou-Hannes. Adjutant. Agami. Ardea. Avoset. Balearic Crane. Barge. Bittern. Boat-Bill. Calidris. Cancroma. Cariama. Catoptrophorus. Ciconia. Charadriadæ. Crane. Cultirostres. Curlew. Cursorius. Demoiselle. Dicholophus. Dottrel. Flamingo. Fulica. Gallinula. Glareola. Godwit. Grallæ. Greenshank. Gruidæ. Hæmatopus. Herodii. Herons. Hians. Himantopus. Ibis. Jabiru. Jacana. Kamachi. Knot. Lapwing. Limosa. Longirostres. Macrodactyles. Macrorhamphus. Microdactylus. Mycteria. Night Heron. Nycticorax. Œdicnemus. Oyster-Catcher. Palamedea. Parra. Peewit. Pelidna. Phalarope. Phœnicopterus. Phœnicopterinæ. Platalea. Plovers. Pluvialis. Porphyrio. Pratincole. Psophia. Rail. Rallidæ. Rhynchæa. Rynchæa. Sanderling. Sandpiper. Savacou. Scolopacidæ. Scopus. Sea-Pie. Snipe. Spoonbill. Spur-wing. Stilt-Plover. Stint. Stork. Strepsilas. Tantalidæ. Tantalus. Theristicus. Tiger-Bitterns. Tigrisoma. Totaninæ. Totanus. Tringa. Tringinæ. Trumpeter. Turnstone. Umber. Vanellus. Water-Hen. Whimbrel. Zapornia.

Order NATATORES.

Albatross. Anatidæ. Anser. Auk. Bean Goose. Bernicle Goose. Booby. Brachyptères. Carbo. Catarrhactes. Cephus. Cereopsis. Clakis. Cobb. Cobble. Coddy Moddy. Colymbus. Colymbidæ. Cormorant. Cygnus. Dabchick. Dendronessa. Diomedea. Divers. Doucker. Ducks. Eider Duck. Eudytes. Frigate. Fuligulinæ. Gannet. Geese. Goosander. Goose. Grebes. Guillemots. Halieus. Haladroma. Harle. Heliornis. Jacksaw. Jager. Kittiwake. Lamellirostres. Laridæ. Lestris. Longipennes. Loon. Lough Diver. Lumme. Malacorhynchus. Mandarin Duck. Merganinæ. Mergulus. Mergus. Mew. Micropterus. Mormon. Noddy. Oidemia. Pachyptila. Pelecanidæ. Pelecanoides. Pelican. Penguins. Petrels. Phaeton. Phalacrocorax. Phaleris. Plotus. Podiceps. Podicepsinæ. Podilymbus. Podoa. Pæcilonitta. Procellaria. Puffin. Pygopodes. Querquedula. Rhynchaspis. Rynchops. Scoter. Sea-Ducks. Shag. Sheldrake. Skimmer. Somateria. Stercorarius. Sterna. Swans. Teal. Tern. Thalasseus. Thalassidroma. Thalassiornis. Totipalmes. Tropic Bird. Uria. Wagel. Wigeon. Wild-Duck. Wild-Goose. Wild-Swan. Xema.

Class REPTILIA.

Herpetology. Ovovipiparous. Reptiles.

Order CHELONIA.

Coui. Chelonians. Chelonura. Dermochelys. Emys. Geoemyda. Hydraspis. Kinosternon. Kinyxis. Sternaspis. Sternothærus. Terrapene. Testudinata. Testudo. Tortoises. Trionyx. Turtle.

Order SAURIA.

Agama. Alligator. Anolis. Ascalabotes. Basilisk. Bipes. Brachypus. Caiman. Calotes. Chalcides. Chamæsaura. Chameleons. Chirotes. Crocodile. Crocodilurus. Diplodactylus. Dragon. Ecphimotes. Emydosaurians. Enaliosaurians. Galeotes. Geosaurus. Gavial. Gecko. Gymnodactylus. Halidracon. Halimnosaurus. Hemidactylus. Hydrosaurus. Hylæosaurus. Ichthyosaurus. Iguana. Iguanidæ. Istiurus. Lacertiadæ. Leiocephalus. Leiolæmus. Leiolepis. Leiosaurus. Lerista. Lialis. Lizard. Lophyrus. Lophura. Lyriocephalus. Mabouia. Megalosaurus. Meteriorhynchus. Monitors. Mosasaurus. Ophiodes. Ophiomorus. Ophiophthalmes. Ophiops. Palæosaurus. Phytosaurus. Platydactylus. Pleodonts. Plesiosaurus. Plestiodon. Pleurodonts. Podarcis. Polychrus. Ptychopleures. Ptychozoön. Proteosaurus. Protorosaurus. Psammadromus. Psammosaurus. Pseudo-Ameiva. Ptyodactylus. Pygodactylus. Ramphostoma. Sarruba. Saurians. Saurophis. Sauvegarde. Scapteira. Scelotes. Scincoidians. Seps. Stellio. Steneosaurus. Streptospondylus. Tejus. Teleosaurus. Thecadactyls. Thecodontosaurus. Thecodonts. Tiliqua. Trapelus. Tropidogaster. Tropidosaura. Tropidurus. Tupinambis. Typhlophthalmes. Varanians. Varanidæ. Varanus. Zonurus. Zootoca.

Order OPHIDIA.

Acanthophis. Acontias. Serpents. Acrochordus. Adder. Amphisbæna. Asp. Blind-worm. Boa. Candisona. Cenchris. Cerastes. Cerberus. Cobra Capella. Cockatrice. Coluber. Crotalophorus. Crotalus. Dendrophis. Dipsas. Erpeton. Eryx. Haje. Hurria. Hydrophis. Hydrus. Javelin Snake. Lachesis. Langaha. Leptophina. Leptophis. Lycodon. Micrura. Naia. Natrix. Ophidians. Ornithocephalus. Orvet. Passerita. Pelamys. Platura. Pseudo-Boa. Pseudopus. Pterodactyle. Python. Rattlesnake. Rhinophia. Rhinopirus. Scheltopusik? Scytale. Slow-Worm. Snake. Tortrix. Trigonocephalus. Typhlops. Viper. Viperidæ.

Order BATRACHIA.

Amphibia. Amphiuma. Axolotl. Batrachians. Bufo. Bull-Frog. Cecilians. Ceratophrys. Frogs. Hyla. Mastodonsaurus. Menobranchus. Menopoma. Natter Jack. Necturus. Perennibranchiata. Proteus. Ranidæ. Rhinella. Salamander. Salamandridæ. Salamandroides. Salamandrops. Siphonops. Sirédon. Siren. Toad.

Class PISCES.

Air-Bladder. Fin. Fish. Ichthyology.

Order ACANTHOPTERYGII.

Agonus. Beryx. Blepharis. Blepsias. Brama. Calliodon. Callionymus. Capros. Caranx. Caranxomorus. Centrarchus. Centriscus. Centrolophus. Centronotus. Centropomus. Centropristis. Cepola. Chætodon. Cheilinus. Cheilodactylus. Cheilodipterus. Chironectes. Chirus. Chromis. Chrysophrys. Cirrhibarba. Clepticus. Clinus. Coryphæna. Crenilabrus. Dactylopterus. Flying Fish. Gasterosteus. Hæmulon. Labrax. Labridæ. Labroïdes. Labrus. Lophiadæ. Mackerel. Mugilidæ. Pagellus. Percidæ. Polynemus. Sargus. Scarus. Scombridæ. Serranus. Sparidæ. Stickleback. Swordfish. Xyrichthys.

Order MALACOPTERYGII ABDOMINALES.

Ageneioses. Barbel. Bleak. Blennius. Bream. Callichthys. Carp. Catostomus. Chatoessus. Chauliodus. Chub. Cirrhinus. Citharinus. Clupeidæ. Cobitis. Cyprinidæ. Cyprinus. Dace. Flying Fish. Gadidæ. Gar-Fish. Gobio. Gold Fish. Grayling. Gudgeon. Herring. Labeo. Leuciscus. Loach. Loricaria. Minnow. Morrhua. Pike. Pilchard. Protopterus. Roach. Rud. Salmon. Salmonidæ. Shad. Siluridæ. Sprat. Tench. Tinca. Trout.

Order MALACOPTERYGII SUBBRACHIATI.

Achiri. Brosmius. Brotula. Flounder. Hake. Plagusia.

Order MALACOPTERYGII APODES.

Alabes. Conger. Eel. Gymnotus. Murænidæ.

Order PLECTOGNATHI.

Balistes. Sun-Fish.

Order CHONDROPTERYGII.

Chimæra. Lamprey. Myxine. Petromyzon. Shark. Skate. Squalidæ. Sturgeon. Sturionidæ. Torpedo.

Gyrodus. Heterocercal. Holocentrum. Holoptychus. Homocercal. Hybodus.

INVERTEBRATA.

Sub-Kingdom MOLLUSCA.

Conchology. Heterogangliata. Malacology. Malacozoa. Malentozoa. Pallium.

Class CEPHALOPODA.

Argonauta. Baculites. Belemnite. Bellerophon. Beloptera. Belosæpia. Cetocis. Chondrosepia. Chrysaor. Conilites. Conularia. Cornu Ammonis. Cuttle-Fish. Eledone. Goniatites. Hibolithus. Lituites. Loligo. Loligopsis. Monothalamia. Nautilidæ. Nautilus. Oceanus. Octocera. Octopus. Ocythoë. Onychoteuthis. Orthoceras. Paclites. Paper Nautilus. Pelagus. Phragmoceras. Polythalamacea. Porodragus. Sepia. Sepiadæ. Sepiola. Sepioteuthis. Siphonifera. Spirulidæ. Tetrabranchiata. Turrilites. Teuthidæ. Tropæum.

Class GASTROPODA.

Ampullaria. Ancylus. Atlanta. Auricula. Berthella. Bulimulus. Bulinus. Bulladæ. Bursatella. Calyptræidæ. Cancellaria. Capulus. Carinaria. Carocolla. Carychium. Cassidaria. Cassis. Cavolina. Cerithium. Cervicobranchiata. Chismobranchiata. Chitons. Chitonellus. Chondrus. Cirrhobranchiata. Cirrhus. Clausilia. Clavatula. Clithon. Cochlicella. Cochlicopa. Cochlitoma. Cochlodina. Cochlogena. Cochlohydra. Cochlostyla. Concholepas. Conœlix. Conovula. Conus. Cowry Shells. Crepidula. Cryptoconchus. Cryptostoma. Cyclobranchiata. Cyclostoma. Cymba. Cypræidæ. Dentalium. Dermatobranchus. Diphyllidia. Dolabella. Dolium. Earshell. Eburna. Ellipsostomata. Elysia. Emarginula. Entomostomata. Eolidia. Eulima. Euomphalus. Fasciolaria. Firola. Fissurella. Flabellina. Fusus. Gasteroptera. Gastroplex. Geocochlides. Gervisia. Glaucus. Haliotidæ. Harpa. Helicarion. Helicidæ. Helicina. Helicolimax. Helix. Hemicyclostoma. Heteropoda. Hippochrenes. Ianthina. Inferobranchiata. Janthina. Lacuna. Lamellaria. Laniogerus. Laplysia. Leptoconchus. Liguus. Limacella. Limacinea. Limax. Limnacea. Limneans. Linguella. *Litiopa. Littorina. Lobaria.* Lupona. Lymnea. Melampus. Meröe. Monoceros. Monodonta. Monotigma. Murex. Nanina. Nassa. Nectopoda. Nematura. Nerita. Neritidæ. Neritina. Neritopsis. Notarchus. Nucleobranchiata. Nudibranchiata. Odontis. Odostomia. Oliva. Olivella. Olygyra. Omalaxis. Onchidium. Onchidoris. Oniscia. Operculum. Ovulum. Oxystoma. Pachystoma. Padollus. Paludina. Magilus. Marginella. Megaspira. Melampus. Melania. Melo. Mesomphyx. Midas's Ear. Mitra. Mitreola. Parmacella. Parmophorus. Partula. Pasithea. Patella. Pectinibranchiata. Pedipes. Peloronta. Peribolus. Peristomians. Periwinkle. Peronia. Persicola. Phakellopleura. Phasianella. Phorus. Phos. Phyllidians. Physa. Pileolus. Pileopsis. Pirena. Placobranchiata. Placobranchus. Planaxis. Planaria. Planorbis. Plectrophorus. Plekocheilus. Pleurobranchæa. Pleurobranchus. Pleurotoma. Plocamoceros. Pollia. Polycera. Polygonum. Polygyra. Polyodontes. Polyphemus. Polyplaxiphora. Polytropa. Porcellana. Potadoma. Potamis. Psilosomata. Pteroceras. Pterosomatidæ. Pterotrachea. Pulmobranchiata. Pupa. Purpura. Purpurifera. Pyramidella. Pyrula. Ranella. Retifera. Rhombus. Ricinula. Rimula. Rissoa. Rostellaria. Rotella. Rudolphus. Scabricola. Scalaria. Scalarians. Scissurella. Scutibranchiata. Semiphyllidians. Sigaretus. Theliconus. Thelidomus.* Thelidonta. Tiara. Trachelipoda. Trichotropis. Triton. Tritonoidea. Trivia. Trochatella. Trochella. Trochidæ. Trochidon. Trochoidea. Trochus. Tubulibranchiata. Turbinacea. Turbinella. Turbinidæ. Turbo. Turris. Turritella. Siphonaria. Siphonobranchiata. Siphonostomata. Slugs. Snails. Solarium. Stomatella. Stomatia. Streptaxis. Strigatella. Strombidæ. Strophostoma. Struthiolaria. Stylifer. Subaplysiacea. Succinea. Tectibranchiata. Telescopium. Terebellum. Terebra. Terebralia. Testacellus. Tethys. Tetracerata. Textilia. Ultimus. Umbrella. Vaginulus. Valvata. Velates. Velutina. Vermetus. Vertigo. Vitrina. Voluta. Volutella. Volutidæ. Volutilithes. Volvaria. Wentletrap.

Class PTEROPODA.

Cleodora. Clio. Cymbulia. Hyalæidæ. Limacina. Spiratella.

Class LAMELLIBRANCHIATA.

Amphidesma. Aspergillum. Astarte. Avicula. Byssoarca. Byssomya. Byssus. Capsa. Cardita. Castalia. Catillus. Chamacea. Clavagella. Cleidothærus. Clotho. Cockle. Conchacea. Crassatella. Crassina. Crenatula. Cucullæa. Cumingia. Cyclas. Cypricardia. Cyprina. Cyrena. Cytheræa. Dianchora. Diceras. Dimyaria. Diplodon. Donax. Erycina. Etheria. Fimbria. Fistularia. Galathea. Gastrochæna. Gervillia. Glauconome. Glycymeris. Gnathodon. Gratelupia. Gryphæa. Hemicardium. Hiatella. Hinnites. Hippocephaloides. Hippopodium. Hippopus. Hippurites. Iridina. Isocardia. Lima. Lithodomus. Lithophagidæ. Loripes. Lucina. Lupa. Malleacea. Malleus. Margarita. Margaritacea. Megadesma. Meleagrina. Melina. Mercenaria. Mesodesma. Monocondylæa. Monomyaria. Mulinia. Mulleria. Muscle. Mya. Myaria. Mycetopoda. Myrtea. Mysca. Mytilacea. Mytilidæ. Mytilus. Naiades. Nucula. Nymphacea. Ostraceans. Ostrea. Oysters. Pachymya. Pachytes. Pandora. Pearl. Pearl Fishery. Pearl Oyster. Pecten. Pectinidæ. Pectunculus. Pedum. Peloris. Penicillus. Perna. Petricola. Pholadaria. Pholadidæa. Pholadomya. Pholæobius. Pholas. Pinna Marina. Pisidium. Pisum. Placenta. Placuna. Placunanomia. Plagiostoma. Pleiodon. Pleurorhynchus. Plicatula. Podopsis. Polyodonta. Potamophila. Psammobia. Psammocola. Pulvinites. Pylorideans. Razor-Shell. Rhomboides. Sanguinolaria. Saxicava. Schizodesma. Solen. Solenella. Solenimya. Solenocurtus. Soletellina. Spisula. Spondylidæ. Spondylus. Submytilacea. Subostracea. Tellina. Tellinides. Tenuipedes. Teredina. Teredo. Theliderma. Thetis. Thracia. Tridacna. Tridacnidæ. Trigonia. Trigonidæ. Tubicolidæ. Umbo. Unio. Unionidæ. Venericardia. Veneridæ. Venus. Vulsella. Xylophaga.

Class BRACHIOPODA.

Crania. Lingula. Megarima. Palliobranchiata. Strophomena. Strygocephalus. Terebratula. Thecidea Trigonosemus. Trigonotreta. Uncites.

Ichthyosiagones? Lepadites? Multivalves. Monoica.

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* Case of an insect mistaken for the shell of a gasteropod by Swainson.

Monopleurobranchiata. Nacre. Paracephalophora. Periostracum. Shell. Vermes.

Class TUNICATA.

Ascidia. Bipapillaria. Boltenia. Botryllus. Cynthia. Cystingia. Dagysa. Dendrodoa. Diazoma. Didermum. Eucœlium. Fodia. Heterobranchiata. Monophorus. Pulmonella. Pyrosoma. Salpa. Salpacea. Synoicum.

Sub-Kingdom ARTICULATA.

Class CIRRIPEDIA.

Balanus. Catophragmus. Cetopira. Chelonobia. Chthamalus. Conia. Coronula. Creusia. Diadema. Gymnolepas. Lepas. Litholepas. Lithotrya. Malacota. Megatrema. Nematopoda. Nobia. Octhosia. Octolasmis. Octomeris. Otion. Pentalasmis. Pentalepas. Platylepas. Polylepas. Pyrgoma. Scalpellum. Tubicinella.

Class CRUSTACEA.

Astacolites. Astacus. Athanas. Atya. Atylus. Autonomea. Axius. Binoculus. Birgus. Branchiopoda. Brine-Shrimp. Calanus. Calappa. Caligus. Calianassa. Calymene. Calypso. Cancer. Caprella. Cecrops. Cephaloculus. Cerapus. Chirocephalus. Chydorus. Cilicæa. Cirolana. Clorodius. Conilira. Corystes. Crab. Crangon. Craw-fish. Cyclops. Cymodocea. Cymothoa. Cypris. Cytherina. Daphnia. Decapoda. Dexamine. Diastylis. Dichelesthium. Dinemoura. Diprosia. Doclea. Dorippe. Dromia. Dynomene. Edriophthalma. Egeon. Egeria. Emerita. Entomostraca. Epialtus. Erichthus. Eriphia. Eryon. Ethusa. Etisus. Eulimene. Eupheus. Eurydice. Eurynome. Eurypodius. Galathæa. Gammarus. Gebia. Gecarcinus. Gelasimus. Gonoplax. Gnathophyllum. Grapsus. Halimus. Hepatus. Herbstium. Hermit Crab. Hippa. Hyas. Hippians. Hippocarcinus. Hippolyte. Homarus. Homola. Homolonotus. Hymenocera. Hymenosoma. Ibacus. Idotea. Idyia. Inachus. Ione. Iphis. Isopoda. Ixa. Jæra. Jassa. Læmodipoda. Lambrus. Larunda. Leptopodiidæ. Lernæa. Leucosians. Lichas. Ligia. Limnoria. Limulus. Lissa. Lobster. Locusta. Lophyropa. Lycesta. Lynceus. Lysmata. Macrophthalmus. Macropa. Macropodians. Macroura. Mæra. Magas. Maiidæ. Malacostraca. Matuta. Megalopa. Melia. Melita. Mesapus. Micippa. Mictyris. Mithrax. Monoculus. Monolepis. Montagua.* Mysis. Næsa. Nauplius. Naxia. Nelocira. Nephrops. Nerocila. Nika. Ocypodians. Œthra. Orithyia. Ostracoda. Ostropoda. Oxyrhynchs. Oxystomes. Pactolians. Pagurians. Palæades. Palæmon. Palæmonians. Palinurus. Paramicippa. Paramithrax. Parasytes Nageurs. Parthenope. Parthenopians. Penæus. Pericera. Persephona. Pherusa. Philoscia. Pherusa. Phronima. Phrosine. Phyllopoda. Phyllosoma. Pinnotheres. Pinnotherians. Pirimela. Pisidia. Plagusia. Platycarcinus. Platymera. Podophthalma. Podophthalmus. Pœcilopoda. Polydectus. Pontophilus. Porcellana. Porcellanians. Portumnus. Portunidæ. Posydon. Potamobia. Potamon. Potamophilus. Praniza. Prawn. Pseudocarcinus. Pseudocorystes. Pseudograpsus. Raninians. Risculus. Ruppellia. Salicoques. Serolis. Schizopoda. Scyllarians. Scyllarus. Shrimps. Squilla. Squillerichthus. Stenopus. Stomapoda. Suctorial Crustaceans. Thalamita. Thalassina. Thalassinians. Thelphusa. Thelphusians. Themisto. Thenus. Thia. Thysanopoda. Trilobites. Tylos. Unicuirassés. Unipeltata. Xantho. Xiphosura. Zoea. Zozymus.

Class ARACHNIDA.

Acarides. Acarus. Scorpio. Spider.

Class INSECTA.

ENTOMOLOGY.

Ant. Aphis. Apiary. Apis. Aurelia. Baetis. Bagous. Balaninus. Banchus. Baridius. Baris. Bassus. Bee. Beetle. Belyta. Bembex. Bembididæ. Beris. Blaps. Blattidæ. Bledius. Blemus. Blepharis. Blister-Beetle. Bolbocerus. Boletobius. Bombus. Bombycidæ. Bombic Acid. Bombilidæ. Borborus. Boreus. Bostrichus. Bothynodères. Bots. Brachyletra. Brachinus. Brachycerus. Bracon. Brentides. Broscus. Bruchus. Bryaxis. Bug. Bupalus. Buprestidæ. Butterfly. Calandra. Calathus. Calcar. Calleida. Callicera. Callichroma. Callidium. Callimorpha. Callistus. Calopus. Calosoma. Campsia. Camptocerus. Camptadontes. Campylomyza. Campylus. Cantharidæ. Cantharis. Carabidæ. Carabus. Cassida. Cassidiadæ. Castnia. Caterpillar. Cebrionites. Cecidomyia. Celyphus. Cephus. Ceramius. Cerambycidæ. Cerapterus. Ceratina. Cerceris. Ceria. Cerocoma. Ceropales. Centorhynchus. Cetoniadæ. Chalcididæ. Chasmodia. Chennium. Chilopoda. Chionea. Chlænius. Chlamys. Chlorion. Chrysalis. Chrysididæ. Chrysochlora. Chrysogaster. Chrysomelidæ. Chrysophila. Chrysophora. Chrysops. Cicadariæ. Cicadella. Cicindelidæ. Cimex. Cimicidæ. Cistelides. Cladius. Clavicornes. Claviger. Cleonus. Cleridæ. Clythra. Clytus. Coccinella. Coccus. Coccus Cacto. Cochineal. Cockroach. Coccoon. Coleoptera. Cossonus. Cossus. Cossyphus. Crabronidæ. Crambus. Crepuscularia. Crioceridæ. Cryptocephalus. Cryptophagus. Cryptorhynchides. Ctenodactyla. Ctenostoma. Culex. Culicides. Cyclica. Cynips. Dapsus. Daptus. Death-Watch. Dermestidæ. Dexianæ. Dicælus. Dinetus. Diopsis. Diphucephala. Diptera. Drone. Earwig. Elateridæ. Fire-Fly. Fly. Flea. Forficulidæ. Formic Acid. Formic Æther. Gadfly. Gallicolæ. Gallinsecta. Glow-Worm. Gryllidæ. Harpalidæ. Hemiptera. Hepialidæ. Heriades. Hesperidæ. Homoptera. Hornet. Humble-Bee. Hydrometridæ. Hydrophilidæ. Hymenoptera. Ichneumon. Labia. Labidoura. Labidus. Lagriidæ. Lamellicornes. Lampyridæ. Larridæ. Larva. Lepidoptera. Leptides. Licinus. Lophyrus. Macraspis. Mantidæ. Meloë. Melolonthidæ. Mosquito. Moth. Muscidæ. Neuroptera. Nyssonidæ. Œstridæ. Paussidæ. Pediculus. Phalæna. Planipennes. Platyurus. Plicipennes. Pompilus. Pselaphus. Psithyrus. Psylla. Pulex. Pupivora. Queen-Bee. Sapygidæ. Scarabæides. Scaritidæ. Scoliadæ. Securifera. Silk-Worm. Sphecidæ. Sphingidæ. Subulicornes. Syrphidæ. Tenthredo. Turnip-Fly. Vespidæ. Wasp. Weevil. Wing. Xylophagi. Xylophili. Zimb. Zygænidæ.

Class MYRIAPODA.

Centipede. Chilognatha. Scolopendra. Syngnatha.

Class ANNELIDA.

Campontia. Chloeia. Chrysodon. Cirratulus. Clitellio. Clymene. Ditrupa. Dorsibranchiata. Eulalia. Galeolaria. Geobdella. Halithæa. Hipponoë. Hæmocharis. Hæmopis. Hirudinidæ. Leeches. Lumbricus. Lysidice. Lycoris. Maldanians. Nais. Nereis. Palmyra. Pectinaria. Phyzelia. Pleione. Pseudobdella. Sea-Mouse. Sanguisuga. Sedentary Annelids. Serpula. Serpulidæ. Stylaria. Syllis. Terebella. Tubicolæ. Vermilia.

Sub-kingdom RADIATA.

RAYED OR RADIATED ANIMALS.

Class RADIARIA.

Sub-Class ECHINODERMATA.

Asterias. Bonellia. Caryocrinites. Cassidulus. Cidaris. Clypeaster. Clypeus. Comatula. Conulus. Crinoidea. Echinidæ. Echinocidaris. Echinoclypeus. Echinoconus. Echinocorys. Echinocyamus. Echinodiscus. Echinolampas. Echinometra. Echinoneus. Echinoroder Echinus. Encrinites. Euryale. Fibularia. Galea. Galeola. Galerites. Ganymeda. Glenotremites. Gorgonocephalus. Holaster. Holothuriæ. Lagana. Marsupiocrinites. Marsupites. Melocrinus. Ophiura. Pentacrinus. Pentremites. Phytocrinus. Platycrinites. Poteriocrinites. Rhodocrinites. Sea-Eggs. Sea-Urchins. Star-Fish. Stelleridians. Thalassema. Trepang. Urchin-Sea.

Sub-Class ACALEPHÆ.

Beroë. Callianira. Callirhoë. Calymma. Calpe. Campanella. Carybdea. Cassiopea. Cephea. Cestum. Chrysaora. Ciliograda. Cirrhigrada. Dianæa. Diphyides. Diphysa. Eirene. Ephyra. Eucharis. Eudora. Eulymene. Evagora. Favonia. Galeolaria. Geryonia. Hippopoda. Linuchia. Lymnorea. Medusa. Melicerta. Mnemia. Obelia. Oceania. Ocyroë. Pegasia. Pelagia. Phorcynia. Physalus. Physograda. Physsophora. Pulmograda. Rataria. Rhizophysa. Rhizostoma. Rhizostomidæ. Rhodophysa. Rosacea. Stephanomia. Thaumantias. Velella.

Class POLYPI.

Actinia. Astræa. Calamophyllia. Calamophora. Campanularia. Canda. Caryophyllia. Catenicella. Catenipora. Cellariæa. Cellastræa. Cellepora. Ceratophyta. Ceriopora. Chrysaora. Cirrhipathes. Clavularia. Cœloptychium. Columnaria. Conipora. Conodyctium. Conulina. Coral. Corallia. Cricopora. Cyclolithes. Dactylopora. Dentipora. Dendrophyllia. Diastopora. Difflugia. Diplocteniuum. Echinastræa. Echinopora. Electra. Elzerina. Entalophora. Eschara. Eucratea.

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* *Erroneously printed 'Montagna' in the work.*

Explanaria. Fascicularia. Favastræa. Favosites. Frondipora. Fungia. Gemellaria. Gemicellaria. Gemmastræa. Glauconome. Goniopora. Hallirhoë. Halysites. Harmodytes. Heliopora. Heteropora. Hippalimus. Hippothoë. Hydnopora. Hydra. Idia. Idomonea. Ierea, Laomedea. Larvaria. Lichenopora. Lithodendron. Lithostrotion. Lobularia. Loricaria. Lucernaria. Lymnorea. Madastræa. Madrephylliæa. Madrepora. Mammelipora. Manon. Mantellia. Marginopora. Massarium. Meandrina. Meliïtæa. Melobesia. Membranipora. Mesenteriopora. Milleporidæ. Monticularia. Montivaltia. Moschata. Nemertesia. Nesea? Notamia. Nullipora. Ocellaria. Oculina. Operculifera. Orbitolites. Ovulites. Palmipora. Palmularia. Palythoa. Pasythea. Pelagia. Pennatula. Pennatularia. Pherusa. Plexaura. Plumatella. Pocillopora. Polype. Polyphyllia. Polypiaria. Polytrema. Porites. Primnoa. Pterodictum. Pulmonellum. Retepora. Sarcoidea. Sertularia. Sertularidæ. Sertulariæa. Syringopora. Terebellaria. Thalassianthus. Thoa. Tibiana. Tilesia. Tricellaria. Tridacophyllia. Tubastræa. Tubifera. Tubiporæa. Tubiporites. Tubulifera. Tubuliporidæ. Tuliparia. Turbinolia. Turbinolopsis. Zoantharia. Zoophyta. Zoophytaria.

Class ENTOZOA.

Ascarides. Filaria. Gnathostoma. Hydatids. Intestina. Planaria. Tape-Worm.

Anthelmintics. Bronchitis.

Class FORAMINIFERA.

Bigenerina. Biloculina. Chrysolus. Clavulina. Crisia. Cristacea. Cristallaria. Frondicularia: Gemmulina. Glandulina. Guttulina. Gyroidina. Heliostegues. Heterostegina. Lenticulina. Linthuris. Lycophris. Macrodites. Melonia. Miliola. Misilus. Nummulite. Pelorus. Peneroplis. Pharamum. Phonemus. Placentula. Planorbulina. Planulacea. Planularia. Planulina. Planulites. Polliontes. Polymorphina. Polystomella. Polyxenes. Pyrga. Renularia. Reophax. Rhinocurus. Rimulina. Rotalia. Sideralina. Soldania. Sphæroidina. Sphærulacea. Symplectomerea. Textularia. Themeon. Tinoporus. Triloculina. Turbinacea. Uvigerina. Vaginulina.. Vertebralina. Vorticialis. Vulvulina.

Class INFUSORIA.

Animalcules. Brachionus. Bursaria. Cercaria. Chilomonas. Closterium. Hirudinella. Microzoaria. Monas. Phytozoaria. Polygastrica. Rotatoria.

Class PSEUDOZOARIA?

Calciphytæ. Calcispongia. Dichotomaria. Eudea. Flabellaria. Fucoideæ? Halispongia. Penicillus? Polyphysa? Siphonia? Spongia. Spongiadæ. Tragos?

N.B. The later and better opinion is that the sponges do not belong to the animal kingdom.

ZOO'PHYTA (from ζῷον, *animal*, and φυτόν, *plant*). This is the title most generally employed for the radiated and phytoid forms of animal life, included by Linnæus in his great divisions of Vermes, viz. Vermes Mollusca, Vermes Lithophyta, and Vermes Zoophyta. Under this title Cuvier ranked the intestinal worms, which are more analogous to Annulosa; and most writers include Sponges and Corallines, which others rank with plants. The general table of De Blainville, as given in his 'Actinologie, is a convenient index to the classification principally used in this work, and may be conveniently referred to in aid of other arrangements. It is exactly copied below from the 110th page of the 'Actinologie.'

- ZOOPHYTES.
  - † faux; mais animaux à tort rapportés aux zoophytes.
    - *Physogrades*
    - *Beroës*, ou *Ciliobranches*
    - *Diphyes*
    - *Entozoaires*
    - *Infusoires*, ou *Microscopiques* Microzoaires
      - *Entomostracés*
      - *Ascaridiens*
      - *Planariés*
      - *Gemmariés?*
  - †† vrais
    - Type I. ACTINOZOAIRES
      - Classe i. *Cirrhodermaires*
        - *Holothurides*
        - *Echinides* . .
          - *Non maxillés*
          - *Maxillés*
        - *Stellerides* . .
          - *Asterides*
          - *Ophiurides*
          - *Encriniens*
      - Classe ii. *Arachnodermaires*
        - *Cardiogrades*
        - *Chondrogrades*
      - Classe iii. *Zoanthaires*
        - mous . . . *Actinies*
        - coriaces . . *Zoanthes*
        - calcaires . .
          - *Madréphyllies*
          - *Madrépores*
      - Classe iv. *Polypiaires*
        - Sous Cl. i. Polypiaires calcaires
          - Fam. i. *Milleporés*
          - ii. *Tubuliporés*
        - Sous Cl. ii. Polyp. membraneux
          - Fam. i. *Operculifères*, ou *Escharies*
          - ii. *Cellariés*
          - iii. *Sertulariés*
        - Sous Cl. iii. Polyp. douteux
        - Sous Cl. iv. Polyp. nus *ou* Hydrés
      - Classe v. *Zoophytaires*, ou *Ctenocères*
        - i. *Tubiporés*
        - ii.
          - *Corallaires*
          - *Pennatulaires*
          - *Alcyonaires*
    - Type II. AMORPHOZOAIRES . . . . *Spongiaires* et *Thelyaires*
  - ††† faux
    - Végétaux . . .
      - *Corallines*
      - *Nematozoaires*, ou *Nematophytes*
      - *Psychodiaires*
    - Ni animaux ni végétaux
      - *Zoospermes*
      - *Nullipores*

ZOÖPHYTA'RIA, the fifth class of the Type Actinozoaria, in the classification of Zoophyta, proposed by De Blainville. It includes four families:—1, Tubiporæa; 2, Corallia; 3, Pennatularia; 4, Alcyonaria, or Sarcoïdea.

The genera in these families have been already mentioned in TUBIPORÆA; POLYPIARIA CORTICIFERA (given to satisfy the reference from Corallia); PENNATULARIA, and SARCOIDEA. References to the title of Zoophytaria are given under Cirripathes, Gorgonia, Plexaura, which are characterised in POLYPIARIA CORTICIFERA: from Codoptychium, which belongs to a different family [SPONGIADÆ], Clavularia [TUBIPORÆA], and Pulmonellum [SARCOIDEA. To prevent any difficulty to the reader we add a tabular view of the divisions of the Zoophytaria of De Blainville, preceded by an abstract of the characters of the class.

Class **Zoophytaria.** Body surrounded anteriorly with a simple circle of pectinated tentacula (generally eight in number); ovaries internal.

Some of the animals are single, others aggregated; but in general they are organically united in a common living mass, as the buds of a [dicotyledonous] tree are united to the stems.

Family 1. Tubiporæa: including the genera Cuscutaria, Telesto, Cornularia, Clavularia, Tubipora. [Tubiporæa.]

Family 2. Corallia: including the genera Corallium, Isis, Melitæa, Gorgonia, Eunicea, Funiculina, Plexaura, Muricea, Primnoa, Antipathes, Cirripathes. [Polypiaria Corticifera.]

Family 3. Pennatularia: including the genera Umbellularia, Virgularia, Pavonaria, Pennatula, Veretillum, Renilla. [Pennatularia.]

Family 4. Alcyonaria, or Sarcoidea: including the genera Briarcum, Lobularia, Ammothea, Xenia, Neptæa, Anthelia, Alcyonium, Cydonium, Pulmonellum, Massarium, Cleona.

These families appear for the most part natural and well defined; because the structure of the Polypi, the manner of their union, the composition of the polypiferous masses, and their free or attached habit of existence have all been consulted. On a general view of the classification principally referred to in these volumes, that of M. De Blainville, as given in his Actinologie, it appears well fitted to introduce the student to a contemplation of the innumerable forms comprehended under the term Zoophytes; but it is evidently capable of much improvement hereafter, when the researches of microscopists and anatomists have made us more fully and exactly acquainted with the true relations of the internal organization of the Polypi of the several families to the structure of the higher groups of the animal world. In this point of view the reader will find much advantage from consulting the Summary given by Dr. Johnston, in his work on British Zoophytes, 1836; the detailed examinations of particular groups by Milne Edwards (*Annales des Sciences Naturelles*, *passim*); and the hints for classification by Dr. Farre in the *Philosophical Transactions* of the Royal Society (1837). As Blainville's classification includes the Actinozoaria as a part of the Zoophyta, we have given under that head a copy of his general Table as an Index to the whole subject. [Zoophyta.]

ZO'OTOCA. [Varanians, p. 133.]

ZOROASTER, or ZERDUSHT, the founder of the religion of the Parsees, was born about 589 B.C., at Urmia, a town of Azerbijan, in the reign of Lohrasp, the father of Gushtasp (the Darius Hystaspes of the Greeks). His parents were in an humble condition, although of a noble family, and some of the Eastern authorities trace the lineage of his father, Purushasp, to Feridoon. Daghda (Anquetil writes Dogdo), the mother of Zoroaster, is also said to have been of princely birth, and it is needless to observe that her life is reported to have been so spotless as to attract the favour of the Deity, who foretold to her the greatness of Zoroaster, while yet in the womb, through the medium of magic dreams. Nor is it necessary to state that the birth of the Persian prophet was attended with many miraculous circumstances calculated to make the persons who saw it adopt and spread the belief in the divine mission of the new-born infant. Many of these miracles have found their way into classical writings, and Pliny mentions that Zoroaster laughed on the day on which he was born, and that his brain palpitated so violently as to repel the hand when placed on it. (*Hist. Nat.*, vii., c. 16; H. Lord's *Account of the Modern Parsees in India*, c. 3.) Miracles of this kind are by Eastern authors always made to precede the life of a remarkable man, and they serve to show the high influence which Zoroaster obtained throughout life, and the respect which posterity paid to his memory. The years of Zoroaster's childhood quietly passed in his native town—although his historians delight in adorning them with the most extravagant accounts of his exploits when a child. However, he must have soon turned his attention to the study of nature, as it is stated that he passed twenty years in the deep caves of the mountain Elbrooz (Pliny mentions this with a slight alteration, *Hist. Nat.*, xi., c. 42) before he went to the court of Gushtasp, at which period he is said to have been only thirty years of age (Hyde, p. 330, on the authority of *Shahristani*). His having secluded himself from the society of men for a great number of years is a fact corroborated by many independent authorities. I
retirement that the will of the Supreme Bein
known to him, and as this portion of Zoroaster
one upon which the Parsees rest most of the
the truth of his divine mission, we shall relat
ing to the Zerdusht-nameh. It must be ob
Zoroaster's journey to the mountain Elbroo
Parsee authors invariably called the prophet's
heaven, where he received his instructions fr
(*i. e.* the Zend-Avesta and the sacred fi
(says the Zerdusht-nameh, c. 22) Bahman,
the sun, and with his head covered by a vei
before Zoroaster, by the command of O
said, 'Who art thou? What dost thou want?
answered, 'I seek only what is agreeable to O
has created the two worlds, but I know not wh
with me. O Thou, who art pure, show me the
law.' These words pleased Bahman. 'Ris
'to go before God; there thou shalt receive th
thy request.' Zoroaster rose and followed B
said, 'Shut thine eyes, and walk swiftly.' Whe
opened his eyes, he saw the glory of heaven;
came to meet him, and with them he approach
to whom he addressed his prayer. From hi
other six Amshaspands (or heavenly ministers)
the following instructions: Ormuzd himself s
aster, 'Teach the nations that my light is hi
all that shines. Whenever you turn your face
light, and you follow my command, Arimar
spirit) will be seen to fly. In this world ther
superior to light." He then handed to him
Avesta with the injunction to declare it befor
Bahman, the Amshaspand presiding over t
surrendered his office to Zoroaster, and gave hi
sary directions. Ardibehesht, Shaherawar, I
Khourdad, and Amerdad followed the example
and Zoroaster returned to the world to ove
false doctrines which were upheld by magicia
brought misery upon mankind. This fan
which is gravely repeated by most of the au
life of Zoroaster, was evidently invented for
of filling up the chasm which the twenty years
would have left.

Zoroaster first saw Gushtasp at Balkh, and
this prince to become a zealous and powerful
of his faith. The Zinat-al-Tawarikh states that
the son of Gushtasp, was the first convert of Zo
that his father was persuaded by the eloquence
follow his example. However, the new doc
Zoroaster said had been revealed to him
spread rapidly in the province of Azerbijan (*i.*
of fire'). Gushtasp introduced it into every part
nions, and ordered 12,000 cow-hides to be tan
the precepts of his new faith might be writt
These parchments were deposited in a vault
a rock in Persepolis. He appointed holy m
them; and it was commanded that the profa
kept at a distance from the sacred book (Malc
The powerful protection of the king enabled
introduce his doctrine farther than the kingd
we hear of his journeys into Chaldæa, and th
the second son of Gushtasp, was sent by him
gherd in order to propagate his new religion.
to gain proselytes in India, and succeeded i
a learned Brahmin (Tchengrighatchah, accor
quetil, vol. i., c. 2, p. 70), who went back int
country with a great number of priests. Tem
or Atesh-gahs, were erected in all parts of th
the expense of Gushtasp, whose zeal in i
Zend-Avesta not only on his own subjects,
those of the neighbouring monarchs, at last e
in a war with Arjasp, king of Turan. Zo
undoubtedly the chief instigator of this war,
protracted beyond his life-time, and finally en
tory gained by Asfandiyar over the Turanians,
exultation of a first success, had determined o
death all the followers of Zoroaster. The pro
the year 513 B.C., about 76 years of age, a
before the general massacre of the fire-wor
been resolved upon by Arjasp. Some autho
by Hyde, pp. 323 and 329, say that he wa
during the persecution.

The whole history of Zoroaster, when divest raneous matter, can be reduced to the following statement:—The antient religion which Djamshid had established in Iran had become merely traditional and lost its nfluence over the nation; new sects had sprung up in very direction; Hindus and Chaldæans were endeavouring to introduce their own religion, when Zoroaster appeared. It is evident that the worship of elements had been established in his native province, before he produced is great reform in the adjacent empire; he therefore eems to have restored the religion of his ancestors to a tate of greater purity and adapted it to the exigencies f the nation where he was the first to promulgate it.

What we have said hitherto rests entirely on the authority of Eastern authors—it has no claim to historical accuracy; but it contains more than can be gathered from classical writers. The Life of Zoroaster, prefixed to Anquetil du Perron's Zend-avesta, is a compendium of all the extravagant stories which have been invented about Zoroaster.

From the different dates assigned to Zoroaster by Greek nd Latin authors, many modern authors were led to be- eve that there were no less than six men of that name; ut this opinion has been satisfactorily refuted by Hyde, in s 'Veterum Persarum et Magorum Religionis Historia;' nd lately by Pastoret, in his 'Zoroastre, Confucius, et ahomet comparés.' For an ingenious endeavour to ove that there were more than one Zoroaster we refer Stanley's 'Historia Philosophiæ' (Pars xiii., Sect. i., 2); and to Bryant's 'Analysis of Ancient Mythology,' l. ii., p. 388, where almost all the passages that can be und in antient authors relating to Zoroaster are very refully put together.

Again, there were writers who identified Zoroaster with oses, among whom Huet is the most prominent (*Demon- atio Evangelica*, Prop. iv., c. 5); others again have sup- sed that Zoroaster was born in Palestine, or that he ssed his early youth in that country and earned his sub- tence by becoming a servant to a Jewish prophet (Hyde, 316). Abu-l-faraj states this prophet to have been ijah, Hyde thought he was Esdras, while Prideaux conjec- res that Zoroaster had been servant to Ezekiel. It is arcely necessary to observe that these conjectures are terly vain and quite useless. There was only one Zoro- ter or Zerdusht, who lived in the time of Gushtasp and fected a great reform.

The leading doctrines propagated by Zoroaster were the llowing:—He taught that God existed from all eternity, nd was like infinity of time and space. There were, he erred, two principles in the universe—good and evil; e one was termed Ormuzd, or the good principle, the residing agent of all good; the other, Ariman, the lord evil. Each of these had the power of creation, but that ower was exercised with opposite designs; and it was om their united action that an admixture of good and il was found in every created thing. The angels of rmuzd sought to preserve the elements, the seasons, nd the human race, which the infernal agents of Ariman ished to destroy. But the power of good alone, the great rmuzd, was eternal, and must therefore ultimately prevail. ight was the type of the good spirit, darkness of the evil pirit; and, as stated above, God said to Zoroaster, 'My ght is concealed under all that shines.' Hence the dis- ple of that prophet, when he performs his devotions in a mple, turns towards the sacred fire that burns upon its tar; and when in the open air, towards the sun, as the oblest of all lights, and that by which God sheds his vine influence over the whole and perpetuates the works his creation. [ARIMANES.]

Zoroaster, we are told, was a great astrologer and ma- cian; and it is even stated by Porphyrius that Darius as so proud of having been initiated into the mysteries of e art by Zoroaster himself, that he ordered it to be in- ribed on his tomb.

After his death the religion he introduced was disturbed a thousand schisms; many reforms were introduced; ut it gradually sank to a mere idolatrous worship of the re and the sun; the worshippers were persecuted when ohammedan rulers had possessed themselves of Iran; ey first fled into the mountains, and at last left the coun- y and settled in Guzerat, where they are to this day, but eatly diminished in number.

(Hyde, *Veterum Persarum et Magorum Religionis istoria*, Oxford, 1760; Anquetil du Perron, *Zend-avesta*, aris, 1771; Pastoret, *Zoroastre, Confucius, et Mahomet comparés*; Malcolm's *History of Persia*; Bayle, *Diction. Historique*, has a long and curious article on Zoroaster.)

ZO'SIMUS (Ζώσιμος), a Greek historian of the time of Theodosius the younger (A.D. 408-450). He is described by Photius (*Bibl. Cod.*, 98) as κόμης καὶ ἀπὸ φισκοσυνήγορος; (comes et exadvocatus fisci), and was perhaps a son of Zosimus, the præfect of Epirus, who is mentioned in the Theodosian Code in connection with some laws promulgated by Valentinian and Valens in A.D. 373. Zosimus is the author of an historical work still extant (ἱστορία or ἱστορικόν), in six books, which appears to have been written after the year A.D. 425, as it (v. 27) mentions an occurrence which happened in that year. It begins with the history of Augustus, and after having given in the first book a sketch of the history of the emperors down to the end of Diocletian's reign, A.D. 305, the author devotes the remaining five books to a more detailed history of the Roman empire down to the year A.D. 409, when Rome was besieged by Alaric a second time, and Attalus was declared emperor. Zosimus seems to have been pretty well acquainted with the earlier writers on Roman history. Photius says that his work was a mere compilation from the chronicle of Eunapius, who however is not mentioned by Zosimus. He also used the works of Dexippus and Olympiodorus, from the latter of whom he copied whole chapters. As Zosimus did not examine the credibility of his sources, his own weight as an historical authority depends on that of his sources. The style of his history is well characterised by Photius, who calls it concise, pure, and pleasing. Zosimus himself was a pagan, and is severely censured by Christian writers for the frankness with which he records the crimes and vices of Christian emperors. (Phot., *Bibl. Cod.*, 98; Evagrius, iii. 40, 41; Nicephorus, xvi. 41, &c.) But it cannot be proved that he carried his accusations any further than his duty as an historian required. The first edition of the history of Zosimus appeared in a Latin translation by Leunclavius, Basle, 1576, fol. It contains a vindication of the character of Zosimus against the imputations of Christian writers, and also a Latin translation of Procopius, Agathias, and Jornandes. The first edition of the Greek text, with the translation of Leunclavius (though the translator's name is not mentioned) is that of H. Stephens, Lyon, 1581, 4to In this edition Zosimus is printed with Herodian. Zosimus is also contained in Fr. Sylburg's 'Romanae Historiae Scriptores Graeci,' Frankfurt, 1590, fol.: this was followed by two separate editions of Zosimus, the one by Chr. Olearius (Zeitz, 1579, 8vo., reprinted at Jena, 1714, 8vo.), and the other by Thomas Smith (Oxford, 1679, 8vo.). The best modern editions are that of J. F. Reitemeier (Leipzig, 1784, 8vo., with a valuable introduction, notes, and commentary), and of Emmanuel Bekker (Bonn, 1837, 8vo.). There is an English translation, under the title of 'The New History of Count Zosimus,' &c., London, 1684, 8vo.

(Fabricius, *Biblioth. Graec.*, viii., p. 62, &c.; Vossius, *De Historicis Graecis*, p. 312, ed. Westermann; Reitemeier, *Commentatio de Zosimi fide, stilo et Historicis quos ille sequutus est Scriptoribus*, in the *Bibliotheca Philologica*, ii., p. 225, &c., Leipzig, 1780, 8vo.)

ZO'SIMUS, a native of Greece, succeeded Innocent I. as Bishop of Rome, A.D. 417, under the reign of Honorius, Emperor of the West. At that time Pelagius and his friend Cœlestius were disseminating in the west their peculiar doctrines about the merit of good works and the freedom of man from sin. [PELAGIANISM.] Zosimus appears at first to have been captivated by the eloquence of Cœlestius, who was a ready and subtle speaker, and to have countenanced his tenets. But Pelagius and Cœlestius were soon after condemned by the council of Carthage, A.D. 418, and Zosimus confirmed the sentence of heresy against the Pelagians. A dispute about jurisdiction having arisen in Gaul between the bishop of Arles and the bishop of Vienne, Zosimus supported the bishop of Arles, but the other bishops of Gaul did not submit to his decision. Zosimus encouraged appeals from the bishops to the see of Rome. His letters on the Gaulish and Pelagian controversies are worthy of notice, and they are inserted in Constant's 'Epistolae Romanorum Pontificum.' Zosimus died in December, 418. (Muratori, *Annali d' Italia*, and the Church Historians.)

ZOSTEROPS, the name given by Dr. Horsfield and Mr. Vigors to a genus of Insessorial or Perching Birds, placed by Mr. Swainson in his subfamily *Parianæ* or TITMICE, in his family SYLVIADÆ.

Generic Character.—Bill rather stouter than in *Sylvicola*, acutely conic, almost entire. Rictus smooth. Wings moderate, pointed; the first quill rather shorter than the three next. Tail as in *Sylvicola*. Feet strong. Tarsus longer than the middle toe; Lateral toes unequal. Eyes encircled with compact white feathers. (Sw.)

Geographical Distribution.— India, Africa, America, Australia.

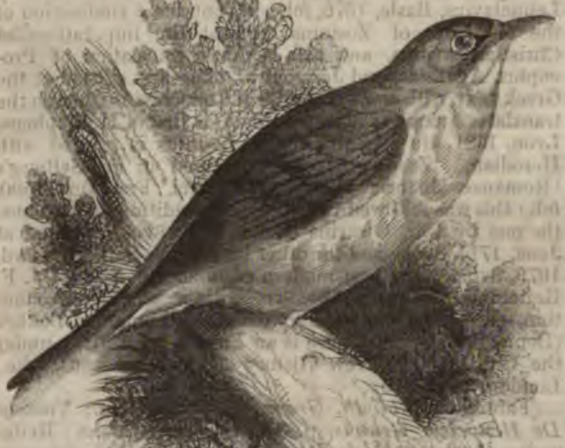
Example.—*Zosterops flava* (Sw.), *Yellow White-Eye.*

Mr. Swainson, in his *Birds of Western Africa*, observes that the species of this genus are all of small size, and nearly intermediate in their affinities between the Warblers and Titmice. He states his belief that only one species is found in the New World; the others, about twelve in number, being restricted to the warm latitudes of Asia, Africa, and Australia. One of these, *Zosterops curvirostris*, Sw. (*Dicæum chloronotus* of the Paris Museum), has, he remarks, the bill nearly as much curved as some of the honey-suckers.

Mr. Swainson adds that the general plumage of all those hitherto discovered is green above and yellowish beneath; so that the species, otherwise well marked, possess a strong mutual resemblance in the general cast of their colours. He thus describes *Zosterops flava*:—

Size of *Zosterops dorsalis*, an Australian species, but the bill, which is black, is larger. The upper plumage is of a bright greenish yellow, the under pure and bright yellow, uniform in all its parts. The quills and tail are blackish, edged with yellow: the snow-white ring round the eye is very conspicuous, and it is connected to the base of the bill by a deep black line; the tail, although divaricated, is even, and the bill and feet blackish. Total length 4¼ inches. (Sw.)

Locality.—Senegal.



Zosterops flava.

ZOUCH, RICHARD, an eminent English civilian, was born about 1590. He was educated on the free foundation of Winchester school; elected to New College, Oxford, in 1607, and chosen fellow in 1609. He took the degree of Bachelor of Civil Law in June, 1614, and was admitted at Doctors' Commons in January, 1618. In April, 1619, he commenced LL.D., and was appointed Regius Professor of Law at Oxford in 1620. He represented Hythe in the last parliament of James I. In 1625 he was appointed principal of St. Alban's Hall, and chancellor of the diocese of Oxford, and soon after judge of the High Court of Admiralty. He contributed the legal arguments to the reasons against the Solemn League and Covenant, published by the University of Oxford in 1647. In 1648 he submitted to the parliamentary visitors, and was allowed to retain his University appointments till the Restoration. Cromwell appointed him one of the delegates in the cause of Dom Pantaleon de Sa, brother of the Portuguese ambassador, who was tried and executed in 1553, for the murder of an English gentleman. At the Restoration he was reinstated as judge of the Admiralty, and nominated a commissioner for regulating the University. He died soon after at his apartments in Doctors' Commons, on the 1st of March, 1661.

Zouch published, in 1613, 'The Dove,' an indifferent poem. His professional works are:—1, 'Elementa Jurisprudentiæ, definitionibus, regulis, et sententiis selectioribus juris civilis illustrata,' Oxford, 1629, 8vo. 2, 'Descriptio juris et judicii feudalis, secundum consuetudines Mediolani et Normanniæ, pro introductione ad jurisprudentiam Anglicanam,' Oxford, 1634, 8vo. 3, 'Descriptio juris et judicii temporalis, secundum consuetudines feudales et Normannicas,' Oxford, 1636, 4to. 4, 'Descriptio juris et judicii ecclesiastici, secundum canones et consuetudines Anglicanas,' Oxford, 1636, 4to. 5, 'Descriptiones juris et judicii sacri; juris et judicii militaris; et juris et judicii maritimi,' Oxford, 1640, 4to. 6, 'Juris et judicii fecialis sive juris inter gentes, &c. explicatio,' Oxford, 1650, 4to. 7, 'Cases and Questions resolved at Civil Law,' Oxford, 1652, 8vo. 8, 'Solutio quæstionis de legati delinquentis judice competente,' 1657, 8vo. 9, 'Eruditionis ingenuæ specimen, scilicet artium, logicæ dialecticæ, &c.,' Oxford, 1657, 8vo. 10, 'Quæstionum juris civilis centuria in decem classes distributa,' Oxford, 1660, 8vo. 11, 'The Jurisdiction of the Admiralty Court asserted against Sir Edward Coke's Articuli Admiralitatis, in the 22nd chapter of his Jurisdiction of Courts,' London, 1663, 8vo.; a posthumous publication. An anonymous pamphlet, entitled 'Specimen quæstionum juris civilis,' Oxford, 1653, 4to., has been attributed to Zouch. (*Biographia Britannica.*)

ZOUCH, THOMAS, an English divine, was born near Wakefield in Yorkshire, in 1737. He entered Trinity College, Cambridge, in 1757. In 1760 he was elected to one of Lord Craven's scholarships. He was chosen fellow of his college, and appointed assistant tutor in 1763. The state of his health obliging him to leave the University in 1770, his college presented him to the living of Wycliffe in the North Riding of Yorkshire. In 1791 he was appointed deputy-commissary of the archdeaconry of Richmond; and in 1793 chaplain to the Master of the Rolls, and rector of Scrayingham. At the death of his elder brother, the Rev. Henry Zouch, he inherited an estate at Sandal, where he continued to reside till his death. Mr. Pitt conferred upon him the second prebend in the church of Durham. The see of Carlisle was offered to him in 1808, but he declined it on account of his advanced age. He died on the 17th of December, 1815. Dr. Zouch was an elegant classical scholar, and possessed considerable acquirements in botany. Besides several occasional discourses, he published 'An inquiry into the Prophetic Character of the Romans, as described in *Daniel* viii. 23-25,' 1792; and 'An attempt to illustrate some of the Prophecies of the Old and New Testament,' 1800. He also published some biographical works:—1, 'Memoirs of the Life and Writings of Sir Philip Sydney,' 1808, 4to. 2, 'Memoir of the Life of John Sudbury, D.D., Dean of Durham,' 1808, 4to.; and an edition of Isaak Walton's Lives,' with additions. (*Gentleman's Magazine*, vol. lxxxvi.; *Annual Register*, vol. lvii.)

ZOUST, GERARD, called sometimes Sowst and Soest, was a German portrait-painter of great ability, who established himself in England, and was one of Lely's rivals in the reign of Charles II. He was born in Westphalia in 1637, but the year in which he came to England is not known. Buckeridge, in his 'English School,' says he came to this country about the year 1656, and found encouragement suitable to his merit. 'His portraits of men,' he continues, 'are admirable, having in them a just, bold draft, and good colouring; but he did not always execute with a due regard to grace in women's faces; which is a habit that can only be acquired by drawing after the most perfect beauties, in which his country did not greatly abound. What we are most indebted to him for is his educating Mr. Riley.' Walpole says of Zoust—'By what I have seen of his hand, particularly his own head at Houghton, he was an admirable master. It is animated with truth and nature; round, bold, yet highly finished.' Jervase, the painter, admired Zoust's style and endeavoured to acquire it: he copied a portrait which he had in his possession, by Zoust, more than once. He was a man of singular temper, and was much displeased at Lely's female portraits being preferred to his. He was slovenly in his dress, and he often opened his house-door in Cursitor's Alley or Holborn Row himself, and if he did not like the look of his visitor, he used to say that his master was not at home. Walpole mentions several portraits by him, among them a fine head of Loggan, the engraver, one of Sir F. Throckmorton, and an excellent one of a gentleman in a dark periwig, on the back of which was written the price of the picture and frame; the picture 3*l.* and the frame 16*s.* His draperies were frequently of satin, in which he imitated the manner of Terburgh. He died in 1681, aged 44.

(*An Essay towards an English School*, &c.; Walpole, *Anecdotes of Painting*, &c.)

ZO'ZYMUS, Dr. Leach's name for a genus of Brachyurous Crustaceans, placed by M. Milne Edwards in the division of *Cryptopod Cancerians*, between the genera *Carpilius* and *Lagostoma*.

The last-mentioned zoologist observes that the small genus *Zozymus* is hardly distinguishable except by the form of the claws, the extremity of which is enlarged and deeply hollowed out into a spoon-shape, a disposition which must influence the habits of the animal. It tends also, in his opinion, to establish the passage between the genera *Cancer* and *Xantho*; for he finds no character sufficiently precise to separate from it certain species, the general form of which is slightly less oval than that of the crabs properly so called, and the latero-posterior borders of whose carapace are nearly as long as the antero-posterior borders, which become strongly dentilated. M. Milne Edwards thus arranges the species:—

§ A. Species having the carapace smooth and without notable embossments.

Example, *Zozymus latissimus.*

Description.—Carapace ovoïd, extremely wide, rather convex; its latero-anterior border very long, and bordered with a lamellar and entire crest, which does not terminate in a tubercle, but is suddenly recurved on the branchial region. Median lobes of the front curved and advancing much. Anterior feet stout; claws without crest or channels on their external surface; an elevated crest on both the upper and lower borders of the eight last feet. Length three inches; colour reddish.

Locality.—New Holland.

§ B. Species whose carapace is granular, but without embossments.

Example, *Zozymus pubescens.*

Description.—Carapace regularly ovoïd, convex, very wide, and covered with small pointed granulations; front very narrow, inclined; latero-anterior borders very much curved, thick, granular, without either crest or dentilations, and prolonged to the level of the cardiac region; four last pairs of feet rounded on their external half, but having the third joint compressed and trenchant. Length about ten lines; body clothed with very fine down; colour whitish.

Locality.—The Isle of France.

§ C. Species whose carapace is granular and embossed.

Example, *Zozymus tomentosus.*

Description.—Carapace ovoïd, very wide, very convex, strongly embossed above, and divided by a great number of linear furrows; genital region divided into three portions by numerous furrows; its latero-anterior borders granulous, and divided by four fissures, which are prolonged in form of burrows on the pterygostomian region, which is not granular; its latero-posterior borders concave and very short. Feet short and covered with granulations; body clothed with blackish down. Length about eight lines.

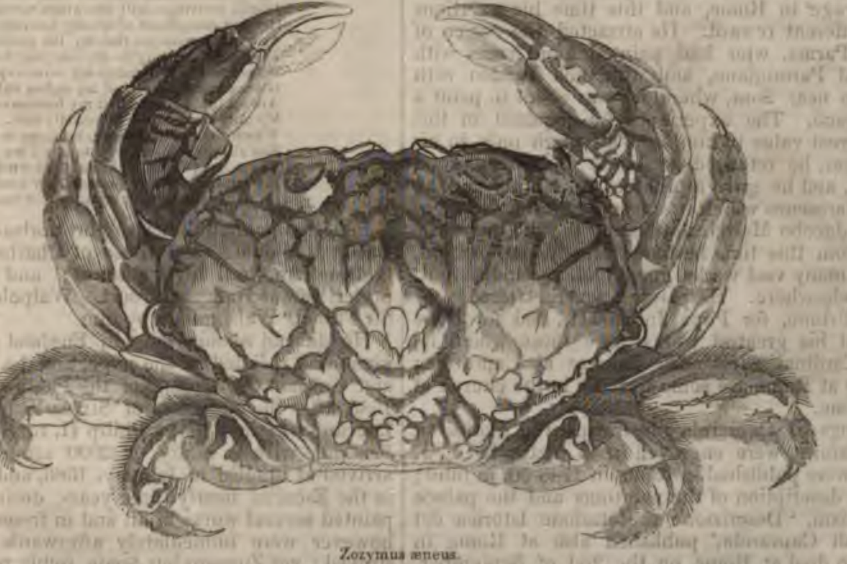
Locality.—The Indian Ocean.

§ D. Species having the carapace strongly embossed, but not granulous.

Example, *Zozymus æneus.*

Description.—Carapace moderately large, convex, very unequal, strongly embossed, and nearly tuberculous at its posterior part; front slightly advanced and indistinctly divided into four lobes; latero-anterior borders of the carapace not prolonged beyond the level of the genital region, and armed with four very wide teeth, compressed and united after the manner of a crest: anterior feet tubercular externally; the succeeding feet hollowed with furrows on their external surface. Length from about two to three inches: colour yellowish with reddish spots.

Locality.—Indian Ocean. (M. E.)



Zozymus æneus.

ZUCCARELLI, or ZUCCHERELLI, FRANCESCO, a distinguished Italian landscape-painter, born at Pitigliano, near Florence, in 1702. He first studied figure-painting, but he eventually decided upon following landscape-painting, in which his first instructor was Paolo Anesi, at Florence: he afterwards went to Rome and continued his studies with Morandi, and lastly with Pietro Nelli. Zuccarelli established himself at Venice, but he acquired in time, through Smith's prints, after his works, so great a reputation in England, that he was induced to visit this country in 1752, and his success was such as to satisfy the most sanguine expectations. At the institution of the Royal Academy in 1768 he was elected one of the members, and is accordingly one of those who are considered its founders. Several of his pictures have been engraved by Vivares. The figures in them were painted by himself; and 'It has been remarked,' says Edwards, 'that among the figures which he introduced in his landscapes, he frequently represented one with a *gourd-bottle* at his waist, as is often seen in Italy. This is said to have been done intentionally, as a sort of pun on his own name, *Zucco* being the Italian word for gourd.'

In 1759 Zuccarelli painted a set of designs for tapestries, which were executed by the king's tapestry-weaver, Paul Saunders, for the Earl of Egremont's house in Piccadilly. He painted many creditable pictures in England, but they are generally very inferior to those he painted in Venice, and to which he was indebted for his reputation and the fortune he made in this country. His later works are cold in colouring, want harmony, and are artificial in their composition: there are some specimens at Hampton Court. Zuccarelli however, in his time, reigned over the public taste in England; and the chief cause of Wilson's want of success was because he did not imitate him.

In 1773 he returned to Florence, and he gave up painting, having resolved to pass the remainder of his life in quiet retirement; the suppression however by the emperor of Austria of a monastery, on the security of which he had advanced money, deprived him of his property. This misfortune compelled him to resume the pencil, and he found sufficient employment from the English gentlemen who visited Florence, where he continued to paint until his death in 1788. He etched some plates after Andrea del Sarto.

(Lanzi, *Storia Pittorica*, &c.; Edwards, *Anecdotes of Painting*, &c.)

ZU′CCARO, TADDEO, and FEDERI′GO, two celebrated Italian historical painters, were the sons of Ottaviano Zuccaro, an obscure painter, and were born at S. Angelo in Vado; Taddeo in 1529. He studied first with Pompeo da Fano, and afterwards with Giacomone da Faenza. He went early to Rome, and became a very popular painter, for the reason, says Lanzi, that there is nothing in his works that the populace cannot understand or imagine it understands. His pictures are compositions of portraits, simply disposed, dressed in the costume of his time, have little variety of character, and he rarely introduced the naked figure, but when he did, it was natural and simple.

His early life, according to Vasari, who writes his name Zucchero, was one of extreme hardship. He left his father's house at the age of fourteen, and set out alone for Rome. When he arrived there, he found himself friendless and houseless, and he was forced to seek employment as a colour grinder, but in this way he added little to his means, and he was for some time comparatively destitute. He passed many of his nights in the streets of Rome, sleeping among the ancient ruins, or under the porches of the modern palaces or churches; and after much perseverance he was at last compelled by excessive privation to return to his father's house, there to recruit his shattered constitution, for, says Vasari, he had been living upon his youth: but during all this period he let pass no opportunity that occurred of improving himself in drawing. As soon as he had recovered his strength, he returned with renewed courage to Rome, and this time his exertions met with a different reward. He attracted the notice of Daniello da Parma, who had painted some years with Correggio and Parmigiano, and who took Taddeo with him to Alvito near Sora, where he was about to paint a chapel in fresco. The experience he acquired in this work was of great value to him, and although only in his eighteenth year, he returned to Rome in 1548, a good fresco painter, and he gave a proof of his ability by the frescoes in chiaroscuro which he executed on the façade of the house of Jacobo Mattei, illustrating the life of Furius Camillus. From this time he found steady employment, and executed many vast works, good, bad, and indifferent, at Rome and elsewhere. He painted several frescoes for the duke of Urbino, for Pope Julius III., and for Pope Paul IV.; but his greatest works were those which he painted for Cardinal Alessandro Farnese at Caprarola; his best works at Rome are some frescoes in the church of the Consolazione.

The paintings of Caprarola illustrating the glories of the Farnese family, were engraved in 45 plates by J. J. Prenner, and were published in Rome in 1748-50, in folio; and there is a description of the paintings and the palace by L. Sebastiani, 'Descrizione e Relazione Istorica del real Palazzo di Caprarola,' published also at Rome in 1741. Taddeo died at Rome on the 2nd of September, 1566, aged 37 years and a day, and he was buried by the side of Raphael in the church of Santa Maria della Rotonda, or the Pantheon, at Rome.

Federigo, Taddeo's brother and pupil, was born at Sant' Angelo in Vado, in 1543. He was given to the charge of his brother at Rome when very young. Taddeo's numerous occupations gave Federigo great advantages, and he was early employed by his brother as an assistant. Federigo completed the works which Taddeo had left incomplete. He painted much in a similar style to that of Taddeo, but he was in every respect inferior to him, except in success, and in the quantity and extensiveness of his works; his drawing was inferior, his compositions were more crowded, and there was generally more affectation in his style. He was invited by the Grand Duke Francesco I. to Florence to paint the cupola of the cathedral, which had been commenced by Vasari. He there painted, says Lanzi, more than three hundred figures fifty feet high, with a Lucifer so large, to use his own words, that the other figures appeared like babies. He boasted that they were the largest figures known, but, continues Lanzi, beyond their vastness they had nothing to recommend them. When Pietro da Cortona was in Florence, there was a project to replace them by some works of that painter, but on account of the greatness of the undertaking, it was feared that he might not live long enough to complete it, and Federigo's works were not disturbed.

After this great work, Federigo enjoyed a reputation which surpassed the fame of all his contemporaries, and he was recalled to Rome by Gregory XIII., to paint the ceiling of the Cappella Paolina in the Vatican. During the progress of this work he had a quarrel with some of the papal courtiers who brought various accusations against him, and to avenge himself he imitated the example of Apelles of Ephesus (Lucian, *De Calumnia*), and painted a picture of calumny, in which he introduced the portraits of his accusers with asses' ears, and placed the picture on St. Luke's day over the door of the church of that saint. This proceeding was represented and gave offence to the pope, and Federigo was compelled to leave Rome immediately, to avoid the consequences. The picture in question is not the one he painted after Lucian's description of that of Apelles of Ephesus; this was painted in distemper on canvas, for the Orsini family; and it is, or was lately, in the Palazzo Lante; there is an engraving of it by Cornelius Cort; it is one of Federigo's best works.

After this event he went to Flanders, where he made some cartoons for tapestries; then to Holland, and thence came to England in 1574. Here he painted the portrait of Queen Elizabeth, and that of Mary Queen of Scots, which is at Chiswick, and which Vertue engraved. He painted a second portrait of Elizabeth in a sort of Persian dress, which is or was in the palace at Kensington, on which there is a scroll with the following verses attributed to Spenser, but which Walpole conjectures are by Elizabeth herself:—

'The restless swallow fits my restlesse mind,'
In still revivinge, still renewinge wrongs;
Her just complaints of cruelty unkinde
Are all the musique that my life prolonges.
With pensive thoughts my weeping stag I crown,
Whose melancholy teares my cares expresse;
His teares in silence and my sighes unknown
Are all the physicke that my harmes redresse.
My only hope was in this goodly tree,
Which I did plant in love, bring up in care,
But all in vaine, for now to late I see
The shales (shells) be mine, the kernels others are.
My musique may be plaintes, my musique tears,
If this be all the fruit my love-tree beares.'

Federigo painted likewise the portrait of Sir Nicholas Bacon at Woburn, and those of Charles Howard, earl of Nottingham, lord high admiral; and Elizabeth's giant porter, now at Hampton Court. Walpole had a portrait of Sir Francis Walsingham by him.

He did not remain long in England; he was soon forgiven and recalled by the pope, and he returned to Rome and finished the ceiling of the Paolina. At the end of 1585, after the accession of Sixtus V. to the papal chair, Zuccaro was invited by Philip II. to Spain to paint the Escurial, with a salary of 2000 scudi per annum. He arrived at Madrid in January, 1586, and he was occupied in the Escurial nearly three years, during which time he painted several works in oil and in fresco, some of which however were immediately afterwards removed or destroyed; yet Zuccaro left Spain richly rewarded. He returned to Rome at the end of 1588. In 1595 he founded the Academy of St. Luke there, for which a charter had been granted by Gregory XIII., and it was confirmed by Sixtus V.; he was the first president. He wrote a book on the principles of painting, sculpture, and architecture, entitled 'L'idea di Pittori, Scultori, e Architetti,' and printed it in 1603 at Turin, with a dedication to the Duke of Savoy. He published two other works at Bologna in 1608; one giving an account of his visit to Parma, 'La dimora di Parma, del Sig. Cav. Federigo Zuccaro;' the other giving an account of a journey in Italy and his stay at Parma, 'Il passaggio per Italia colla dimora di Parma, del Sig. Cav. Federigo Zuccaro.' He died in 1609, the year following, at Ancona. Federigo Zuccaro, though a mannerist, had great ability as a painter: he was also sculptor, poet, and architect, and he is said to have owed his success chiefly to his general accomplishments and personal attractions; he was the most fortunate painter, or perhaps artist, of his time. Lanzi criticizes his writings; he terms them bombastic and pedantic, and says that instead of instruction they present a mere tissue of sterile and undigested speculations, and that one page of Vasari is worth more than all that Zuccaro wrote.

(Vasari, *Vite de' Pittori*, &c.; Baglione, *Vite de' Pittori*, &c.; Walpole, *Anecdotes of Painting*, &c.; Lanzi, *Storia Pittorica*, &c.; Cean Bermudez, *Diccionario Historico*, &c.)

ZU'CCHI, ANTONIO, an Italian painter, born at Venice in 1726. His father, Francesco Zucchi, was an engraver, and was his son's first instructor in drawing; he afterwards learned painting under F. Fontebasso and J. Amigoni. Robert Adam, the architect, when in Italy, engaged Zucchi to make drawings for him; and Zucchi travelled with him in Italy and accompanied him to this country, and was much employed by him as an interior decorator and fresco painter. He painted mythological subjects, ruins, and ornaments: his colouring was pleasing, but his style was superficial and merely ornamental. He executed some works in the old Buckingham House, St. James's Park, and he painted much at Osterley Park, the seat of the Countess of Jersey, originally built by Sir Thomas Gresham. Zucchi lived several years in England, and was an associate of the Royal Academy. He left this country in company with Angelica Kauffmann, and went to Rome, where he died in 1795.

(Longhi, *Vite de' Pittori Veneziani*, &c.; Edwards, *Anecdotes of Painting*, &c.)

ZUG, THE CANTON OF, one of the smaller cantons or states of the Swiss Confederation, is situated nearly in the centre of Switzerland, and is bounded on the north by the canton of Zürich, on the east and south by Schwyz, and on the west by Luzern and Aargau. It is about 14 miles long from east to west, and about 10 miles in its greatest width. It lies in the basin of the river Reuss, an affluent of the Rhine, and its waters flow in a northern direction. The northern part of the lake of Zug occupies the centre of the canton; the southern part is in the territory of Schwyz. The lake is a fine piece of water, about eight miles long, and between one and two miles wide, surrounded by a delightful country. The small lake of Ægeri lies in the south-east part of the canton of Zug, near the borders of Schwyz, from which it is separated by the ridge of Morgarten. The river Lorze is the outlet of the lake of Ægeri, and after a very tortuous course, it enters the lake of Zug below Baar, and issues out of it again near the village of Cham, and flows northwards into the Reuss. The canton of Zug is entirely agricultural; the soil is fertile, and the people are industrious and generally thriving. Fruit-trees are in great abundance; some districts appear like a continuous orchard. There are also fine meadows, and the horned cattle are remarkably large and fine. Wine is made in several localities. The principal articles of exportation are dried fruit, kirschwasser, heifers, and steers, butter, cheese, and honey. The lakes abound with fish. Offsets of the mountains of Schwyz enter the canton of Zug from the east and south, and slope towards the banks of the lake.

The canton is divided into ten communes, and contains 15,300 inhabitants, all of whom profess the Roman Catholic religion. There are a convent of Capuchins and two nunneries; one of the latter, the monastery of Frauenthal, is one of the oldest in Switzerland. The head town, Zug, is built on the east bank of the lake, and at the foot of a pleasant hill called Zugerberg, which is covered with vineyards and orchards. The principal church is dedicated to St. Oswald, who was a Saxon king of Northumbria in the seventh century, and who, according to the monkish legends, was distinguished for his piety and chastity. The adjoining cemetery is planted with flowers, and kept in that style of neatness peculiar to the burying-grounds of the central cantons of German Switzerland. It contains, among other sepulchral monuments, that of General Zurlauben, a native of Zug, who served many years abroad, and died in 1779. He left a valuable collection of MSS. on the history of Switzerland, which is now in the cantonal library of Aargau. The arsenal of Zug contains, among other curiosities, the banner of the canton, stained with the blood of the landamman, Peter Kollin, who fell with his sons at the battle of Bellinzona, fighting against the Milanese, in 1422.

Zug is on the high road from Zürich to Italy by the St. Gothard: the part which runs along the eastern bank of the lake, from Zug to Arth in the canton of Schwyz has been recently completed, and the town of Zug paid 30,000 florins for its share of the expenses. Zug has a gymnasium with four professors, and an institution for female education directed by nuns.

The other towns of the canton are:—1, Baar, about three miles north of Zug, on the road to Zürich; it has a town-house, a public school, a paper-mill, and about 2000 inhabitants. 2, Cham, at the northern extremity of the lake, on the road from Zug to Lucern, has about 1000 inhabitants. 3, Menzingen has about 2200 inhabitants. On the neighbouring hill of Gubel is a chapel, in commemoration of the defeat of the Protestants by the Roman Catholics in 1531, during the religious wars which followed the Reformation in Switzerland.

The constitution of the canton of Zug is a representative democracy. The people assemble in May every year in their respective communes, and appoint the members of the landrath, or legislative body, consisting of 162 members, who sit for one year, but are re-eligible. The communal assemblies have the right of proposing projects of laws, which the landrath approves or rejects. There is also a landgemeinde, or general assembly of the whole canton, which meets once a year, and appoints the landamman and other officers of the state, as well as the deputies to the federal diet of all Switzerland. There is also a cantonal council, which consists of one-third of the members of the landrath, and which has both executive and judicial powers, and is presided over by the landamman. The criminal court is composed of 25 members taken from the cantonal council. There is a civil court for the whole canton, and inferior courts in every commune. Fornication is reckoned among other punishable misdemeanours. In all these small democracies the number of public functionaries is multiplied to an extent which seems disproportionate to the amount of the population, but this is done in order that all the citizens may in turn enjoy a brief period of power. The public revenue is supplied by both direct and indirect taxation.

The canton of Zug has kept itself one of the quietest among the political disturbances of Switzerland of the last half a century.

(Leresche, *Dictionnaire Géographique Statistique de la Suisse*; Franscini, *Statistica della Svizzera*.)

ZUIDER ZEE, or SOUTH SEA, is so called by the Dutch in contradistinction from the North Sea, though it is only a wide bay of the North Sea, from which it is separated by a series of islands which extend in the form of a segment of a circle along the north-west border of the Zuider Zee. These islands are called Texel, Vlieland, Ter Schelling, and Ameland. The first and last have been noticed under their proper heads. Vlieland is about ten miles long, and nearly one mile and a half broad in the widest part; the soil consists of sand, and it contains only one village, inhabited by about 800 fishermen. Ter Schelling is 17 miles long, and nearly three miles wide. The northern coast is bounded by sand-hills; but on the southern shores the soil is good, and partly cultivated, partly used as pasture-ground. This island contains four villages, with about 2000 inhabitants. These islands are partly or entirely surrounded by shoals, so that only small boats can land there, but the straits which divide them from each other have water enough for large vessels. They are however little used, with the exception of the Mars Diep, or strait, that divides Texel from the tongue of land called the Helder, through which large vessels pass in sailing to and from Amsterdam. The other straits are only navigated by fishing-vessels.

The Zuider Zee lies between 52° 15′ and 53° 30′ N. lat., and between 4° 15′ and 6° E. long., and covers about 12,000 square miles, or about twice the extent of the county of York. Near the middle it is narrowed by a projecting peninsula, on the east point of which the town of Enkhuizen is built, and which extends towards the most south-western projection of the province of Friesland, so as to leave only a strait about ten miles wide. South of this strait the sea is generally from 25 to 36 miles wide. At its south-western extremity an inlet branches off to the west, which extends about 15 miles into the province of Holland. It is from one to two miles wide, and called Het Y. This inlet is deep enough for vessels of considerable size, and constitutes the harbour of Amsterdam, which is built on its southern shore. The entrance to this inlet is between shoals, and is called the Pampus. Not far from its western extremity the Y is joined from the south by a narrow river, called Spaaren, which is the short channel by which the lake of Haarlem discharges its waters into the inlet. [HAARLEM, vol. xi., p. 520.]

The shores of the Zuider Zee are generally low. On its eastern side they are well defined, and on the south-east, in the province of Gelderland, they rise several feet above the level of the sea. But the western shores are very low, so that a great portion of the adjacent countries is defended from the encroachments of the sea by dikes. Along the eastern shores the sea has sufficient depth for vessels of moderate size, and in general also for large vessels. But along the western shores several shoals occur, the most extensive of which are near the Texel and at the entrance of the Y; and at low tides there is so little water in them, that the larger merchantmen were formerly obliged to discharge a portion of their cargo at the Texel before they could sail to Amsterdam. To obviate this disadvantage the North, or Helder Canal has been made, which begins at the Mars Diep, in the strait which divides Texel from the Helder. Near the village called the Helder a new harbour, called the Nieuwe Diep, has been made, which is spacious, and deep enough to allow ships of 600 tons burthen to lie close to the quays even in the greatest storms. The Helder Canal begins at this place, and extends southward to Alkmaar. A few miles south of Alkmaar it turns to the east to the town of Purmerend, whence it runs southward to the Y, in which it terminates opposite the town of Amsterdam. This canal is capable of receiving the largest merchant-vessels, and the locks are so wide that ships of the line of 74 guns can pass. It is about 60 miles long, 25 feet deep, and 130 feet wide. This great work was begun in 1819, and completed in 1825.

According to the most antient accounts of these parts of Europe, which are derived from the Roman writers, the Zuider Zee did not then exist, but its place was occupied by a low swampy marsh drained by the river Yssel. This river was not then, as it is now, considered an arm of the Rhine. But after the Roman general Claudius Drusus, about twelve years before the Christian æra, had caused a canal to be made from the Rhine to the Yssel, a portion of the water brought down by the Rhine was discharged by this canal into the Yssel. It does not appear that this change in the course of the rivers materially affected the low countries drained by the Yssel, as no change is recorded before the beginning of the thirteenth century. But in 1219 a great portion of the low country was inundated by the sea, after continued north-western gales, which broke down the dikes by which it was protected against the water. Before the inhabitants were able to repair the dikes, and drain the tracts which were still covered with water, after the sea had retired, new inundations took place, which washed away the soft soil with which the country was covered, and rendered it impossible to do anything for the protection of those tracts which had been spared by the waves. The last great inundation took place in 1282, and gave to the Zuider Zee the form and depth which it still preserves.

ZÜLLICHAU is a Prussian town in the government of Frankfort and province of Brandenburg, situated in 52° 3′ N. lat. and 13° 40′ E. long., in a fertile plain at the distance of two miles and a half from the Oder, and 110 miles from Berlin. It is surrounded with a rampart and a moat, and has outside of the town a citadel, which is surrounded with its own wall and ditch. There are four suburbs, which are more extensive than the town. The public buildings and institutions are, one Lutheran and one Calvinist church, an orphan asylum, a school founded in 1719 by Sigismund Steinhast, a needle-maker; a royal school (called the Paedagogium), and a seminary for schoolmasters. The number of inhabitants is about 5000, who have manufactures of woollen cloths, linen, dimity, stockings, hats, leather, starch, and powder: there are tanneries, breweries, brandy-distilleries, and vinegar-manufactories. The trade of this town is very considerable, and the inhabitants cultivate much fruit and hops, and at the distance of a league from the town have planted, in a good soil and warm situation, 70 vineyards, which are the most northerly in Germany. When the monasteries flourished in Northern Germany, the monks extended the cultivation of the vine *to Bordesholm* and Schwerin, on the shores of the lakes; but these vineyards were abandoned when the monks disappeared.

(J. C. Müller, *Wörterbuch des Preussischen Staates*; W. A. von Schlieben, *Neuestes Gemählde der Preussischen Monarchie*; Johann Hübner, *Zeitungs Lexicon*; Stein, *Geographisches Lexicon.*)

ZUMMO, GAETA'NO GIULIO, a celebrated modeller in coloured wax, was born of a noble family at Syracuse, in 1656: his name is commonly, but incorrectly, written Zumbo. He devoted himself early to the study of sculpture, and combining with it a careful investigation of the anatomy of the human body, he produced some very clever works and anatomical preparations in coloured wax, prepared after a method of his own. He acquired a reputation in several cities of Italy; in Bologna, Genoa, but especially at Florence, where the Grand-Duke Cosmo III. took him into his service. Among other works which Zummo executed for this prince is one which is called Corruption, 'La Corruzione;' it consists of a group of five figures in high relief, showing various stages of decomposition of the human body after death. At one corner of this work he has put his own portrait and inscribed under it his name as follows:—Caet$^{us.}$ Jul$^{us.}$ Zummo S^{us}, which is, Caetanus Julius Zummo Syracusanus. He made another group showing the effects of the plague; and both works are as extremely repulsive to look at as they are remarkable for their ingenuity of execution. He made likewise at Florence several anatomical preparations. At Genoa he executed two very beautiful works, representing the Nativity and the Descent from the Cross; the latter has been well engraved by E. S. Cheron. They are both described by De Piles in his 'Cours de Peinture,'—'Description de deux ouvrages de Sculpture, qui appartiennent à Mr. Le Hay, faits par Mr. Zumbo, Gentilhomme Sicilien.' From Genoa Zummo went to Paris, where he died in 1701.

Upwards of a century before Zummo, Jacopo Vivio, an Italian artist, distinguished himself for his models in coloured wax; he is said to have made a copy of the Last Judgment by Michael Angelo in wax.

(Fiorillo, *Geschichte der Mahlerey*, vol. i.)

ZU'RBARAN, FRANCISCO, a very celebrated Spanish painter, born at Fuente de Cantos, in Estremadura, in November, 1598; he is called the Spanish Caravaggio. His parents, who were of the labouring class, soon discovered in young Francisco an ability to excel in painting, and they accordingly sent him to Seville to the school of Juan de Roélas. He made very rapid progress, and from the great resemblance of even his earliest works to those of Caravaggio, he is supposed to have copied some pictures of that master which he may have seen at Seville. He drew correctly, always painted from nature, and was remarkable for his persevering studies of white draperies from the lay-figure, in painting which he greatly excelled. In 1625 the Marquis de Malaçon commissioned Zurbaran to paint some pictures for the altar of St. Peter in the Cathedral of Seville; and about the same time he painted his celebrated picture of St. Thomas Aquinas, for the great altar of the church of the college of that saint at Seville; it contains many figures larger than life, and for nature, chiaroscuro, and general execution, is considered Zurbaran's masterpiece, and ranks him, says Cean Bermudez, with the first masters of Lombardy: unless recently it has not been engraved. Other celebrated works by Zurbaran at Seville are three at the Carthusians of Santa Maria de las Cuevas; the two altar-pieces of San Lorenzo and Sant' Antonio Abad at the Mercenarios Descalzos; some pictures at the Merced Calzada; those by him in the church of San Buenaventura; and the crucifix in the oratory of the convent of St. Paul. He painted likewise several works at Madrid in the Palacio Nuevo, and in the Buenretiro, and some of them probably before 1633, for on some works painted for the Carthusians at Xerez in that year he signs himself painter to the king (Philip *III.*), a title which he most probably acquired after he had executed some of his paintings at Madrid. He also spent some time at Madrid after this date working for Philip IV., but he returned to Seville, and died there in 1662. He formed no scholars at Madrid, but Bernabé de Ayala, the brothers Polanco, and others were his scholars and imitators at Seville.

Zurbaran's works are very numerous at Seville: there are also several at Cordova and Goadalupe, and some at Castello and Penaranda. Out of Spain they are very uncommon, but Marshal Soult brought away some, and others have been sold and removed more recently. In the Spanish Museum in the Louvre there is a room devoted chiefly to the works of Zurbaran; there are in it, according to the catalogue, 81 pictures by him, but many of them are very indifferent, and are probably not by him. In this country the Duke of Sutherland has a good specimen of his style. His works have as much nature and power as those of Caravaggio, and less vulgarity. The pictures from the life of San Pedro Nolasco at the Merced Calzada at Seville, though some of Zurbaran's earliest works, are among his best; they are remarkable for the skill with which he has managed the white draperies of the monastics.

(Cean Bermudez, *Diccionario Historico, &c.*: Kolloff, *Beschreibung der Königlichen Museen, &c. zu Paris.*)

ZÜRICH, one of the large cantons of the Swiss Confederation, is bounded on the north partly by the canton of Schaffhausen, and partly by the grand-duchy of Baden; on the east by Thurgau and St. Gall; on the south by Schwyz and Zug; and on the west by Aargau. The territory of Zürich lies in the basin of the Rhine, all its water-courses flowing northwards into that river. The area of the canton is reckoned by Meyer of Knonau at 32 German square miles, or about 704 English square miles. The population in 1837 was 231,576. There are no high mountains in the canton; but several ridges of hills, some of which attain a height of 2700 feet, run from south-east to north-west, forming valleys between, through which flow the principal rivers of the canton, the Thur, the Töss, the Glatt, and the Limmat. The lake of Zürich, the eastern extremity of which belongs to the cantons of Schwyz and St. Gall, is long and narrow; it runs through the middle of the canton, extending for about 25 miles from south-east to north-west: its breadth measures from one to two miles. The banks are strewn with thriving small towns and villages, and country-houses, especially on the side of Zürich; and the surrounding country, rising in gentle slopes on both sides, is planted with vineyards and orchards, intermixed with fields, exhibiting a most animated landscape, which contrasts with the distant view of the snow-capped peaks of the Alps of Glarus. The Limmat, a rapid clear stream, issues out of the lake at its north-west extremity, intersects the town of Zürich, and is joined by the Sihl, a river coming from the south, which has its source in the canton of Schwyz.

Agriculture is diligently attended to in the canton of Zürich, and the value of manure is well understood. The principal products are—corn, wine, fruit, and pulse. The wine is mostly white, and generally of an inferior kind, but in some localities good wine is made; the red wines of Winterthur, Neftenbach, and Meilen, and the light coloured wine of Teufen, are as good as any in Switzerland. The horned cattle amounted, in 1836, to about 47,000 head; sheep to 3500 head, only, besides 5500 goats. Considerable tracts of ground are covered with forests, which belong some to the state, and some to the communes or to corporations.

More than one-eighth of the population of the canton is occupied in manufactures. The cotton and silk manufactures are by far the most important; they have been noticed under Switzerland (*Trade and Manufactures*). Zürich carries on an active trade, especially with Italy, and it contains several highly respectable mercantile and banking houses.

Two dialects of the German Swiss are commonly spoken in the canton of Zürich; the written language is the high German, and is spoken by educated persons. The religion of the country, recognised as such by the constitution, is the Reformed or Evangelical, established by Zwingli and Bullinger. The number of the clergy is nearly 300, of whom 143 are incumbents of parishes. About 2000 Roman Catholics are scattered about various districts of the canton; they have a Benedictine convent at Rheinau on the banks of the Rhine.

The public revenue of the canton of Zürich amounts to between 1,100,000 and 1,200,000 Swiss livres. The Swiss livre is worth one-half more than the French franc, or fifteen pence sterling. The revenue is derived chiefly from the interest of capital and rent of landed property belonging to the state; from the tax on property, manufactures, and income; from an octroi or excise duty on liquors; from the duty on salt; from fines and fees; from the post-office and other items. The expenditure is distributed under the following heads:—Civil administration, 178,000 Swiss livres; police, 99,450 livres; military, 122,000 livres; public worship or church, 192,154 livres; public instruction, 185,400 livres; roads and public buildings, 360,000 livres. There is a body of permanent gendarmerie or police force reckoning 118 men, chiefly for the service of the town of Zürich. The militia, which is the national force, consisting of all the men from 19 to 40 years of age, is organised after the same manner as in the other cantons of Switzerland. The contingent or select militia, which is always ready to be called out, amounts to 9000 men; the landwehr, which is next liable to take the field in case of emergency, is about the same number.

By the actual constitution, which was sanctioned by the great majority of the people in 1831, and was afterwards revised in 1837, the canton of Zürich is a representative democracy; all citizens who have attained twenty years of age enjoy the elective franchise, except bankrupts, paupers, criminals, and those who labour under an interdict. The canton is divided into 65 electoral circles, of which are 13 for the town of Zürich and 52 for the country. The electoral circles return one deputy for every 1200 inhabitants. The Great Council or Legislature consists of 242 members, who must be at least 30 years of age, and of whom thirty-three are chosen by the Great Council itself to complete its number. By this arrangement the town of Zürich returns a greater proportion of deputies relatively to its population than the country districts, and this is the case in most of the larger cantons of Switzerland, where the chief amount of wealth and information is centered in the head town. The deputies are elected for four years. The Council appoints the Executive Council, which consists of 19 members for six years, and is presided over by the burgmeister. The Great Council appoints also the members of the court of appeals, of the criminal court, and those of the ecclesiastical council, which superintends the administration of the church, and is formed both of clerical and lay members. Besides the ecclesiastical council there is a synod or assembly of the clergy, which constitutes the supreme authority for spiritual affairs, and which meets at least once a year, and is presided over by the antistes or head pastor of the church of Zürich.

The canton is divided for administrative purposes into eleven districts, having each its council for local purposes, a prefect or administrative officer appointed by the executive, and a court of justice. Unfortunately, amidst the political changes, the reform in the judicial system, and especially in the criminal laws has not kept pace with political reform; generally speaking, judicial legislature and administration are still very imperfect throughout Switzerland. The use of torture was abolished at Zürich by law in 1831.

Zürich, the head town of the canton, is pleasantly situated at the north-west extremity of the lake, and is divided by the river Limmat into two nearly equal parts; of which the one on the right bank is called the Grosse Stadt, and the other the Kleine Stadt. The Grosse Stadt is built on the slope of a hill called the Zürichberg; the Kleine Stadt lies on more even ground between the Limmat and the Sihl, just above the confluence of the two rivers. Both towns are surrounded by ramparts and ditches, with bastions and ravelins, but the works, being commanded by the neighbouring heights, have been lately ordered to be razed. The streets are mostly narrow and irregular, the houses high, massive, and antient looking, and the general appearance is that of a town of the Middle Ages. There are however several modern and handsome constructions, especially in the Kleine Stadt. The münsterhof, or cathedral, is a fine old building of the eleventh century; one of the towers is called the tower of Charlemagne, for it is said that that sovereign, during his German expeditions, resided some time in this spot, which was then beginning to be inhabited under the name of Castrum Turegum. The other remarkable buildings of Zürich are:—the Frauenmünster, once a nunnery, built in the thirteenth century; the Prediger church; the church of St. Peter, with its handsome tower and clock; the town house; the orphan asylum; the Wasserkirche, with the town library annexed to it; the new university; the Casino, or assembly-rooms; the Wellenberg tower and dungeon, in a small island in the middle of the river, where state prisoners were formerly confined; the arsenal; and the new police and guard house. The principal promenades are the Lindenhof, in the Grosse

The other town of some importance in the canton is Winterthur, situated in a plain 12 miles north-east of Zürich, a regularly built town, one of the handsomest and neatest in all Switzerland. The population is about 3400 inhabitants, who are occupied chiefly in manufactures and trade. It has several handsome buildings, a public library, a cabinet of medals, a rich cabinet of ornithology belonging to Mr. Ziegler Steiner, several schools, and other useful institutions. The site of the antient Vitodurum, where the Romans had a fortified encampment, is at Ober Winterthur, about a mile and a half from the town of Winterthur, on the road to Frauenfeld in Thurgau. Many remains of antiquity have been found on the spot.

Zürich has been called the Athens of German Switzerland. Science and literature have been cultivated at Zürich for ages past, and many valuable works have come from its presses. Zürich can boast of many distinguished men of learning natives of the town or its territory; C. and J. Gessner, J. von Muralt, Escher, Schintz, and Rahn, for the physical sciences; Hirzel, Sulzer, Lavater, and Paul Usteri, in philosophical and political studies; the philologists Conrad of Zürich, Jacobus Ceporinus, Rudolf Collinus, Thomas Bibliander, Joshua Malhers, J. Fries, Henry Hottinger, J. C. Orelli, J. U. Fäsi; the historians J. von Winterthur, Gerald Edleback, J. Stumpf, H. Bullinger, Simler, J. J. Hottinger, Bodmer, Füssli, Weiser, Meister, M. Usteri; the geographers J. C. Fäsi, Ebel, and Meyer of Knonau; numerous divines, such as Hemmerlin or Malleolus, Zwingli, Leo Judä, Pellican, Bullinger, Breitinger, Heidegger, Häfeli, and others. In literature and poetry there are Bodmer, Zimmermann, C. Meyer, Solomon Gessner, several Füssli, Lavater, J. Horner, Escher, D. Hess; and the musicians Schmidli, Egli, Waldi, Nägeli, and Pfeiffer. The list of Zürich painters is considerable. Many learned societies exist at Zürich, some of them founded many years since. The Society for the Encouragement of Natural Sciences was founded by J. Gessner in 1745; the Helvetic Society, founded by Bodmer, has been revived since 1818, under the name of the Historical Society; the Society of Medicine and Surgery was established in 1788; the Society of Artists about the same epoch; the origin of the Society of Music dates from the seventeenth century. The Society of National Antiquities and that of Literature have been founded of late years. A society for assisting the destitute was established in 1799: it has been the means of founding an institute for the blind, and another for the deaf and dumb. The Society of Morality, founded in 1765, has contributed to the establishment of other useful institutions, among others to a

On his return to his native country in 1549,
pointed by the states of Aragon *coronista* (chr
the kingdom, the first who filled the office, t
instituted.

The duties of this appointment appear to hav
his whole time from 1549 to 1567. An ordi
issued in his favour by Philip II. to all the mu
and abbeys of his dominions, enjoining them to
archives and communicate their most secret
Zurita. Thus authorized, the Coronista travell
Aragon, Italy, and Sicily, and collected a great
important documents.

In 1567 Zurita was appointed private secre
king. In 1568 the grand inquisitor intrusted to
all the correspondence of the holy office. T
close of his life he resigned this appointment. an
to the Hieronymite convent of Saragossa. The
tion of his Annals of Aragon was the occupat
declining years. He died in his convent, on
November, 1581. His books he bequeathed to
treux of Saragossa, but most of them were tak
sion of for the Escurial library.

The works of Zurita are:—1, 'Annales de la
Aragon,' Saragossa, 1562-79; 2, 'Indices rerur
goniae Regibus gestarum ab initiis regni ad *an*
tribus libris expositi,' Saragossa, 1578; 3, 'Pro
la historia en el reyno de Aragon, que contiene
libros varios successos desde el an 1512, hasta a
Saragossa, 1580; 4, 'Enmiendas y Advertenc
coronicas de los reies de Castilla que escrivio
de Ayala,' Saragossa, 1683. Bouterweck spea
terms of the writings of Zurita. By a lucid ex
the connection of events he has succeeded in
the growth of the Aragonese constitution.

It was Zurita who first discovered the 'Chron
andrinum,' published by Ducange among the
historians. Some grammatical notes of Zuri
'Commentaries of Cæsar,' Claudian, and the
Itinerary' are preserved in MS. in the libra
Chartreux of Saragossa and of the Escurial.

(*Elogios de Geronimo Zurita primer Coronista*
de Aragon, par Diego Josef Dormer; N. Anto
theca Hispana Nova.)

ZURNAPA, the Arabian name, according
of the GIRAFFE, of which, as far as present resea
gone, there appears to be but one living species
factory evidence having been brought forward
that the Giraffes of Nubia, Senegal, and the Cap
cifically different.

the existing species, but has the same characteristic long and slender neck, as is proved by the fossil cervical vertebræ, which, with all the characters of maturity, differ from the corresponding vertebræ in the African or existing species, in being one-third smaller, and in some slight variations of configuration

The former example due to the researches of these accomplished and zealous officers, of the extension of a genus supposed to be peculiarly African to the continent of India, in the case of the Sewalik Hippopotamus, is now paralleled by the discovery of the associated Giraffes. Africa boasts at present of but one Hippopotamus, nor, as far as we know, has she more than one Giraffe; but there existed at least two species of both these genera during the ancient period when the conditions of the Sewalik range afforded the means of their subsistence with the contemporaneous *Sivatheria*, Mastodons, and other gigantic forms of Mammalia dependent for their food upon the rich and teeming vegetable produce of the soil. *Hippopotami* require deep rivers for their safe and comfortable abode; and Giraffes are especially organized to subsist on a peculiar natural family of trees—the Acacias, which confine them to plains or regions of moderate elevation. But the fossil remains to which we have called attention occur more than 3000 feet up the loftiest range of mountains in the world. The streams that irrigate the localities which have now become famous from the abundance of these fossils are now narrow and rapid, hastening to pour themselves into some tributary to the Ganges, and must long have lost those characters which adapted them for the abode of *Hippopotami*. The vegetation is equally characteristic of the present altitude of the soil, and could as little yield subsistence to Giraffes. When therefore these now peculiarly African types of gigantic herbivorous mammalia formerly existed where their fossil remains are at present found, it may reasonably be conjectured that the elevation of the Sewalik or Sub-Himalayan chain had comparatively but begun, and that the geographical character of the land was such as to have afforded the requisite rivers for the *Hippopotami* and the acacia-groves for the Giraffes.

ZUTPHEN, situated in 52° 8′ N. lat. and 6° 12′ E. long., is an inland town, in the province of Gelderland, in the kingdom of the Netherlands. It lies on the right bank of the Yssel, over which there is a stone bridge, and is traversed by the Berkel, which divides it into the New and the Old towns, and falls into the Yssel. There is also an extensive suburb, with many gardens and country-houses. It is strongly fortified, and the ramparts, which are planted with trees, afford a pleasant public walk. The principal public buildings are, the great church, an antient stately edifice, St. Eusebius's church, containing the tombs of several dukes of Gelderland, and two other churches; the town-hall, the house of correction, the college of deputies, and the S'Gravenhof, or count's palace. There is a Latin school, a society of architecture and drawing, a school of art, and a society for the study of natural history. There are 11,000 inhabitants, who have a brisk commission trade with Germany and the neighbouring countries. In the war with Philip II., king of Spain, Zutphen was besieged in 1572 by the Spaniards, who took it by storm, and committed the most frightful excesses. It was retaken in 1591, after a siege in which the gallant Sir Philip Sydney was killed. Near Zutphen is the beautiful country-seat of the king of the Netherlands, called the Loo.

(Hassel, *Handbuch*, vol. ix. (*The Netherlands*); Stein's *Handbuch*, edited by Hörschelmann; Cannabich, *Lehrbuch*.)

ZWINGLI, or ULRICH ZUINGLI, the reformer of Switzerland, was born at Wildhaus in the Toggenburg, in January, 1484. His father was a substantial farmer. Zwingli studied first at Basle, and then at Bern, from whence he went to study philosophy at Vienna; on his return to Basle he went through his theological studies under Thomas Wyttenbach. He was ordained priest and said his first mass in 1506. He was then appointed to the parish of Glarus, the head town of the canton of that name. He applied himself strenuously to the study of the Scriptures in the Hebrew and Greek texts, and that of the early fathers of the church. He appears to have been early impressed with a notion that all was not right in the government and discipline of the church as then established, and he communicated his doubts by letters to several learned men, with whom he was acquainted. His life was pure and exemplary, and he was much beloved by his flock for his sermons; he inculcated the practice of Gospel morality, avoiding as much as possible to speak of the intercession of saints, of images and relics, and of fasts and pilgrimages. Twice he accompanied, as chaplain, the military contingent of Glarus to the wars in Italy, in which the Swiss were then taking an active part, as auxiliaries to one or the other of the belligerents. Zwingli was at Milan when a part of the Swiss, won over by the intrigues and bribes of Cardinal Schinner, refused to ratify the treaty of peace with France agreed upon by most of the cantons, and marched out to attack the French army under Trivulzio, more than double their strength. They fought desperately for two days at Marignano, on the 14th and 15th of September, 1515, lost one-half of their number, but at the same time so crippled the French that they were allowed to retire unmolested with their artillery and their wounded.

On his return to Switzerland, Zwingli wrote some strong remonstrances to the governments of the various cantons, entreating them to put a stop to the practice of foreign enlistment, and not to allow the blood of their countrymen to be wasted for quarrels not their own. After having filled his post at Glarus for ten years, he was appointed, in 1516, preacher to the monastery of Einsiedlen. There, in the very sanctuary of devotional practices, pilgrimages, indulgences, and votive offerings, Zwingli preached more freely than he had done at Glarus against the abuse of those things, entreating his audience to seek forgiveness through the merits of the Saviour alone, and not through the intercession of the Virgin and other saints, and to consult the Scriptures as the only safe rule in matters of faith. He had several conferences with Cardinal Schinner, whom he had known in Italy, and he warmly represented to him as well as to the Bishop of Constance the urgent necessity of a reform in the discipline of the church, entreating them and their brother prelates to take the work into their own hands, for fear that the people whose eyes began to be opened to the astounding corruption around them, should lose all respect for the church, and the whole social and religious world be thrown into anarchy. At this time Zwingli had not even heard of Luther, whose theses against the sale of indulgences were affixed at the gates of the Castle Church of Wittenberg, on the last day of October, 1517, when Zwingli had been already preaching at Einsiedlen against similar practices for nearly two years. This shows that the movement of the Reformation did not originate with Luther alone, but commenced simultaneously in different countries, where minds similarly tempered, though unacquainted with one another, felt a common impulse from general circumstances and from what they saw of the condition of the church around them.

In 1518 the traffic in indulgences spread to Switzerland. Bernardin Samson, a Franciscan friar of the convent of Milan, was commissioned by his superiors to sell indulgences in Switzerland. Samson, a vulgar ignorant man, in his eagerness for customers went beyond the lax notions of the times, according to which most people believed that indulgences remitted the guilt as well as the penalty of past offences, a notion unwarranted by the councils or by the divines of the Roman church. Samson told the Swiss mountaineers that by purchasing indulgences to a certain amount they might obtain a sort of privilege or immunity for future sins which they might happen to commit. Samson however was opposed by Zwingli, who made a stand at the church gate of the abbey of Einsiedlen, and refused the friar admittance, being supported in this by the abbot, and especially by Theobald, baron of Geroldsek, who was the vogt or economical administrator of the abbey. Zwingli then preached to the assembled pilgrims, not exactly against the doctrine of indulgences, but against the glaring abuse of them which was being made, exposing the mercenary object of the friar, and laying the blame not on the heads of the church, but on their subordinate agents. Even Faber, vicar of the bishop of Constance, was ashamed of Samson, and forbade him, under some allegation of informality, to sell his indulgences within his diocese. Bullinger, the rector of Bremgarten, and a friend of Zwingli, refused Samson admittance to his church. The friar however reaped a good harvest at Luzern, Bern, and other places.

In the mean time Zwingli had been invited by the chapter of the Gross Münster, or collegiate church of Zürich, to be their preacher, which offer he accepted on condition that he should not be expected to preach anything but the word of God as it is in the Scriptures. On Samson making his appearance at Zürich, he found there his old antagonist, and was of course refused admittance. Soon after Samson left Switzerland to return to Milan, carrying with him, according to the account of Stettler, in his Chronicle, about 800,000 crowns. This was in 1519.

Zwingli, from his opposition to the sale of indulgences, was led to investigate other questionable practices of the Roman church, as Luther was doing in Germany. He corresponded on these matters with several men of learning in other parts of Switzerland; Henry Lovit, of Glarus, styled Glareanus; Kopflin, who Latinized his name into Capito, according to the fashion of the times; Hauschein, of Basle, called Œcolampadius; Henry Bullinger, of Bremgarten; Thomas Wyttenbach, of Bienne; and Berchthold Haller, of Bern; all of whom preached against indulgences, and against the multiplicity of external forms in worship. They all insisted upon the propriety of reading prayers in the vernacular language of each country, and they recommended that religious instruction should be made clear, intelligible, and accessible to all. By degrees they were led on to gainsay the right assumed by the see of Rome to decide upon all religious and ecclesiastical questions. Erasmus of Rotterdam, who was living at Basle, and who had gone along with them in exposing and ridiculing various superstitious practices and other clerical abuses, stopped short when his friends directed their attacks against the papal authority. [ERASMUS.] The court of Rome, whose attention was engrossed by Luther's German schism, had hitherto taken little notice of the Swiss controversy, but now it began to threaten the innovators with excommunication. The bishop of Constance forbade the preaching of the new doctrines, and the Mendicant orders laid charges of impiety and sedition against Zwingli before the magistrates of Zürich. Zwingli published his defence under the title of 'Apologeticus Architeles,' in 1522, copies of which were rapidly spread all over Switzerland. Things bore a threatening appearance against Zwingli; Luther had just been condemned at Worms as a heretic, and was obliged to conceal himself. But Zwingli lived in a republican country, where he had less to fear from pope or emperor.

In January, 1523, the Great or Legislative Council of Zürich appointed a conference to be held at the town-hall, to which all the ecclesiastics of the canton were invited, for the purpose of hearing the exposition of the new doctrines, and the arguments of their advocates as well as of their opponents. Zwingli published a list of articles to be discussed in the colloquy. As these form the main subject of the separation of the Swiss reformers, or Evangelicals, as they began to style themselves, from the church of Rome, we shall quote the principal among them :—'It is an error,' said Zwingli, 'to assert that the Gospel is nothing without the approbation of the church, and to value other instructions and traditions equally with those contained in the Gospel. The Gospel teaches us that the observances enjoined by men do not avail to salvation. The mass is not a sacrifice, but a commemoration of the sacrifice of Jesus Christ. The power assumed by the pope and the bishops has no foundation in Scripture. God has not forbidden marriage to any class of Christians: therefore it is wrong to interdict it to priests, whose forced celibacy has become the cause of great licentiousness of manners. Confession made to a priest ought to be considered as an examination of the conscience, and not as an act which can deserve absolution. To give absolution for money is simony. Holy Writ says nothing of purgatory: God alone knows the judgment which He reserves for the dead; and as He has not been pleased to reveal it to us, we ought to refrain from indiscreet conjectures on the subject. The jurisdiction exercised by the clergy belongs to the secular magistrates, to whom all Christians ought to submit themselves. No person ought to be molested for his opinions; it is for the magistrates to stop the progress of those which tend to disturb the public tranquillity.'

On the day fixed for the conference, the Council of Two Hundred, presided over by the burgomaster, assembled in the town-hall, whither the ecclesiastics of the canton, Zwingli included, repaired, together with a great number of spectators. The bishop of Constance had sent Faber, his vicar-general, accompanied by several theologians. The burgomaster opened the sitting by explaining the motives which had induced the government to convoke the assembly, for the sake of becoming enlightened by a public discussion on the questions which distracted the church and unsettled the consciences of the people. He then invited those who considered the doctrines of Zwingli and his friends as heretical, to state their arguments against them. Faber however declined entering upon particular points of controversy, but descanted on the necessity of union in the church, and of obedience to the decrees of the Councils, who were inspired by the Holy Spirit; on the evils of heresy, and on the audacity of turbulent men who excited contentions and schisms. 'As to those who appeal to the Scriptures in the three languages,' said he, 'I reply that it is not sufficient to quote the sacred writings, but that it is also necessary to understand them. Now the gift of interpretation is not one which is given to all. I do not boast of possessing it: I am ignorant of Hebrew; I know little of Greek: and, though I am sufficiently versed in Latin, yet I do not pretend to be an able orator. I disclaim the presumption of assuming the office of a judge on questions concerning salvation; these can only be decided by a general council, to whose decisions I shall submit without a murmur: and it would become all present to show a like submission.'

To this Zwingli replied, that if by the church Faber understood the popes and cardinals, the historical records of many of them showed that they could not have been enlightened by the Holy Spirit; that if he meant the councils, as embodying the authority of the church, he was forgetting how many of those assemblies had accused each other of bad faith and heresy. 'Even the fathers of the church,' observed Zwingli, 'cannot be regarded as unerring guides, since they often do not agree among themselves; witness St. Jerome and St. Augustin, who held very different opinions on important points. . . . There certainly is a church that cannot err, and is directed by the Holy Spirit. This church is composed of all the true believers united in the bonds of faith and charity; but it is visible only to the eye of its divine founder, who knoweth his own. It does not assemble with pomp, it does not issue its decrees after the manner of the kings of the earth; it has no temporal reign; it seeks neither honours nor domination: to fulfil the will of God is the only care by which it is occupied.' The conference after this turned upon the invocation of saints and other points in debate, but it was no more than a desultory conversation, as the two parties did not meet on common ground: Zwingli refusing to admit any arguments but those drawn from Scripture; while Faber chose his from the decisions of the councils and the traditions of the church. At last the burgomaster dissolved the meeting, but the council remained assembled; and after some deliberation, it came to a resolution that 'Zwingli, having neither been convicted of heresy nor refuted, should continue to preach the Gospel as before; that the pastors of the town and territory of Zürich should ground their discourses on the words of Scripture alone, and that both parties should avoid all personal reflections and recriminations.' The forms of worship remained unchanged for the present, mass continued to be said, the images remained, but more frequent and more scriptural sermons were preached for the instruction of the people. Some of the more impatient and rash partisans of the new doctrines, having pulled down a large crucifix which stood at one of the gates of Zürich, the culprits were arrested and charged with sacrilege. Zwingli blamed them for committing an act of violent innovation without the authority of the magistrate, but he at the same time maintained that the offence could not be called sacrilege, as images ought not to be objects of religious worship. This gave rise to much debate in the council, which at last convoked a second conference, for the purpose of deciding 'whether the worship of images was authorized by the Gospel, and whether the mass ought to be retained.' This conference was held in October, 1523. About nine hundred persons were present, including most of the clergy of the canton of Zürich. The council had invited the other cantons and allies of the Confederation, as well as the university of Basle, to send their deputies, but Schaffhausen and St. Gall alone answered the call. Zwingli and his friend Leo Judä ex plained and supported their theses, viz. that the worship of images was unscriptural, and that the mass was not a sacrifice. The prior of the Augustines, after much desultory conversation, said that he could not refute Zwingli unless he were allowed to quote the canon law. The conference lasted three days, but was not productive of any new argument against the Reformers, who had full time to explain their doctrines and to produce a deep impression on the greater part of the assembly, after which the council closed the meeting, and adjourned its own decision to the following year.

During the interval the council applied to the bishops of Constance, Basle, and Coire, begging of them explicitly to state their sentiments concerning Zwingli's doctrines. The bishop of Constance alone sent to the council an apology for the use of the mass, which however contained nothing more than the usual reasonings of the Canonists in favour of whatever had been decreed by the church. Zwingli wrote an answer to it by order of the council, condemning the use of images, the invocation of saints, the exhibition of relics in churches, and the ex voto offerings. At the beginning of 1524, the Great Council ordered all the pictures, statues, relics, offerings, and other ornaments to be removed from the churches, allowing those which were the gift of private individuals to be restored to them or their descendants. Thus Zürich was the first canton in Switzerland which openly embraced the Reformation: Bern, Basle, and Schaffhausen, and a part of Glarus and Appenzell, followed some years later. In January, 1525, the mass was finally abolished at Zürich; and on Easter Sunday of that year the Lord's Supper was celebrated according to the simple form suggested by Zwingli, and which is the same as that observed in the Reformed churches of Switzerland and France to this day.

The next thing was to provide for the instruction of the people, and to find funds for that purpose. The chapter of the Great Münster, or Collegiate Church of Zürich, of which Zwingli was a member, was a very wealthy body: it had its own fiefs and jurisdictions, and was independent of the council. Zwingli reasoned with his brother canons on the propriety of allotting a part of their ample revenues for the purpose of education, and on the expediency of doing this of their own accord, without waiting for the lay power to interfere. A majority of the chapter having recognised either the justice or the prudence of concession, a convention was agreed upon between the chapter and the council, by which the former resigned its regalia of feudal jurisdiction and immunities to the state, swearing allegiance to the council as its sovereign, retaining at the same time the administration of its own revenues, of which a part was to be appropriated to defray the salary of spiritual pastors for the town. Those canons who were capable of performing pastoral functions should be employed as such, and those who were old and infirm should retain their benefices; but at their death their places were not to be filled up, and the revenues of their benefices were to be employed in founding professorships for the gratuitous instruction of the people. A small minority of five canons protested against the convention, alleging the authority of the pope; and, not choosing to subject themselves to the lay authority, they quitted Zürich and retired into the Roman Catholic cantons. The abbess of the Frauenmünster and her nuns followed the example of the chapter; and reserving pensions for themselves during life, they gave up to the state all their property and privileges. The surplus revenue was employed to found a seminary for candidates for the clerical profession. The convents of the mendicant orders were afterwards suppressed by order of the council, the aged and infirm members were granted annuities for life and a common habitation in one of the convents, and the others were placed in various trades and professions. The convent of the Dominicans was transformed into an hospital for the sick; that of the Augustines into an asylum for the destitute. In every instance the property of the church was neither swallowed up by the treasury nor embezzled by grasping individuals. It was guaranteed by the state, and made into a distinct fund for the purposes of education, religious instruction, and charity. Vested rights were respected, and a decent regard was observed towards the feelings and prejudices of the old occupants. This mode of secularization of church property, so very different from the system of spoliation and plunder pursued in other countries, then and in our own days, even by states calling themselves Roman Catholic, is one of the bright features of the Swiss reformation, for the other reformed cantons generally acted upon the same principle of honesty which Zwingli proclaimed and enforced at Zürich.

Zwingli was commissioned by the government to organize a system of public instruction adapted to the awakened intelligence of the age. He reformed the public schools, appointed new professors for the classical languages, and founded an academy for theological studies. He appointed Conrad Pellican, a native of Alsace, to one of the chairs of divinity, and Rudolf Collinus, of Luzern, to that of Greek: this was in 1526.

The Anabaptists, a fanatical sect, the wild offshoot of the Reformation, who among other vagaries wished to establish a community of goods and a commonwealth independent of magistrates or government, made their appearance in the canton of Zürich. Zwingli had several conferences with some of their leaders: he tried to convince them of the impropriety and impracticability of their schemes, but all to no purpose: disturbances were excited, the Anabaptists, being warned by the Council, refused to submit; they stirred up the ignorant people to acts of violence, until the government was obliged to resort to measures of severity in order to restore tranquillity.

Zwingli did not attend the conference held at Baden in Aargau, in 1526, in presence of the deputies of all the cantons, in which Eckius, chancellor of the university of Ingolstadt, challenged the theologians of the Reformation. The Council of Zurich would not allow Zwingli to go, as there was a manifest intention of seizing his person and condemning him as a heretic. Œcolampadius, who was less known and less obnoxious to the Romanists, undertook to answer the arguments of Eckius, but the majority of the cantons being Roman Catholic, the diet supported the resolutions of Eckius and Faber, grand-vicar of the bishop of Constance, to the effect that Zwingli and his adherents should be considered as heretics, and as such excommunicated, and it condemned all changes in doctrine or worship, and forbade the sale of heretical books. The cantons of Bern, Zürich, Basle, Schaffhausen, Glarus, and Appenzell protested against this decision; but the Roman Catholic cantons began to act upon it, and arrested and put to death several of the Reformed preachers within their territories.

At the beginning of 1528 Zwingli repaired to a conference held at Bern, by order of the senate of that canton. He was attended by Œcolampadius, Bullinger, Collinus, and Pellican, and by Bucer and Capito, preachers at Strassburg. The conference lasted nineteen days, and as it was laid down as a preliminary principle that no argument would be admitted which was not grounded on a text of Scripture, the Reformed divines obtained a full advantage over their opponents. The consequence was that the important canton of Bern publicly embraced the Reformation.

In September, 1529, Zwingli repaired with Œcolampadius and others to Marburg to hold a conference with Luther and Melanchthon. They agreed upon the principal points of faith, and signed together fourteen articles, containing the essential doctrines of their common belief: they only differed upon the subject of the Eucharist. Luther maintained the doctrine of the real presence, while Zwingli, in his 'Commentary on True and False Religion,' had asserted that 'the outward symbols of the blood and body of Christ undergo no supernatural change in the Eucharist.' The grounds of this controversy between the Lutheran and the other Reformed churches are explained under the heads **Reformation** and **Sacraments**. Zwingli and Luther, after much discussion, parted, still in controversy, but not in anger. Zwingli was averse from dogmatism, and he did not pretend to erect his own ideas into articles of faith. In his 'Exposition of the Christian Faith,' which he addressed shortly before his death to King Francis I., while he admits the necessity of justification by faith for all those to whom the Gospel has been made known, he discards the sentence of sweeping condemnation against those who have not been acquainted with the Scripture, and he expresses his belief that 'all good men who have fulfilled the laws engraven on their consciences, whatever age or country they may have lived in, will partake of eternal felicity.'

In the year 1531, after several angry and hostile remonstrations between the Roman Catholic and the Reformed cantons, war actually broke out. The Reformed cantons, and Zürich in particular, complained of the persecution to which their fellow-believers were subject not only when found within the territory of the Roman Catholic cantons, but also on the neutral ground of Thurgau, Baden, and the other common subject bailiwicks, where the bailli or governor for the time happened to belong to a Catholic state. The Roman Catholics complained of the interference of Zürich with the territories of the Abbot of St. Gall, where the commissioners from Zürich had proclaimed liberty of conscience. The grounds of the dispute were of a mixed nature, resulting from religious and political jealousy. The Catholic cantons broadly refused liberty of conscience to their citizens or subjects, on the plea that it was contrary to the doctrine of their church. Bern and Zürich came to the determination of stopping the supplies of provisions which Luzern and the forest cantons were in the habit of procuring from or through the territories of the other two, forbidding the citizens of the Waldstätten to frequent the markets of Bern and Zürich, and enforcing a kind of blockade which was severely felt by the mountain cantons, which, being chiefly pastoral, depended for their supply of corn, salt, and other necessaries on the markets of their more favoured neighbours. The five cantons of Luzern, Zug, Schwyz, Uri, and Unterwalden declared war against Zürich and Bern, and their troops advances to Cappel, a village on the road from Zug to Zürich, and within the territory of the latter canton. The council of Zürich, which was far from unanimous, was taken by surprise, for it did not expect so sudden an attack. A few hundred militia were posted at Cappel, and a body of about 2000 more were ordered to reinforce them in haste, and Zwingli received orders from the council to accompany and encourage them. On taking leave of his friends, he told them that their cause was good, but was ill-defended; that his life, as well as the lives of many excellent men who wished to restore religion to its primitive simplicity, would be sacrificed: but no matter, said he, 'God will not abandon his servants; he will come to their assistance when you think all is lost.'

On arriving on the field of battle the disproportion of the two hosts became visible. The men of the five cantons, nearly 8000 strong, attacked the Zürichers, by whom they were repulsed at first; but a body of the former passing through a wood, whichhad been left unguarded, turned the position of the Zürichers, and fell upon their rear. Confusion became general among the Zürichers, most of whom were killed and the rest dispersed. Zwingli received a mortal wound and fell, but not senseless. Some Catholic soldiers passing by, without knowing who he was, offered to fetch a confessor, which he refused. They then exhorted him to recommend his soul to the Virgin Mary, to which Zwingli replied by a negative motion of the head. One of the soldiers then ran him through with his sword, saying that he ought to die, being an obstinate heretic. The next day, the body, being recognised, was burnt, and his ashes scattered to the wind, amidst the acclamations of the men of the five cantons. Zwingli was forty-seven years of age when he died. The battle of Cappel was fought on the 11th of October, 1531.

Zwingli was a very remarkable man. Inferior perhaps to Luther in fiery eloquence, and to Calvin in logical acuteness, he was possessed of deeper learning and more consistency and sobriety of thought than the German reformer, and had more candour and charity than he of Geneva. For piety of life, sincerity of purpose, and knowledge of the Scriptures, he is inferior to none of the reformers of the sixteenth century.

His works, written some in Latin and some in German, consist of controversial treatises, expositions of his doctrines, epistles, notes, and commentaries on the book of Genesis, on Isaiah, and Jeremiah, on the Gospels and on the Epistles of Paul, James, and John; treatises on original sin, on Providence, on true and false religion, on the certainty and clearness of the word of God, and others. They were collected and published at Zürich in three vols. 4to., in 1581, with an *Elenchus articulorum*, consisting of sixty-seven articles or conclusions gathered from the works of Zwingli, with explanations. Myconius, J. G. Hess, Usteri, and Vögelin have written biographies of Zwingli; and Hottinger, in his history of the Swiss Reformation, has spoken of him at length. The Life of Zwingli, by Hess, has been translated into English by Lucy Aikin, London, 1812.

ZWINGLIANS, is the name which was given to the disciples of the reformer Zwingli, and consequently to the reformed churches of German Switzerland in general. Owing to their controversy with the Lutherans concerning the real presence in the Eucharist, they were also called 'Sacramentarians.' But the name which they themselves assumed was that of Evangelicals, which after a time displaced the other two. They are also called by the name of the Reformed Churches of Switzerland, as distinct from that of Protestants, which applies more particularly to the German Reformed Churches, in consequence of the 'protest' delivered to the Diet of Spires, in April, 1529. It ought to be observed however that the Lutherans were not alone in signing the protest, as many towns of Germany and the Landgrave of Hesse, whose tenets were like those of the Zwinglians or Sacramentarians, also joined in it; so that the appellation of Protestant is not confined to the Lutheran Church, but applies in an historical sense to the German reformed churches in general. The Swiss had no participation in the protest, which was a political act of the German States. An account of these various denominations is given under the head Reformation.

The Swiss cantons and towns which embraced the reformed doctrines as preached by Zwingli, did not constitute one compact and uniform church; having no bishops or hierarchy, and being politically divided into independent republics, or municipalities, each canton had its synod or assembly of pastors, which regulated all ecclesiastical affairs, in concert with the lay authority. Zwingli had from the beginning inculcated the principle of subjection to the magistrates in matters concerning temporal discipline and jurisdiction. Spiritual matters alone were left entirely to the pastors. We read of the church of Zürich, the church of Basle, the church of Bern, and others; they all called each other sisters, they all lived in communion with one another, they all agreed in the fundamental points of faith, but each drew up its formulary or profession of faith. At last the want of a common bond among them, like the confession of Augsburg for the Lutherans, was felt. The impulse however came from Germany. In 1566 the Emperor Maximilian II. convoked a diet at Augsburg to settle the political disputes among the various states of Germany which arose from the difference of religion. The Lutherans endeavoured to keep out the Sacramentarians, as they styled them, from the general pacification of Germany, and above all, they strove to exclude Frederic III., elector-palatine, who was at the head of that party. Frederic asked the advice of Bullinger, the friend of Zwingli, whom he had succeeded as head pastor at Zürich, and requested him to forward him a confession of faith, which he might lay before the diet. Shortly before this, Bullinger had privately written an abstract of his belief, as a legacy to his friends, during a pestilence which desolated Switzerland, and by which he had been attacked himself, but recovered, after losing his wife and children. He now sent it to the elector, who wrote an answer, to testify his joy at the perusal of Bullinger's confession. All the reformed cantons and towns of Switzerland then said, 'Why not adopt it as our own?' And it was so adopted.

'Every confession of faith,' observes a modern Swiss historian, 'partakes of the character of the age in which it is written, but that of Bullinger may be said to have been better than its age. It was neither the offspring of polemical disputation, nor the cold, calculating work of an assembly of theologians; it was the effusion of a pious mind, animated by a wish for peace. It was the work of a man who, when he wrote it, thought himself on the brink of the grave, and it partook of the solemnity of that last period of existence. There was no mention of anathema in it. On the subject of the Eucharist, it expressed Zwingli's doctrine clearly, but in a less harsh and abrupt manner than that of the preceding formularies. Beza, who had succeeded Calvin as the head of the church of Geneva, hastened to sign Bullinger's Confession. Zürich

Bern, Schaffhausen, Mühlhausen, Bienne, and St. Gall gave in their assent. The Evangelical portion of Appenzell and Glarus were already agreed in their tenets with the church of Zürich. Neuchâtel added its signature to that of its allies. Basle had an old formulary of its own, which did not materially differ from Bullinger's confession, and it was only in the following century that it formally acknowledged the Helvetic confession of faith, as it was now styled. Knox and about forty ministers of the kirk of Scotland sent in their signatures. The churches of the Palatinate, those of Poland and Hungary, signed also the Helvetic Confession. The reformed churches of France, through political and other reasons, drew out a confession of their own, acknowledging however their concord with the Swiss churches.' (Vulliemin, *Histoire de la Confédération Suisse, Continuation de Müller, Gloutz, et Hottinger.*) An abstract of the Helvetic confession of faith is given in the appendix to the 'History of Switzerland' published by the Society for the Diffusion of Useful Knowledge. On the abstruse topic of predestination, it affirms that 'God, out of his wisdom, has predestined or chosen, from all eternity, freely, of his own mere grace, and without regard for persons, the righteous whom he intends to save through Jesus Christ,' but at the same time it condemns any rash judgment concerning the salvation of any one individual or class; and it says that we must hope favourably of every one. 'If we hold communion with Christ, and that by means of a true faith, he be ours and we his, we then have a tolerably certain proof that our names are written in the book of life.'

The appellation of Calvinists has occasioned some confusion with regard to the Reformed churches. Calvin, who began his career as a Reformer several years after Zwingli's death, and when the Reformation in Switzerland had been already effected, was, properly speaking, the head and the great teacher of the church of Geneva. His doctrines, which may hardly be said to differ in any point from those of the Helvetic church, except perhaps in a stronger expression of the dogma of predestination, exercised an influence over the Reformed churches of France. But Calvin has had no influence over Switzerland, where the Reformation was established long before his time; and it is only by a sort of anachronism that the Reformed churches of Switzerland have been called Calvinistical. [Calvin and Calvinism.]

ZWOLL. [Overyssel.]

ZYGÆNIDÆ, a tribe of insects belonging to the order *Lepidoptera*, placed by Linnæus with the *Sphinges* on account of the resemblance of their antennæ to those of that family. Latreille divided them into two groups, according to the forms of the antennæ, which in the one are simple or scarcely pectinated, but are entirely so in the other, at least in the males. *Sesia* and *Zygæna* are examples of the latter; *Procris* and *Aglaope*, of the latter.

The genus *Zygæna* includes some very beautiful insects, which, while they resemble moths in general aspect, fly during the day and in full sunshine. When at rest they reflex their wings. Their caterpillars have six feet, are pilose, and are not furnished with the corneous tubercle which those of the *Sphinges* bear on the last ring of the body. Unlike the last-named insects, they do not bury in the ground to undergo their metamorphosis, but spin a spindle-shaped cocoon of silky texture, which they attach to the stems and branches of grasses.

Zygæna filipendula, a greenish black insect with six crimson spots on its upper wings, and red under-wings bordered with black, is a common British species.

ZYGNE'MA (from *ζύγον*, a yoke, and *νῆμα*, a thread), a genus of plants belonging to the confervoid group of the natural order Algæ. This genus is characterized in Hooker's 'British Flora' by the following structure:—the filaments simple, finally united by transverse tubes; the endochsome forming dotted spiral rings, which, after conjugation, are condensed into a globule in one of the filaments. Four species of this genus are described as British by Mr. Harvey, in the fifth volume of Smith's 'English Flora.' These are as follow:—

Z. nitidum, with dark green filaments, parallely joined, and the articulations with numerous arching spines. This is a very common species, and is found abundantly in our fresh-water ditches. 'After conjugation,' Mr. Harvey observes, 'the filaments become crisped, fragile, and lose much of their lubricity; the spires are soon after decayed, and the contents of one articulation discharged through its tube into the opposite one, where they form a dark-coloured globule. The other species undergo similar changes.'

Z. deciminum, with dark green filaments parallely joined, in aparallel way, the spires doubly cruciate. This is also an extremely common species. Its joints are very variable in length. The granules, arranged in a spiral form, cross each other, so as to give them the appearance of the continued multiplication of the Roman numeral X, whence the specific name.

Z. quinium has pale yellow-green filaments, which are parallely joined with simple spires. This is also a common species. The spiral lines in this species resemble the multiplication of the Roman numeral V.

Z. curvatum has green unbranched filaments, very slender, and here and there slightly bent, and combined by their angles; the joints are cylindrical, and are four times as long as broad: the colouring matter is arranged in a triple irregular series of dots. This species is not so common as the others. When young it is of a dull pale green colour, and only three imperfectly spiral lines of globules are distinguishable. These lines become afterwards more conspicuous, the rest of the filaments being nearly colourless, and their component granules larger. The threads or filaments unite here and there, but not at every joint, and the processes which connect the filaments together are not situate in the middle between the two joints. In some of the combined joints the contents appear unchanged, and in others they form a mass of larger granules than in the lines, and some have a large oval seed, which often swells the joints.

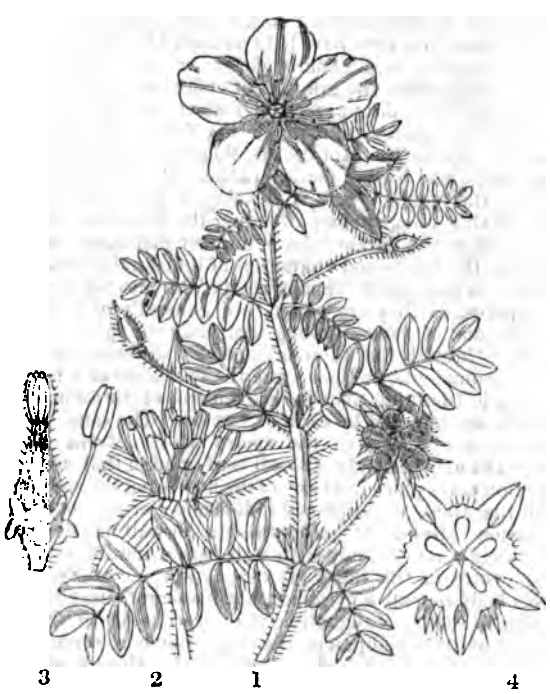
The structure and functions, as well as the species, of this genus and allied genera have been lately studied with great attention by Mr. A. H. Hassall, and formed the subject of several communications to the 'Annals of Natural History.' It has been generally stated by botanists that the species of the genus Zygnema, with those of Tyndaridea and Mongeotia, require for their reproduction that the filaments of which they are composed should unite together. This union is effected by the contact of the filaments, and at the point of contact a connecting tube is formed, which, having communication with the inside of the filament, an interchange of the contents of the two filaments was supposed to take place, and in this manner the fertilization of the spores to be effected. There is no doubt that this union does take place in the greater number of Zygnemæ, but Mr. Hassall has stated that he has found three new species of Zygnema which do not thus conjugate. These species may however have to be removed to another genus, as conjugation is a generic character of the Zygnemæ. After conjugation the granules of endochsome, which form the spiral lines, disappear, and collect into masses, which become the spores from which the future plant is reproduced. When the plant decays, these spores float about in the water, and having found a radius on which to fix themselves, the young plant is developed from them. One remarkable phenomenon attending the liberation of these spores from the parent tube is the fact that many of them assume the habits and characters of infusorial animalcules. When viewed under the microscope, the moving spores, or zoospores, as they are called, are generally of a greener colour, and of a more oblong form than the spores. Their motion through the water is somewhat different from that of an animalcule, and has more the character of a helpless rolling or tumbling than the movements of the animalcules which are effected by distinct organs. The same phenomenon is observed in the spores of *Vaucheria clavata* [Vaucheria], and Mr. Hassall is of opinion that no reproduction takes place from any of the bodies but the zoospores, and that these are produced independent of the act of conjugation. Besides these organs, Mr. Hassall has described minutely a round body with a stellate structure, seated in the centre of the tubes of various species of Zygnema. This body he calls a cytoblast, but it seems to have no other claim to such a designation than its having in the later stages of its development the appearance of some of the larger cytoblasts of higher plants. Mr. Hassall also describes a vascular structure existing between the granular masses which form the spiral lines on the inside of the filaments of the Zygnemæ. This structure however is not at all evident to other observers, and, as well as the deductions made with regard to its function, requires further investigation.

In the 10th volume of the Annals of 'Natural History' Mr. Hassall has described seventeen additional species of Zygnema, besides the three which produce their spores without conjugation. These have been chiefly found in ponds and ditches in Hertfordshire and Essex.

(Hooker's *British Flora*, vol. ii.; Hassall's papers in the 10th and 12th volumes of the *Annals of Natural History*.)

ZYGODA'CTYLI, the term used by M. Temminck, M. Vieillot, and others to designate those perching birds which have their feet composed of two anterior and two posterior toes, the external toe of the two last mentioned being capable of a direction either forward or backward. The Parrots, Woodpeckers, Toucans, Cuckoos, &c. belong to this group, which forms the first tribe of the second order (*Sylvicolæ*) of M. Vieillot, and the fifth order of M. Temminck.

ZYGOPHYLLA'CEÆ, a natural order of plants belonging to Lindley's Gynobasic group of polypetalous Exogens. Seventeen genera are referred to this order, and the number of species is not great. They are herbs, shrubs, and trees, having a very hard wood, and the branches often articulated at the joints. The leaves are opposite, and are furnished with stipules, are seldom single, mostly unequally pinnated, and without dots. The flowers are hermaphrodite, regular; the calyx is divided into 4 or 5 pieces, with a convolute æstivation; the petals are unguiculate, alternate with the segments of the calyx, and a little longer; during æstivation they are very short and scale-like; the stamens are double the number of the petals and dilated at the base, sometimes naked, sometimes placed on the back of a small scale and hypogynous; the ovary is simple, surrounded at the base with glands or a short spinous disk, more or less deeply furrowed with 4 or 5 cells; the ovules in each cell 2 or more, attached to the minor angle, pendulous or occasionally erect; the style is simple, usually with 4 or 5 furrows; the stigma is simple or with 4 or 6 lobes; the fruit is capsular, sometimes fleshy, 4 or 5 angles or wings bursting by 4 or 5 valves bearing the dissepiments in the middle or into as many close cells, and the saccocarp not separable from the endocarp; the seeds are not so many in number as the ovules, and are either compressed and scabrous when dry, or ovate and smooth with a thin herbaceous integument; the embryo is green with a superior radicle, foliaceous cotyledon, and a whitish albumen of a horny and cartilaginous texture.



Tribulus cistoides.

1, Cutting, with leaves and flowers; 2, Flower separated; 3, Pistil deprived of calyx and corolla, showing the disk and glands; 4, Section of fruit.

This order is nearly related to Oxalidaceæ and I
from the former however it is distinguished by a
of characters, and from the latter it is distinguisl
leaves being furnished with stipules, and bein
dots. Lindley observes, 'With Limacerbaceæ th
in the stamens springing from the back of an hy
scale, a structure well worth more attentive cons
than it has yet received: something analogous to
found in Silenaceæ.'

The great bulk of the species of this family
distributed throughout the temperate regions of t
they are not, however, wanting in the tropics. T
number are found in America, but the order h
sentatives in all the quarters of the Old Worl
New Holland. Many of the species are known a
timber, medicinal secretions, and ornamenta
The following are the characters of the most
genera:—

1. Leaves opposite.

Tribulus (from τρίβολος): carpels 5, 1-celled,
indehiscent, beset with prickles on the outsi
absent; 5 sepals, 5 petals, and 10 stamens.

Ehrenbergia (named after C. P. Ehrenberg, a
German naturalist): capsules 10, 1-seeded, in
crested.

Fagonia (in honour of Mr. Fagon, physician
XIV., and a patron of Adanson): the capsule
5-angled, 5-celled; the cells 2-valved, 1-see
stigma single; the sepals 5; the petals 5;
stamens 10.

Röpera (named after J. Röper, a German botan
of a monograph on the genus Euphorbium :
angled, the angles winged, usually with 4
which are suppressed from abortion; 4 sepals:
8 stamens; style with 4 furrows and a single see

Zygophyllum (from ζύγον and φύλλον): capsul
pentagonal, 5-celled, 5-valved, and many-se
style single, and the filaments with an appenda
base inside; sepals 5; petals 5; stamens 10.

Guaiacina, from *Guaiac* (a native name): ca
stipitate, 5-angled, 5-celled, sometimes 2 or 3 ce
abortion; 10 stamens; 5 petals; 5 sepals; style
seeds solitary in the cell.

2. Leaves alternate.

Biebersteinia (in honour of F. M. Bieberstein, a
botanist, author of 'Flora Tauro-Caucasia'): e
coronate at the base, 1-seeded; petals 5; sepa
mens 10; styles 5, joined.

Melianthus (from μέλι and ἄνθος, honey-flower
4-lobed, with 4 cells, which are 1-seeded from
calyx 5-cleft, unequal, the lower segment
petals 5; stamens 4, of which two are conna
single, crowned by a 4-cleft stigma.

The species of the genus *Tribulus* are diffus
herbs with abruptly pinnate leaves and membr
pules, with yellow or white flowers seated on
solitary pedicles. This genus, with some others
to this natural order, was included by Jussieu in
Rutaceæ.

T. cistoides, Cistus-like Caltrops, has leaves wit
of equal leaflets, which are silky beneath, with
the length of the petioles. This plant is a native
America and the West Indian Islands. It has lar
flowers, resembling those of the rock-rose, which
a pleasant fragrance. It is abundant about Ki
Jamaica, where it is called turkey-flower, and is
in the gardens on account of the beauty of it
Fowls are said to be fond of this plant, and it is
to fatten them, as well as to heighten their flavou

T. terrestris, Common Caltrops, has leaves wit
six pairs of equal leaflets; the pedicles sho
the petioles; the carpels four-horned. This plant
of the South of Europe, of Senegal, and of th
tius, in barren sandy places. In the South o. Eu
so abundant in the arable land of some parts,
troublesome to the cattle on account of the prick
running into their feet. The French give to this
name of *La Croix de Chevalier*. The other speci
genus are found in Egypt, North America, Afri a.
East Indies. All of them form pretty plants for
tion. With the exception of *T. cistoides* and
the species are annual. The seeds of the annual

should be sown in a hotbed in spring, and the plants may be placed out on the open border in a warm sheltered situation, about the middle of May. The perennial species may be propagated either by cuttings or seeds, and will grow very well in a mixture of loam and peat.

The genus *Ehrenbergia* has only a single species, the *E. tribuloides*, which is an annual, bearing coppery, vermilion-coloured flowers. It is a trailing plant, and may be cultivated in the same manner as the annual species of Tribulus.

The species of the genus *Fagonia* are herbs or under-shrubs, with single or ternate leaves, and purple or yellow flowers. They are natives of Spain, Egypt, the East Indies, Persia, and the North of Africa. Most of them are trailing plants. In cultivation they can only be propagated by seeds, which may be sown in pots in the autumn in some rich light soil, and then placed in a frame for the winter. In the following spring they may be placed in pots for the greenhouse, or in the open border. The shrubby species do not usually live more than three or four years.

There are two species of *Röpera*, both of them natives of New Holland. They are decumbent shrubs with small yellow flowers. They will grow in a soil composed of loam, peat, and sand, and cuttings will root freely when planted in sand under a hand-glass.

Zygophyllina, the Bean-Caper, is the most extensive genus of the order, comprising about twenty-seven species. They are either herbs or shrubs, with membranous twin stipules, simple binate or primate leaves, with red, white, or yellow flowers with a dark base.

Z. simplex has simple sessile, cylindrical leaves. It is a native of Egypt and Arabia, and frequently met with in the deserts of those countries. It has yellow flowers, and is called in Arabia *Garmal:* it is esteemed a good remedy in diseases of the eyes, and the bruised leaves mixed with water are used for this purpose.

Z. Fabago, Common Bean-Caper, has stalked leaves, obovate leaflets, erect pedicles, a smooth calyx, and undivided petals. It is a native of Syria and other parts. It has yellow petals of a copper brick-colour at their base. This plant is a common herbaceous perennial in our gardens, and was cultivated in Great Britain by Gerarde as early as 1596. This plant is supposed by some writers to be the *Telephium* of Dioscorides.

Z. fœtidum, Fetid Bean-Caper, has stalked leaves, obovate leaflets, nodding flowers, a downy calyx, and cut reflexed petals. It is a native of the Cape of Good Hope, and has orange-yellow petals with a purple spot at the base. The plant gives out a strong fox-like scent, which renders the house in which it is grown very offensive, and on this account it is seldom grown. It was introduced by Mr. Marson in 1790.

Z. coccineum, Scarlet-flowered Bean-Caper, has stalked leaves; cylindrical, fleshy, smooth leaflets; erect pedicles; acuminated petals, and cylindrical capsules. This plant is a native of the deserts of Egypt and other parts of North America. Although abundant, all kinds of cattle and even camels refuse to touch it.

In the cultivation of these plants, the perennial species may be propagated by cuttings, which will root freely in a pot of sand under a hand-glass. When the plants are grown, they will thrive in a soil composed of loam and peat and sand. The annual species may be propagated by seeds sown in pots of the same kind of soil, and placed in a hotbed. The common Bean-Caper is the only species that will grow in the open air. It should be planted in a dry situation in a light soil. It can however be only propagated by seeds, which are only occasionally ripened in this country. The seeds should be sown in a pot and placed in a frame, and when the plants are four inches high they should be planted out in an open border.

There are six species of the genus of *Guaiacum*, five of which are trees. They are remarkable for the hardness of their wood, and have usually blue flowers.

G. officinale, Lignum-vitæ, or Guaiacum, has leaves with two pairs of obovate or oval blunt leaflets; twin peduncles, and 2-celled fruit. This plant attains a height of about 30 feet, and is a native of Jamaica and St. Domingo. The wood is exceedingly hard, and is known in England under the names of Brazil-wood and Lignum-vitæ. It is much used in medicine. [GUAIACUM OFFICINALE.]

G. sanctum, Holy Lignum-vitæ, has leaves with five or seven pairs of oval, blunt, mucronate leaflets; the petals and branches somewhat pubescent; the pedicles twin; the petals fringed; the capsule 5-celled. It is a native of South America, and is abundant in St. Domingo, New Mexico, and Brazil. This tree attains a height of about 20 feet, and, according to Hernandez, has blue wood. It is called in some of the West India Islands Bastard Lignum-vitæ. It has also been used in medicine, in the same diseases as the *G. officinale*, but more especially for syphilitic disease.

G. arboreum has leaves with from seven to fourteen pairs of oval, oblong, blunt leaflets, which are unequal at the base, and are usually alternate; and the petioles and branchlets somewhat pubescent. It is a native of Carthagena, Guadaloupe, and Cumana. It was first described by Jacquin under the name of Zygophyllum arboreum. This tree is called by the natives of Cumana *Guay-a-cun*, which is in fact the name of all hard woods among them. This tree is one of the largest and handsomest of the order, attaining the height of 40 feet, and terminating in a beautiful head of branches.

In cultivating the species of Guaiacum, the ripened cuttings, if taken off at a joint, will root, and may be planted in a pot of sand under a hand-glass, which should be exposed to the influence of heat. Every part of these plants is brittle, and care should be taken in transplanting them that the fibres are not broken.

The species of *Biebersteinia* are perennial herbs, beset with glandular hairs and having unequally pinnated leaves. There are two species: the one sweet-scented, a native of the Altai Mountains; the other a native of various districts of Persia.

The species of *Melianthus*, Honey-flower, are shrubs with unequally pinnate leaves, having a strong odour when bruised, and racemes of brown or yellow flowers.

M. major, Great Honey-flower, has glaucous leaves, smooth on both surfaces, with large stipules joined to the petiole. Like the two remaining species, *M. minor* and *M. comosus*, this is a native of the Cape of Good Hope. All three species are shrubs, and attain a height of from four to six feet. They will thrive well in any light soil, and may be propagated by cuttings, or by suckers, which they throw out abundantly from the root. *M. major* may be grown in the open air against the wall, but it requires a mat in the winter.

(Don's Miller; Loudon, *Cyclopædia of Plants;* Lindley, *Natural System;* Sir J. E. Smith, in Rees's *Cyclopædia.*)

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